

## Part II. List of Other Arthropod Pheromones and Allomones

Update: May 4, 2024

### (C) Other Compounds

These semiochemicals are divided into the following four groups and listed in ascending order of carbon chain length or ring size.

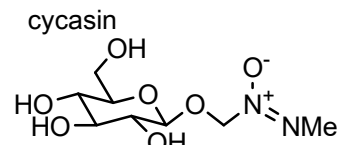
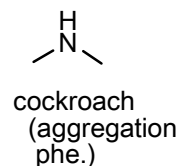
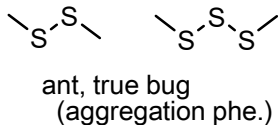
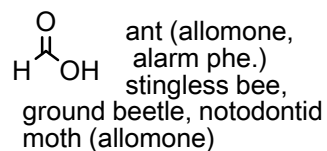
[ C-1 ]	Other: Acyclic compounds	i – xxii	(487 compounds)
[ C-2 ]	Other: True alkaloids	i – xii	(217 compounds)
[ C-3 ]	Other: Aromatic compounds	i – vii	(151 compounds)
[ C-4 ]	Other: Ring compounds	i – v	(99 compounds)

See the database, <https://lepipheromone.sakura.ne.jp/mepdb.html>, for more information, such as the IUPAC names, arthropod species names, and research publications

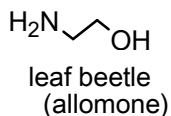
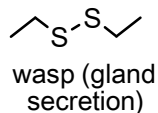
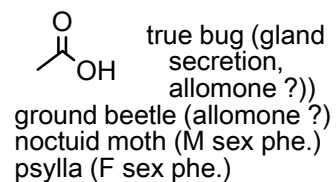
Lepidopteran female sex pheromones and male attractants are listed in **Part I**. Other arthropod pheromones and allomones are listed in **Part II**, which is composed of **(A)** terpenoid compounds, **(B)** non-terpene methyl-branched compounds, and **(C)** other compounds.

# [ C-1 ] Other: Acyclic comp. (i)

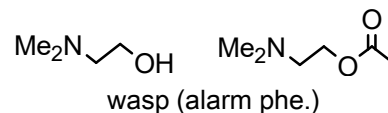
## C1 chain



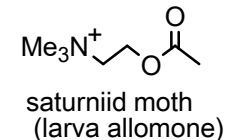
## C2 chain



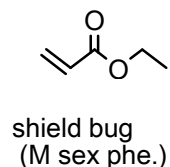
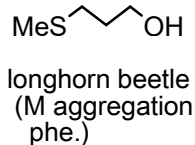
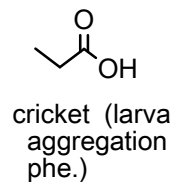
## deanol



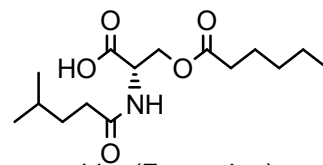
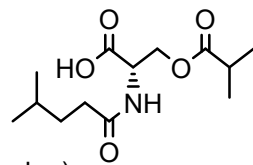
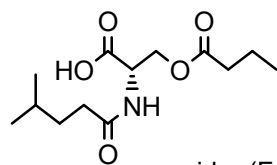
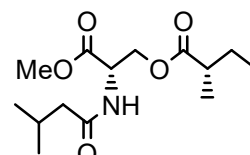
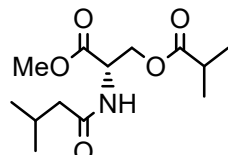
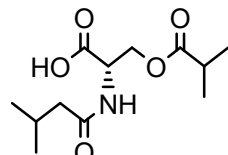
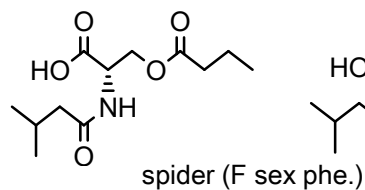
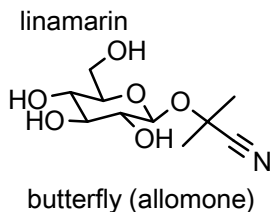
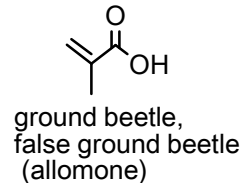
## acetylcholine



## C3 chain

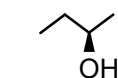


## methacrylic acid



# [ C-1 ] Other: Acyclic comp. (ii)

## C4 chain

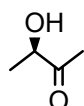


scarab beetle  
(F sex phe.,  
M aggregation phe.)  
butterfly (larva allomone)

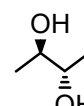
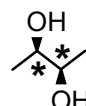


scarab beetle  
(M aggregation  
phe.)

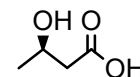
### acetoin



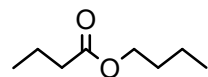
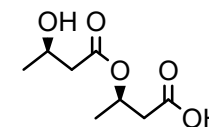
scarab beetle (F sex phe.)  
cockroach (M sex phe.)  
butterfly (M sex phe. ?)



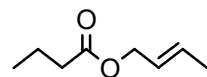
scarab beetle  
(F gland secretion)



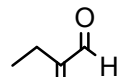
spider (F sex phe.)



leaf bug (F sex phe.,  
gland secretion)  
termite (primer phe.)

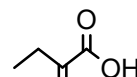


leaf bug (F. sex phe.)

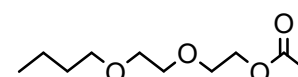


cockroach  
(allomone)

### ethacrylic acid

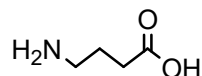


false ground beetle  
(allomone ?)



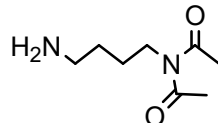
true bug (aggregation phe.)

### GABA

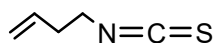


saturniid moth,  
tussock moth  
(larva allomone)

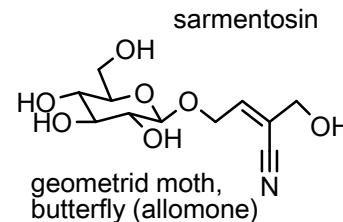
### diacetyl putrescine



leaf beetle (allomone ?)

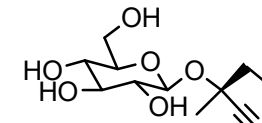


aphid (alarm phe)



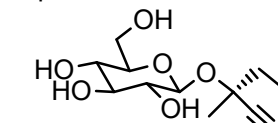
geometrid moth,  
butterfly (allomone)

### lotaustralin

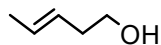


butterfly (allomone)

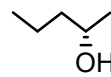
### epilotaustralin



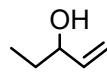
## C5 chain



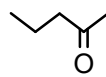
bark beetle  
(F aggregation  
phe. ?)



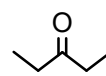
wasp  
(alarm phe.)  
assassin bug  
(sex phe. ?)



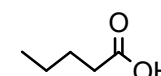
butterfly (larva  
allomone)



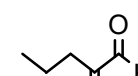
ground beetle,  
darkling beetle  
(allomone ?)



scarab beetle (M  
aggregation phe.)  
assassin bug (alarm phe.)  
butterfly (larva allomone)

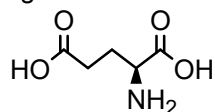


grasshopper  
(F. sex phe.)

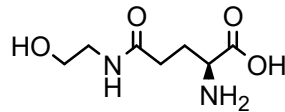


cockroach  
(allomone)

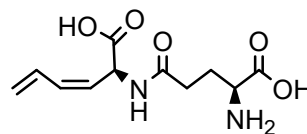
### glutamic acid



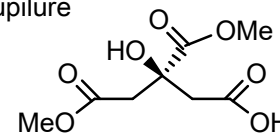
fruit fly (marking phe.)



leaf beetle (allomone)

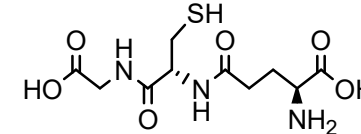


### cupilure



spider (F sex phe.)

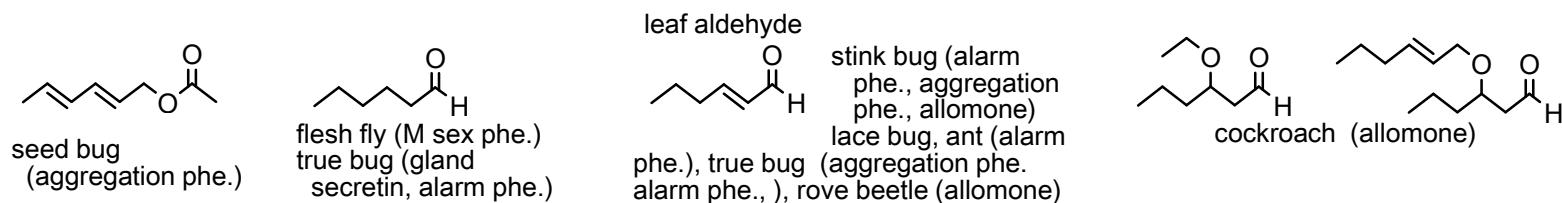
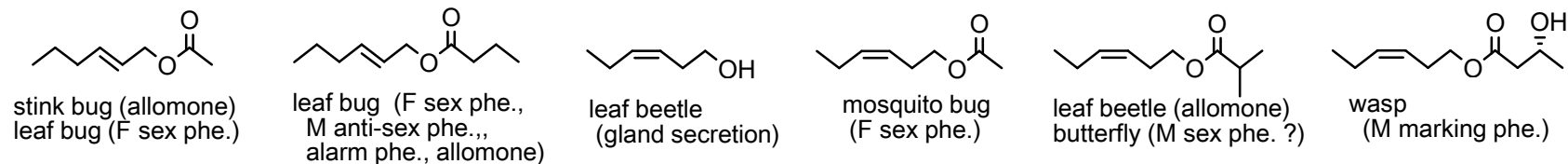
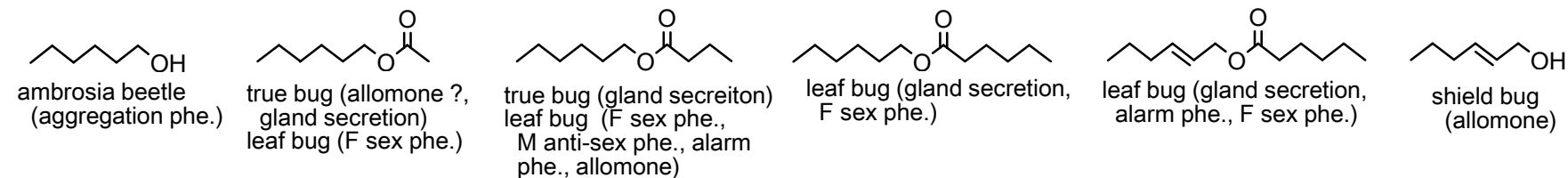
### glutathione



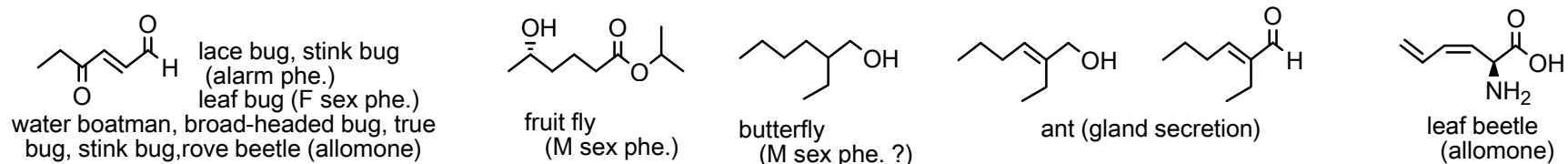
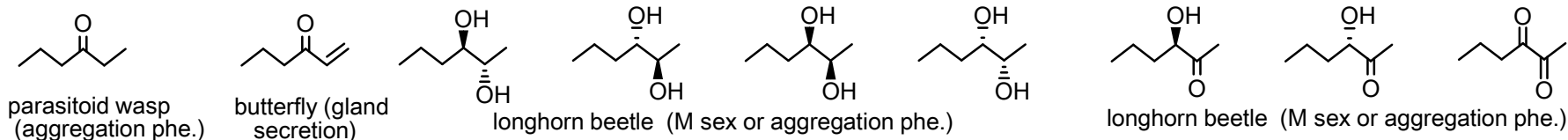
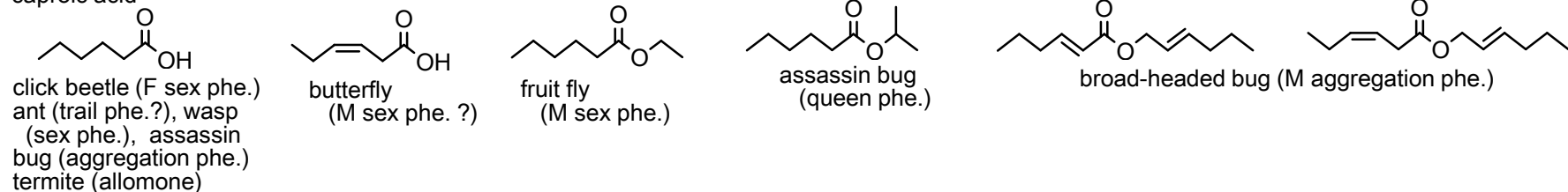
fruit fly (marking phe.)

# [ C-1 ] Other: Acyclic comp. (iii)

C6 chain

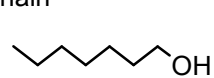


caproic acid

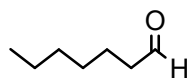


# [ C-1 ] Other: Acyclic comp. (iv)

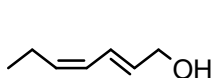
C7 chain



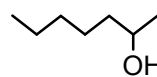
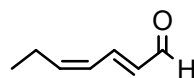
bark beetle (F aggregation phe.)  
fruit fly (M sex phe.)



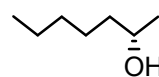
assassin bug (M sex phe.)



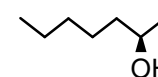
leaf beetle (aggregation phe.)



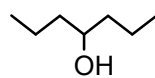
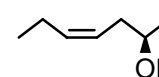
bee (alarm phe.)



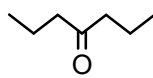
caddis fly (F sex phe.)



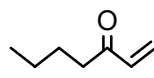
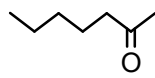
eriocraniid moth (F sex phe.)



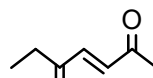
ant (gland secretion)



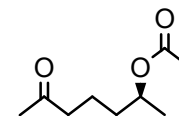
honey bee, ant, ground beetle (alarm phe.)  
caddis fly (F sex phe.)



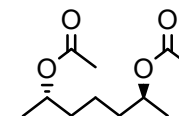
harvestman (allomone ?)



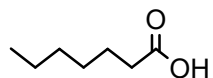
stingless bee (allomone)



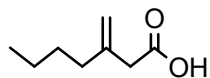
gall midge (F sex phe.)



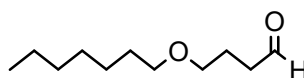
enanthic acid



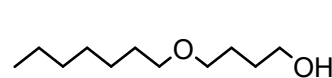
ant (trail phe. ?)



seed beetle (F sex phe.)

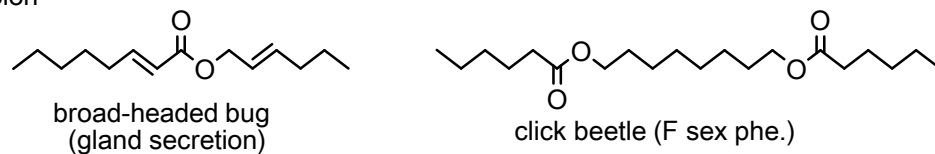
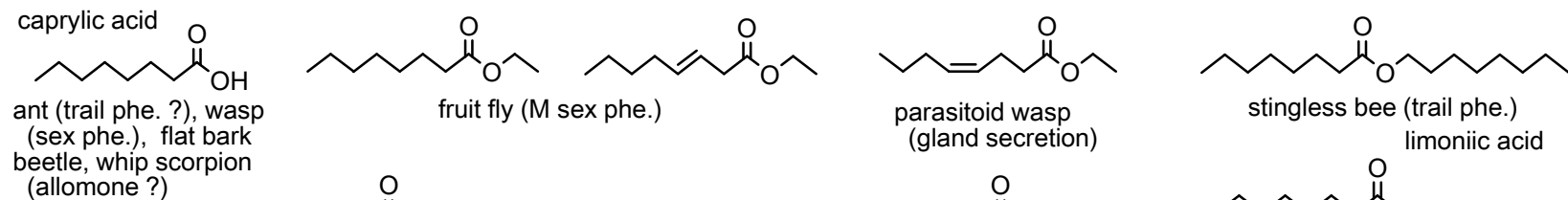
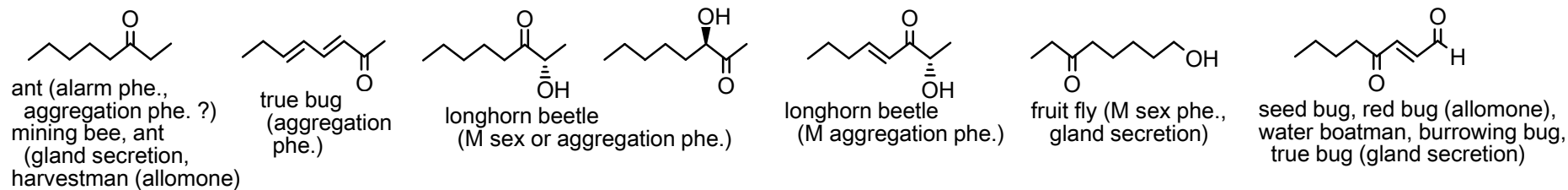
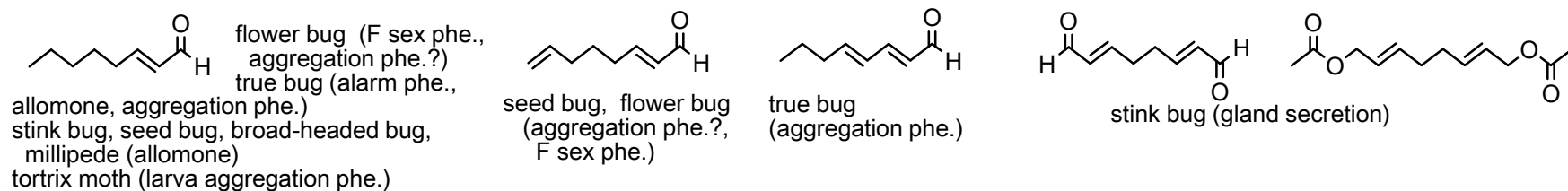
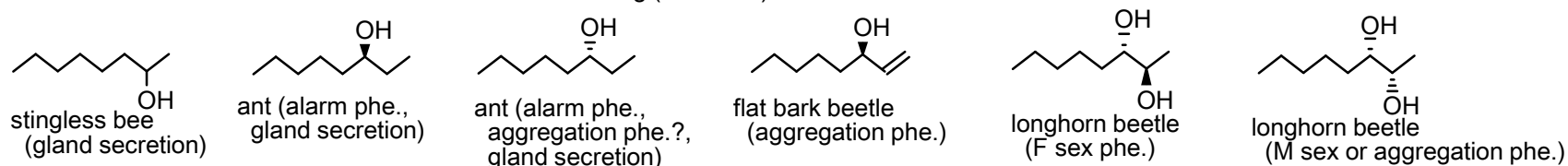
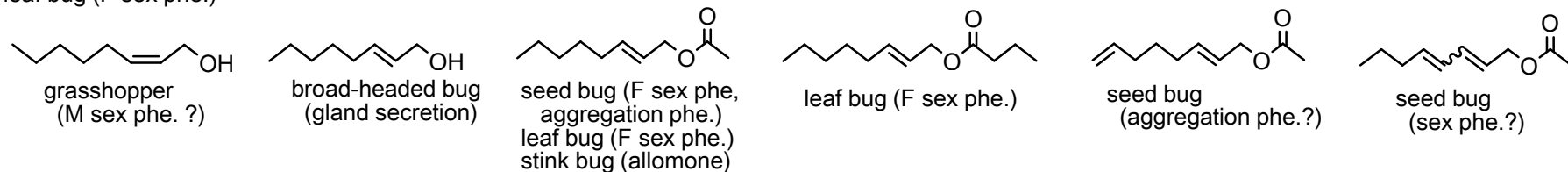
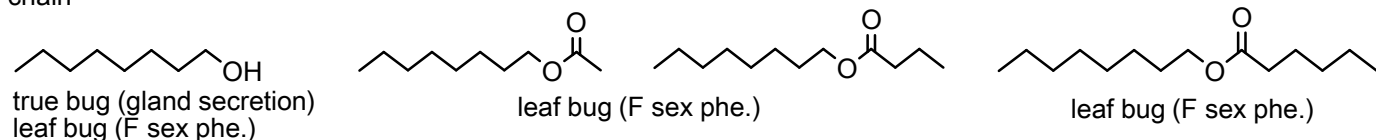


longhorn beetle (M aggregation phe.)



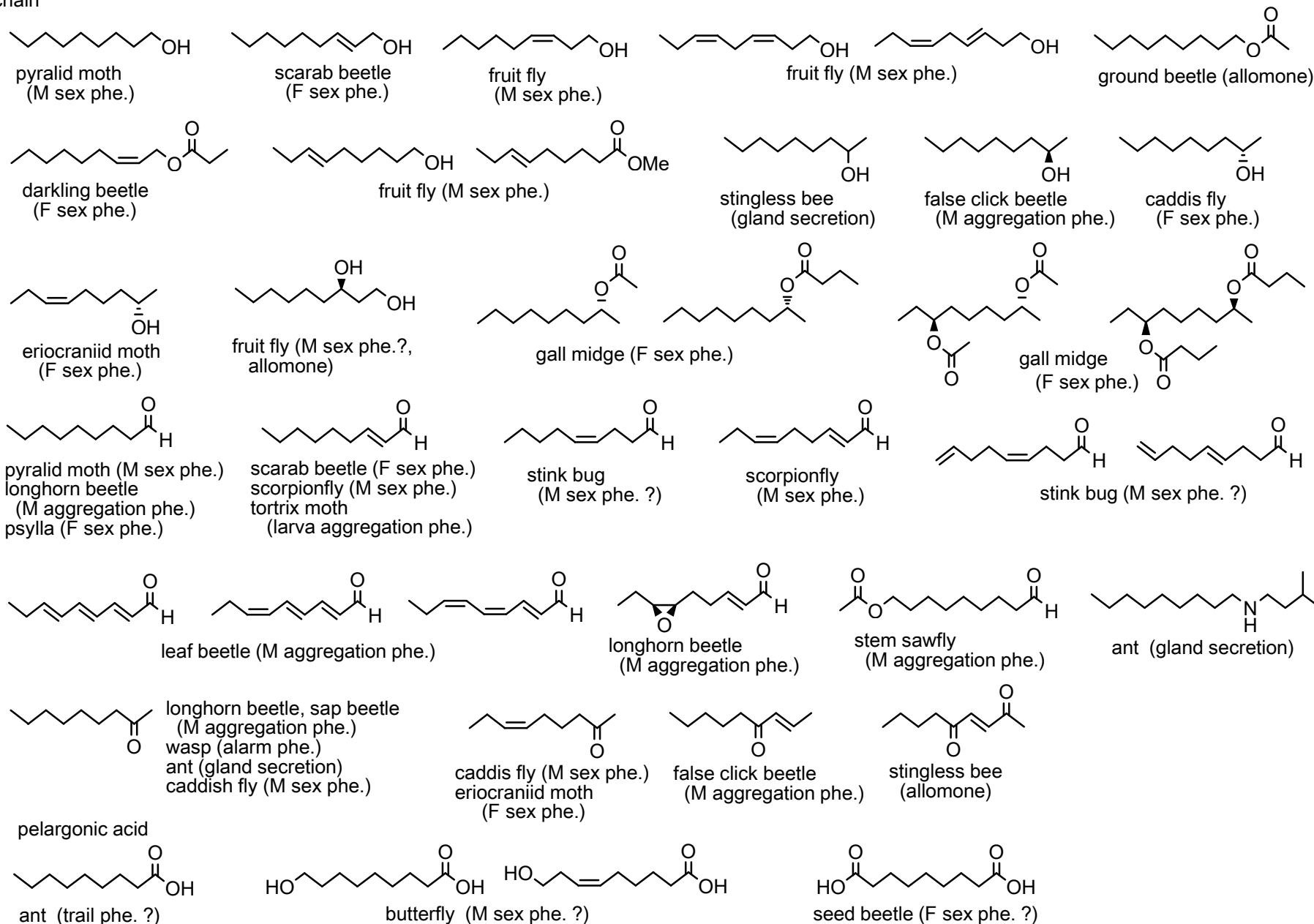
# [ C-1 ] Other: Acyclic comp. (v)

C8 chain



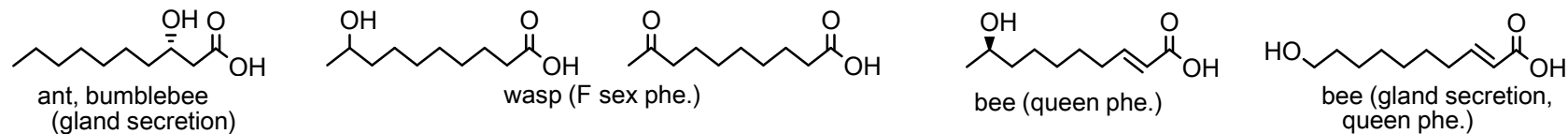
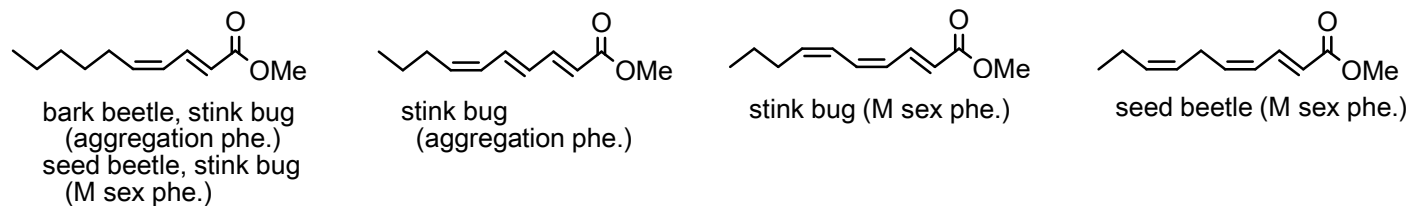
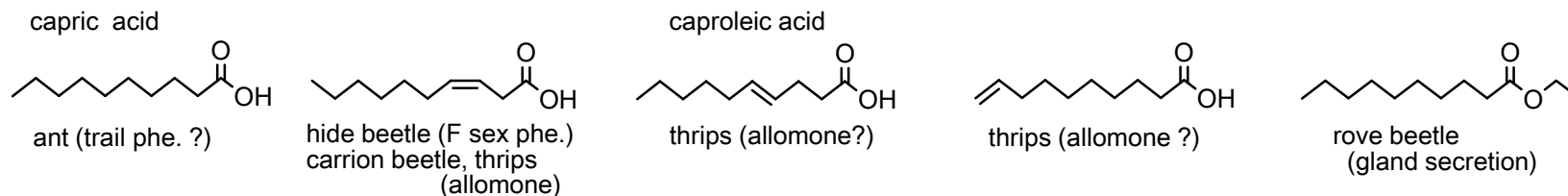
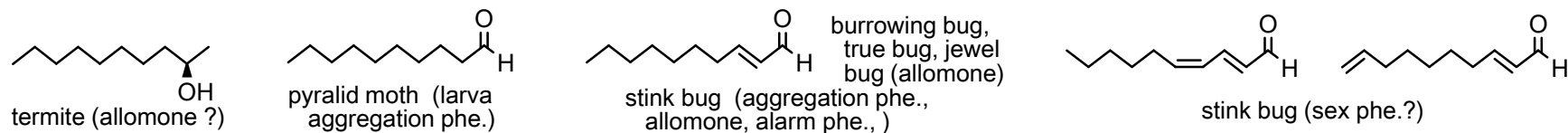
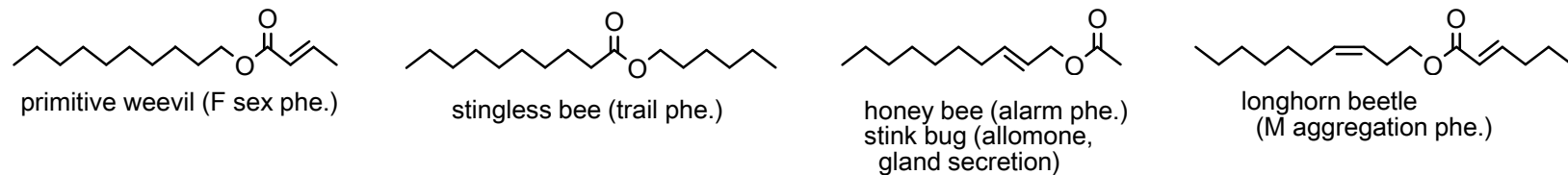
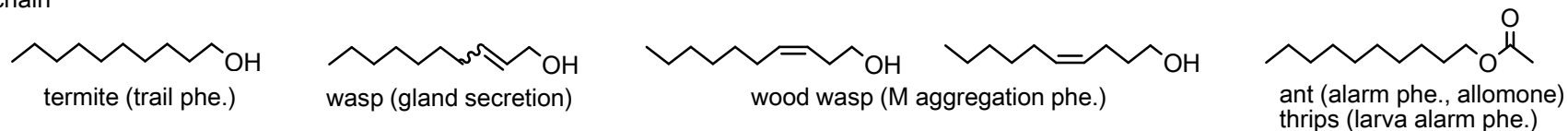
# [ C-1 ] Other: Acyclic comp. (vi)

C9 chain



# [ C-1 ] Other: Acyclic comp. (vii)

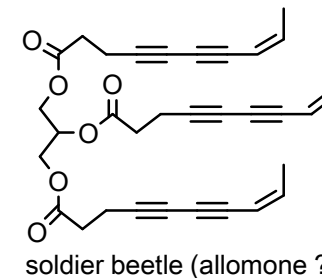
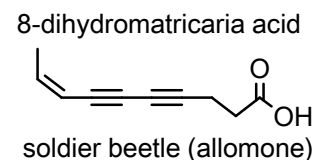
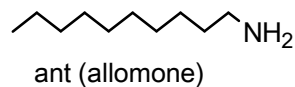
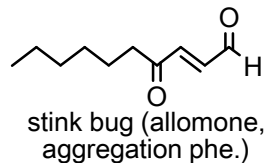
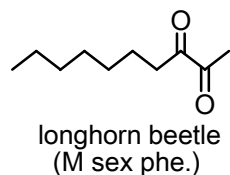
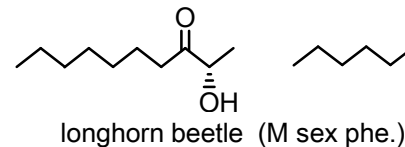
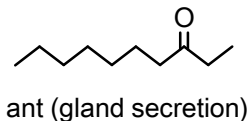
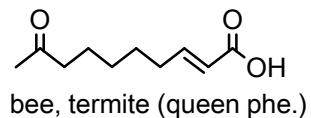
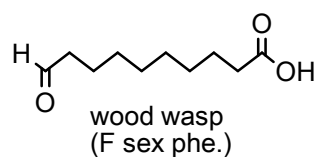
C10 chain



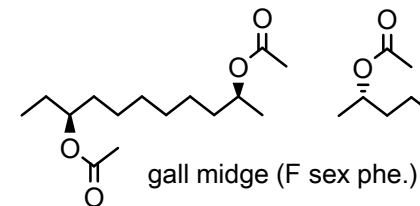
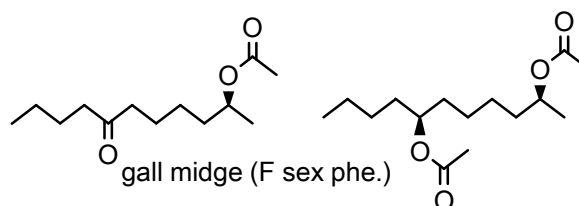
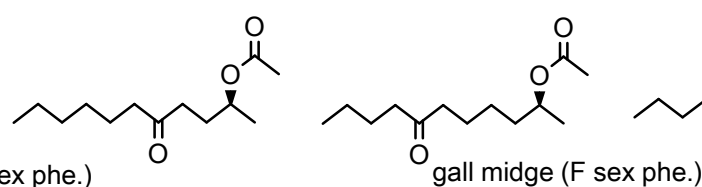
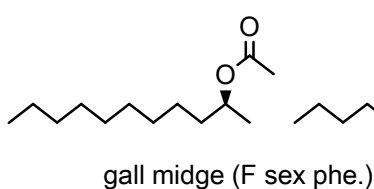
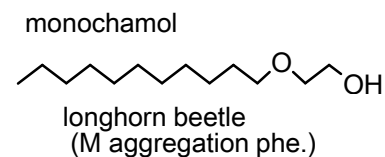
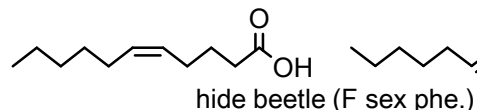
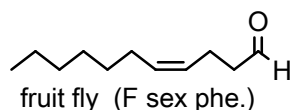
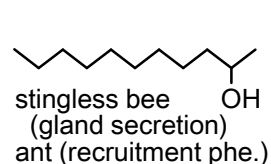
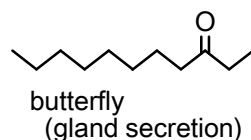
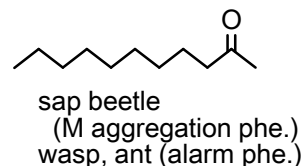
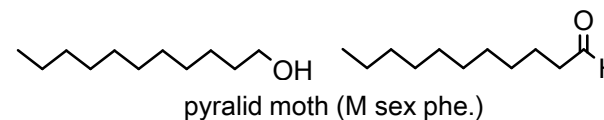
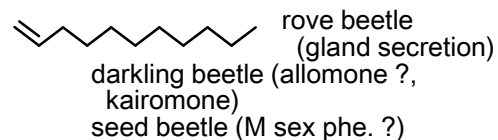
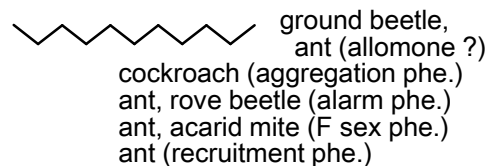


# [ C-1 ] Other: Acyclic comp. (viii)

## C10 chain

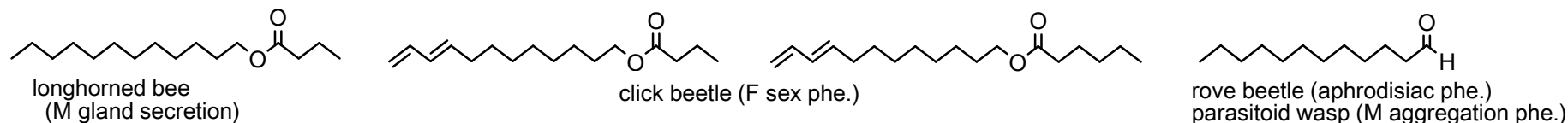
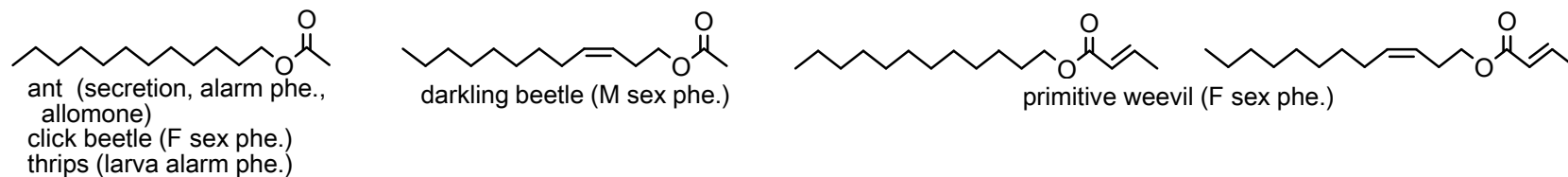
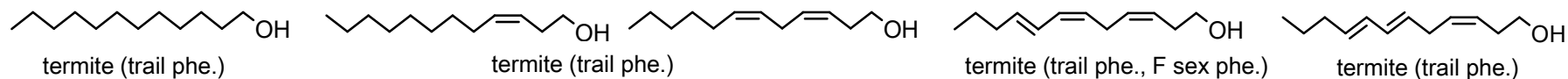


## C11 chain

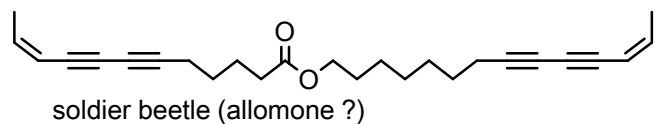
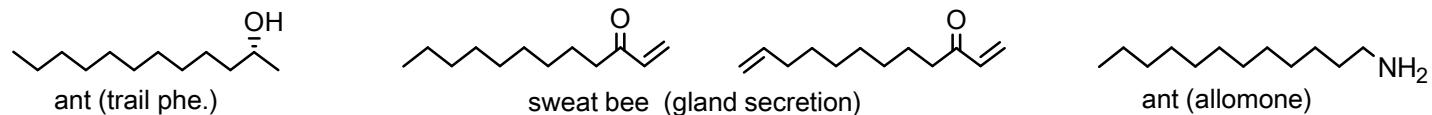
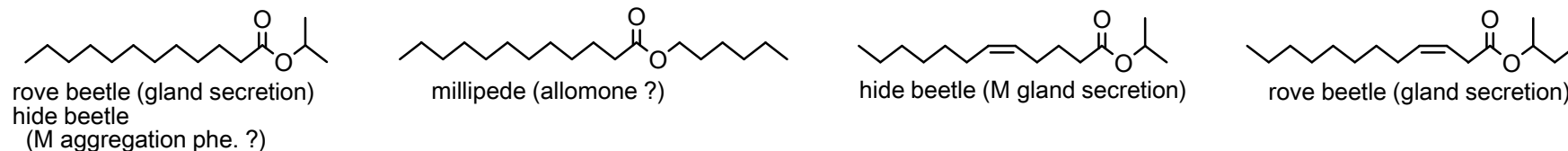
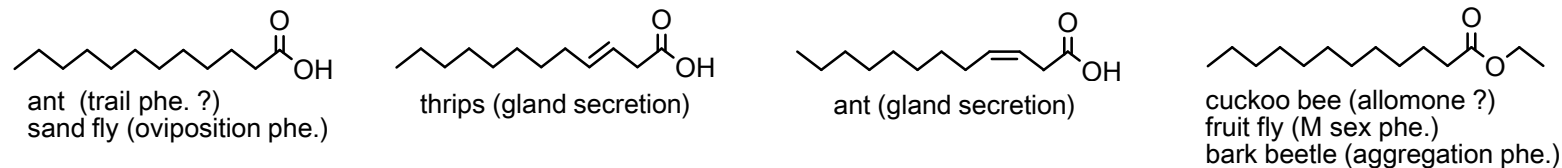


# [ C-1 ] Other: Acyclic comp. (ix)

C12 chain



lauric acid

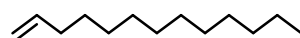


# [ C-1 ] Other: Acyclic comp. (x)

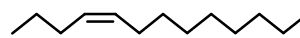
## C13 chain



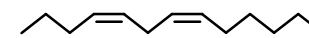
ant (gland secretion,  
F sex phe., alarm phe.  
allomone)  
burrowing bug, jewel bug,  
stink bug (gland secretion)  
true bug, red bug (allomone)



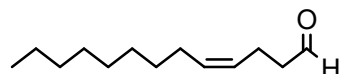
darkling beetle (M sex phe.)  
stink bug (allomone ?)



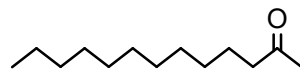
ant (F sex phe.,  
gland secretion)  
green lacewing (allomone, alarm phe., gland secretion)  
rove beetle (aphrodisiac phe.), stink bug (allomone ?)



green lacewing  
(gland secretion)



parasitoid wasp (F sex phe.)



wasp (marking phe. ?)  
caddis fly (F sex phe. ?)  
harvestman (allomone ?), ant (secretion, allomone ?)  
fruit fly (M aggregation phe.),



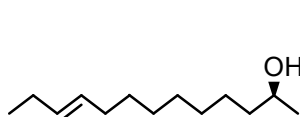
harvestman (allomone ?)



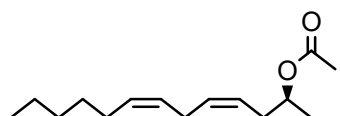
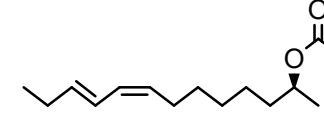
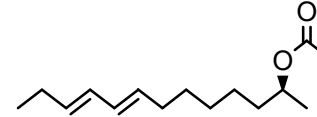
gall midge (F sex phe.)  
fruit fly (M aggregation phe.)



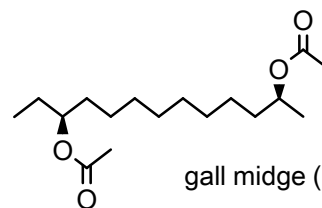
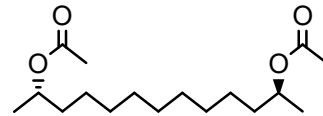
gall midge (F sex phe.)



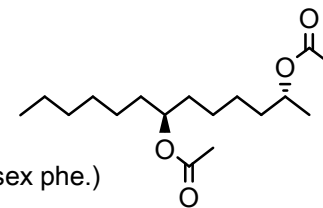
gall midge (F sex phe.)



gall midge (F sex phe.)



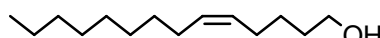
gall midge (F sex phe.)



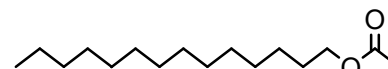
## C14 chain



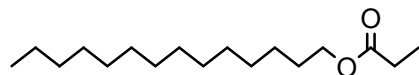
cockroach (aggregation phe.)



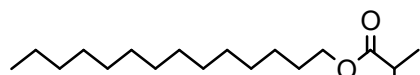
sawfly (F sex phe.)



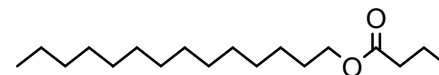
ant (alarm phe.)  
ground beetle, bee (allomone)  
parasitoid wasp (F sex phe.)  
bumblebee (gland secretion)



termite (F sex phe.)



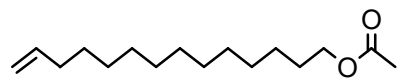
broad-headed bug  
(M aggregation phe.)



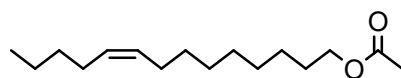
longhorned bee (M gland secretion)

# [ C-1 ] Other: Acyclic comp. (xi)

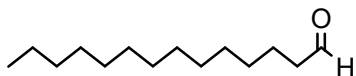
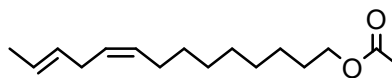
C14 chain



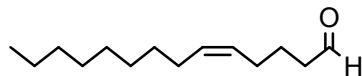
click beetle (F sex phe.)



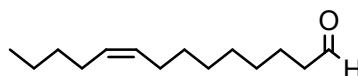
bolas spider (allomone: prey attractant)



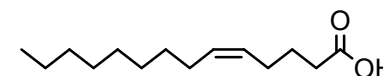
mantid, parasitoid wasp  
(F sex phe.)  
ant (queen allomone)



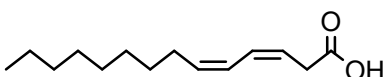
rove beetle (aphrodisiac phe.)



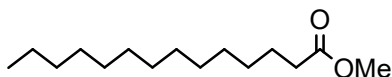
bolas spider  
(allomone: prey attractant)



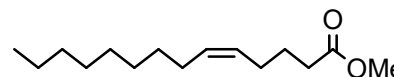
thrips (allomone?)



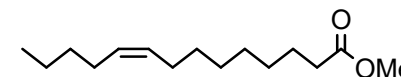
hide beetle (F sex phe.)



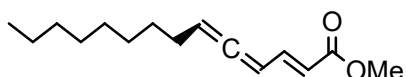
bark beetle (gland secretion)  
cuckoo bee (F marking phe.)



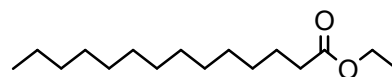
scarab beetle (F sex phe.)



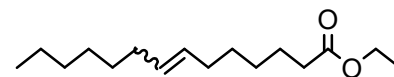
fruit fly (M anti-aphrodisiac phe.)



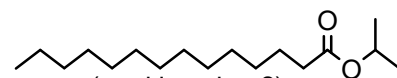
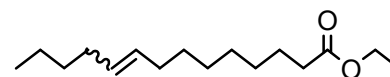
seed beetle (M sex phe.)



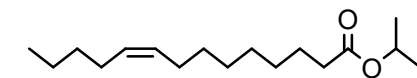
cuckoo bee (allomone ?)  
wasp (marking phe. ?)  
fruit fly (M sex phe.)



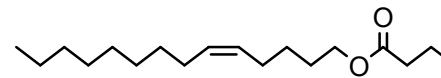
bumblebee (M marking phe. ?)



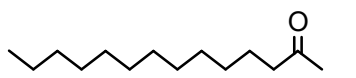
wasp (marking phe. ?)  
hide beetle (M aggregation phe. ?)



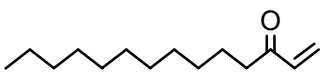
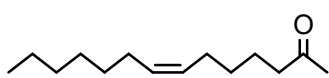
hide beetle (M aggregation phe. ?)



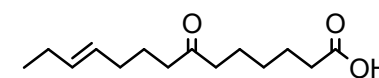
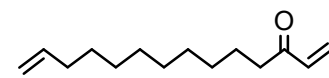
stingless bee (secretion)



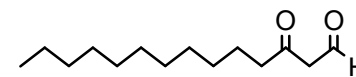
scarab beetle (F sex phe.)



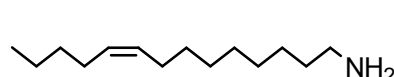
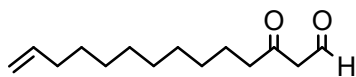
termite (allomone)



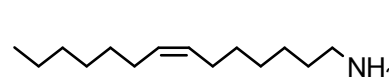
butterfly (M sex phe. ?)



termite (allomone)

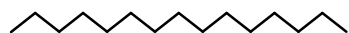


ant (allomone ?)

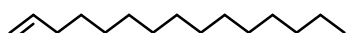


# [ C-1 ] Other: Acyclic comp. (xii)

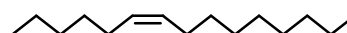
C15 chain



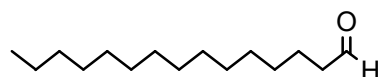
true bug, small carpenter bee  
(allomone ?), wasp (F sex phe.)  
ant (gland secretion)



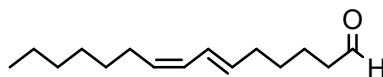
darkling beetle (allomone)



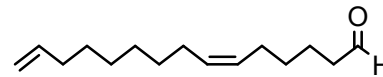
acarid mite (alarm phe.)



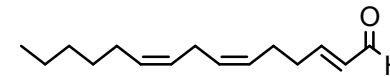
mantid (F sex phe.)



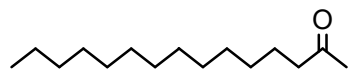
longhorn beetle (M aggregation phe.)



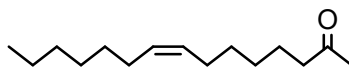
webspinning sawfly (F sex phe.)



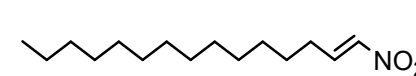
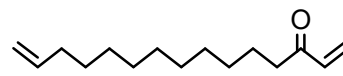
longhorn beetle (aggregation phe.)



wasp (marking phe.?, trail phe.?)  
fruit fly (M aggregation phe.)  
darkling beetle (allomone ?)  
ant, cuckoo bee (gland secretion)



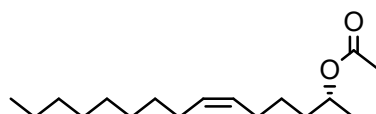
termite (allomone)



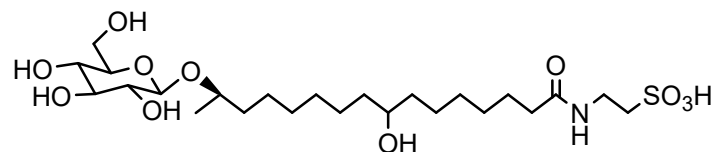
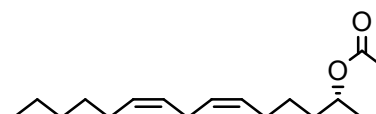
termite (allomone)



fruit fly (M aggregation phe.)



gall midge (F sex phe.)



fruit fly (marking phe.)

# [ C-1 ] Other: Acyclic comp. (xiii)

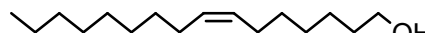
C16 chain



acrolepiid moth (M sex phe.)



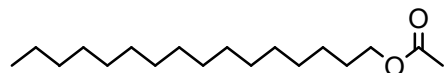
bumblebee (M marking phe. ?)  
noctuid moth (M gland secretion)



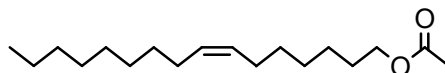
scarab beetle (F sex phe.)



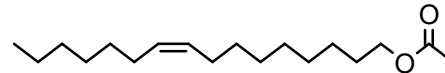
bumblebee (M marking phe. ?)



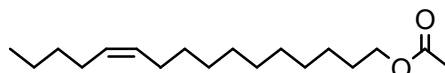
ground beetle (allomone)  
cuckoo bee (marking phe. ?)  
noctuid moth, bumblebee (gland secretion), spider (F sex phe.)



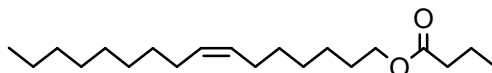
bumblebee (M marking phe. ?)



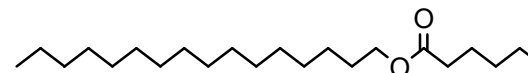
thrips (gland secretion)



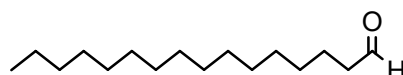
parasitoid wasp (F sex phe.)



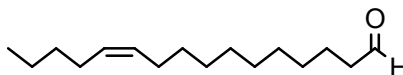
stingless bee (secretion)



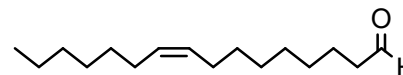
sweat bee (gland secretion)



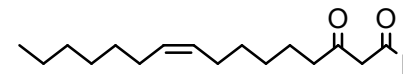
wasp (M marking phe. ?)



bolas spider (allomone: prey attractant)

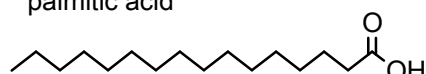


ant (trail phe., aggregation phe.)  
parasitoid wasp (F sex phe.)



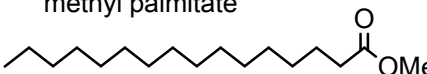
termite (allomone)

palmitic acid

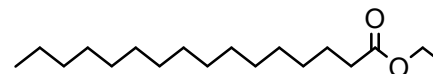


leafroller moth (M-to-M inhibitory phe.)  
longhorned bee (F gland secretion)  
termite (aggregation phe.)

methyl palmitate

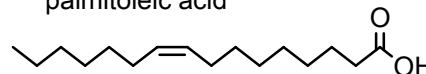


cuckoo bee (F marking phe.)  
wasp (F allomone)  
tineid moth (M aggregation phe.)  
fruit fly (marking phe. ?)



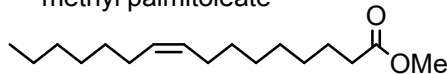
bark beetle, plasterer bee (gland secretion)  
cuckoo bee (allomone ?)

palmitoleic acid

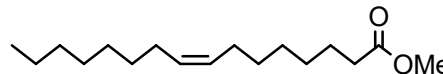


wasp (marking phe. ?)  
termite (aggregation phe.)

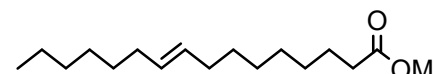
methyl palmitoleate



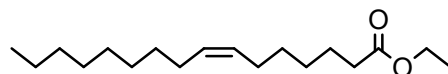
tineid moth (M aggregation phe.)  
tsetse fly (F sex phe.)



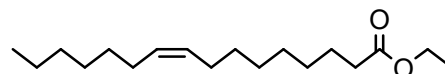
stink bug (M sex phe.)



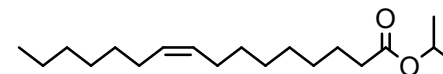
fruit fly (marking phe. ?)



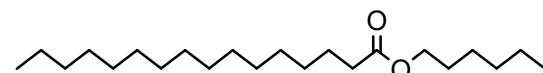
wasp (M marking phe. ?)



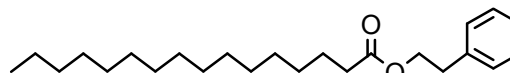
parasitoid wasp (F sex phe.)



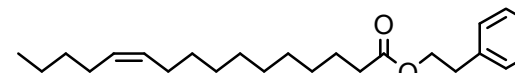
rove beetle (M aggregation phe.)



butterfly (M aphrodisiac phe.)

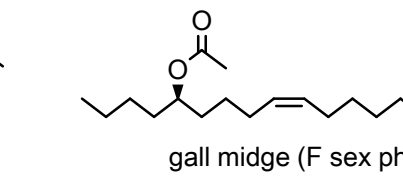
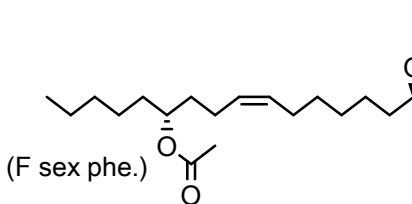
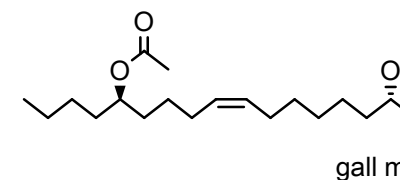
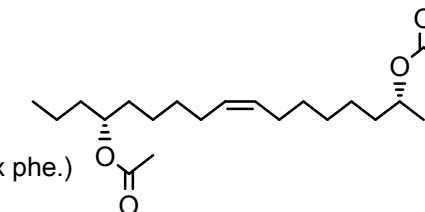
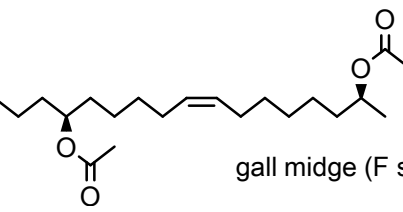
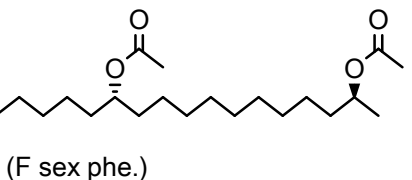
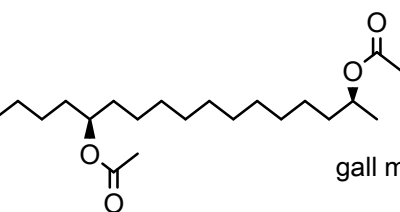
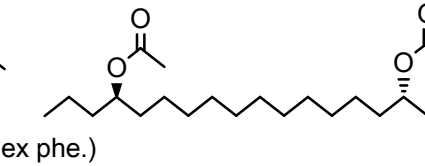
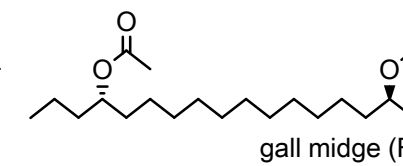
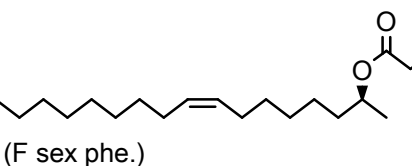
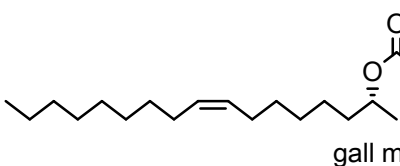
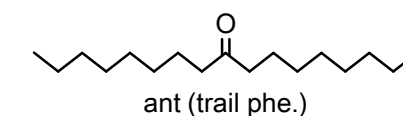
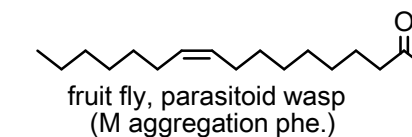
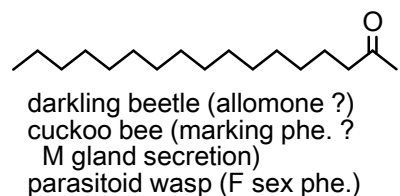
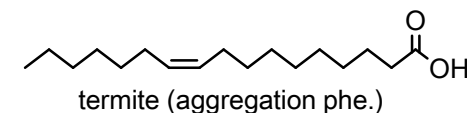
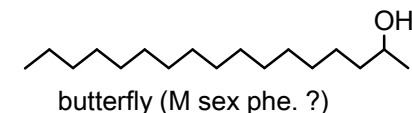
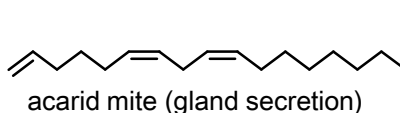
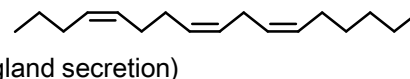
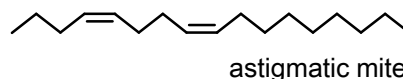
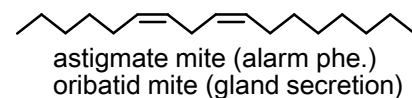
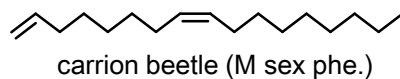
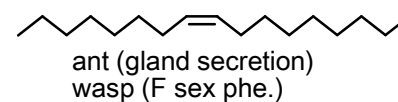
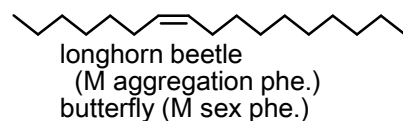
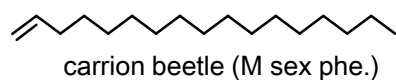
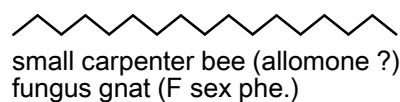


butterfly (M sex phe. ?)



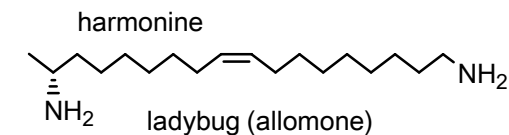
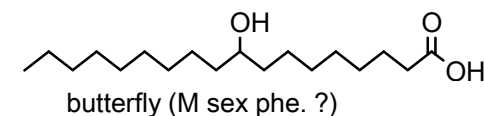
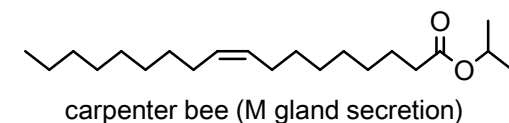
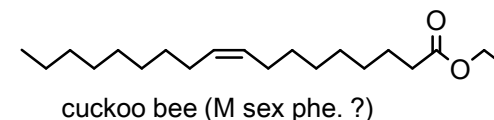
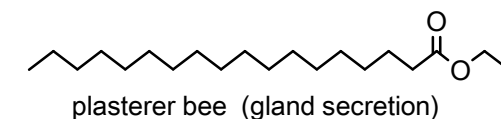
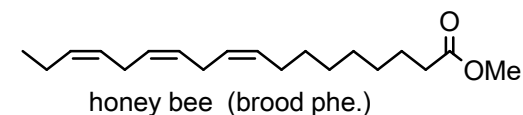
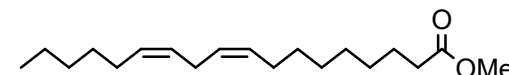
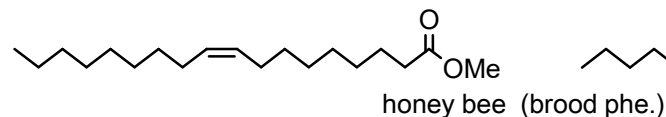
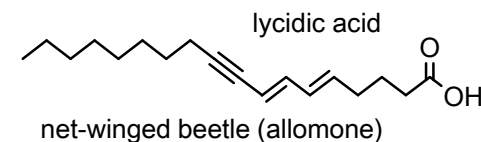
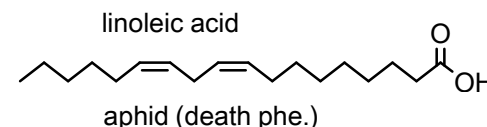
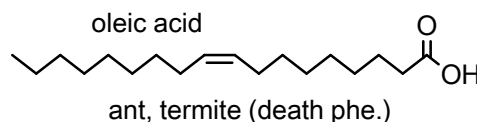
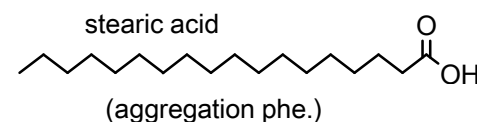
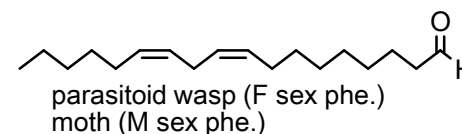
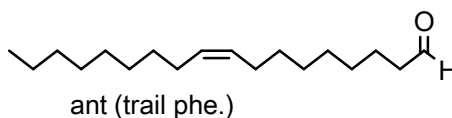
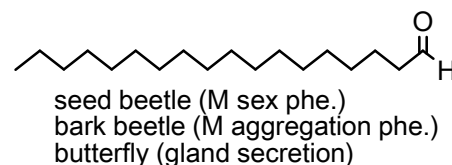
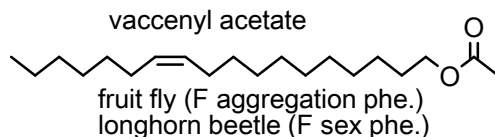
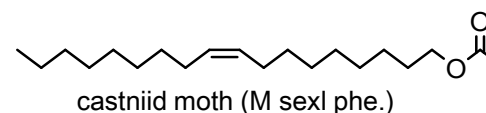
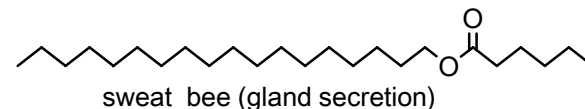
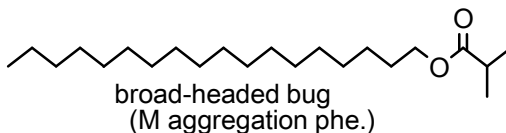
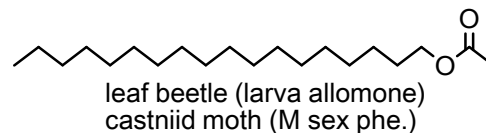
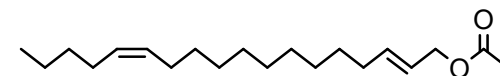
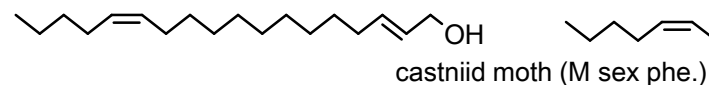
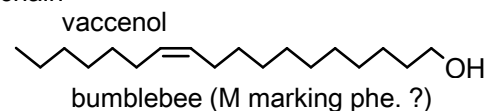
# [ C-1 ] Other: Acyclic comp. (xiv)

C17 chain



# [ C-1 ] Other: Acyclic comp. (xv)

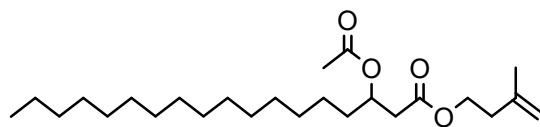
C18 chain



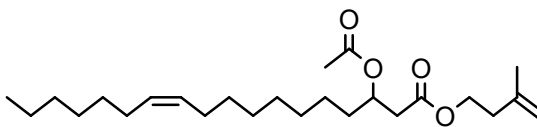


# [ C-1 ] Other: Acyclic comp. (xvi)

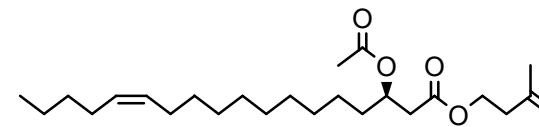
C18 chain



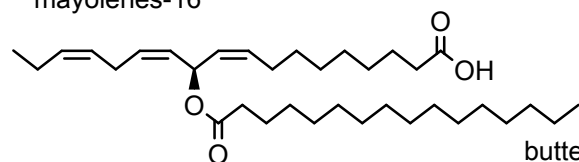
butterfly (M gland secretion)



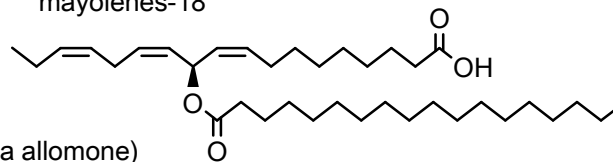
butterfly (M gland secretion)



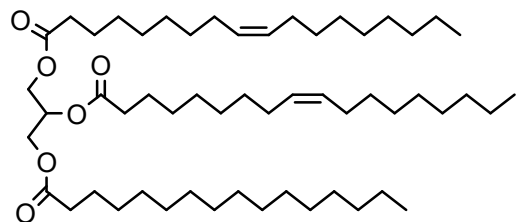
mayolenes-16



mayolenes-18

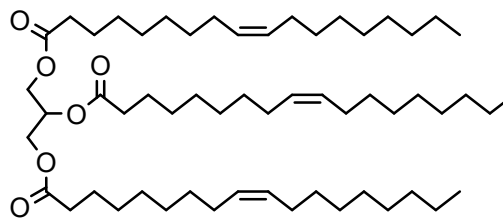


butterfly (larva allomone)



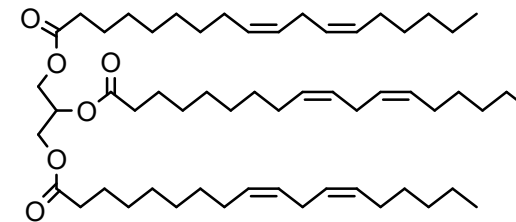
honey bee (brood phe.)

triolein



ant (brood phe.)

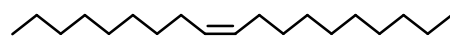
trilinolein



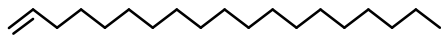
termite (F sex phe. ?)

# [ C-1 ] Other: Acyclic comp. (xvii)

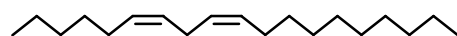
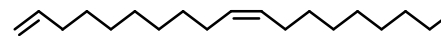
## C19 chain



ant (marking phe.)  
thrips (gland secretion)



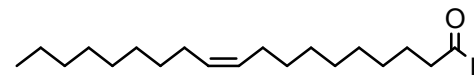
carrion beetle (M sex phe. ?)



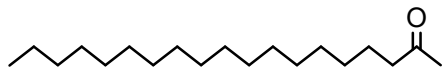
mite (alarm phe.?)



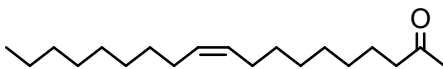
ant (gland secretion)



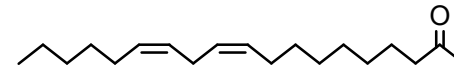
sawfly (F sex phe.)



seed beetle (F sex phe.)

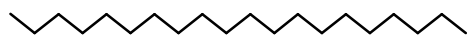


darkling beetle (allomone ?)  
wasp (M marking phe.)



termite (trail phe.)

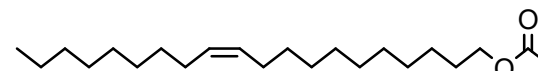
## C20 chain



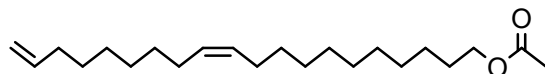
longhorned bee  
(F gland secretion)



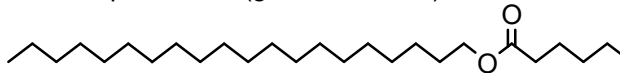
honey bee (worker alarm phe.)  
wasp (M marking phe.)  
carpenter bee (gland secretion)



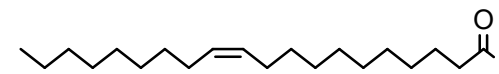
leaf beetle (larva allomone)  
fruit fly (M aggregation phe.)



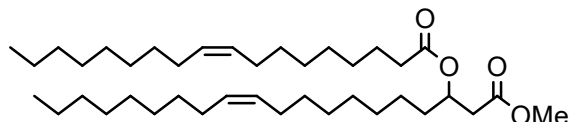
thrips (allomone)



sweat bee (gland secretion)



ant (trail phe.)

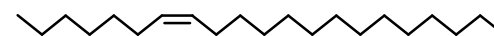
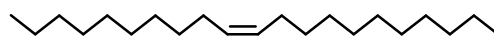


pyralid moth (larva trail phe.)

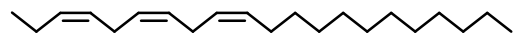
## C21 chain



fruit fly (M aggregation phe.)



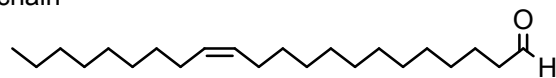
rove beetle, plasterer bee (F sex phe.)



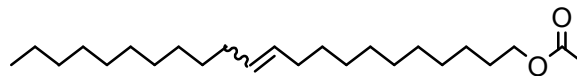
erebid moth (M sex phe.)

# [ C-1 ] Other: Acyclic comp. (xviii)

C22 chain

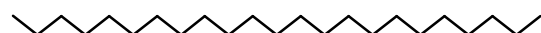


ant (trail phe.)

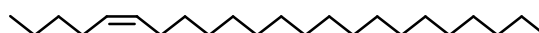


fruit fly (M anti-aphrodisiac phe.)

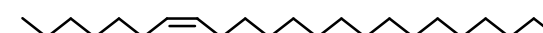
C23 chain



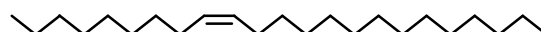
bumblebee (marking phe.), ant (gland secretion)



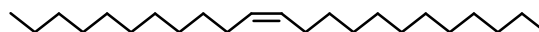
stable fly (F sex phe.)



fruit fly, rove beetle, plasterer bee (F sex phe.)



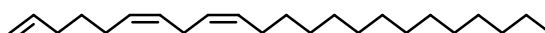
stable fly, firefly, longhorn beetle (F sex phe.)  
fruit fly, spider (M sex phe.)  
ant (marking phe., gland secretion)



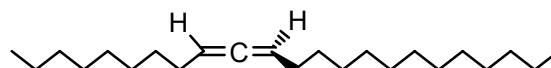
soldier beetle (M sex phe.)



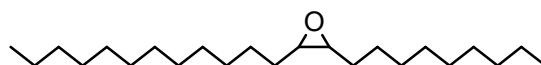
wasp (F sex phe.)



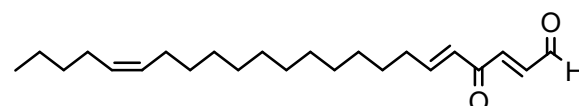
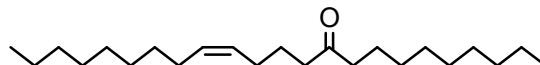
fungus gnat (F sex phe.)



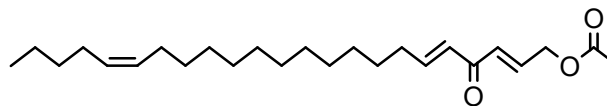
scarab beetle (F cuticular HC)



stable fly (F sex phe.)

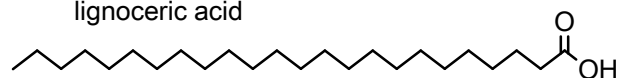


ant (allomone)



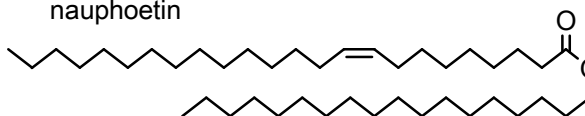
C24 chain

lignoceric acid



termite (gland secretion)

nauphoetin

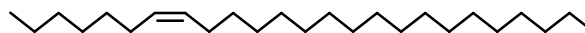


# [ C-1 ] Other: Acyclic comp. (xix)

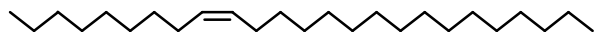
C25 chain



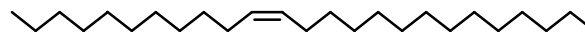
cuckoo bee (gland secretion)



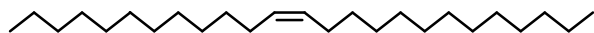
longhorn beetle, plasterer bee (F sex phe.)



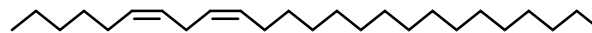
fly, longhorn beetle, mining bee, leaf bug  
(F sex phe.), wasp (brood phe.)



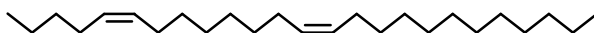
fruit fly (F sex phe.)



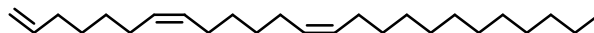
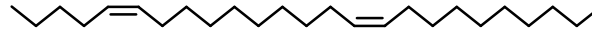
ladybug (oviposition-deterring phe.)



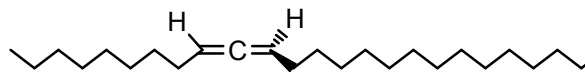
wasp (F sex phe.)



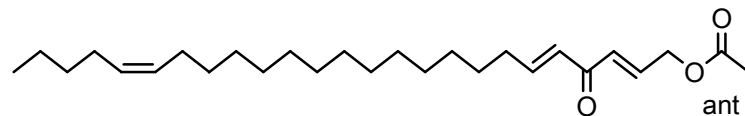
fruit fly (F sex phe.)



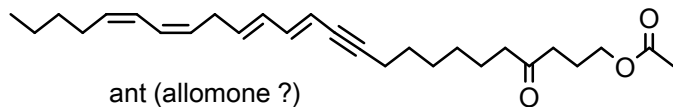
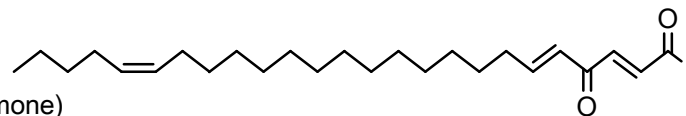
stable fly (M sex phe. ?)



scarab beetle (F cuticular HC)



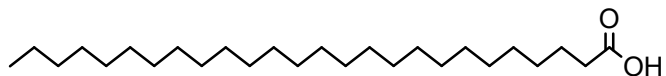
ant (allomone)



ant (allomone ?)

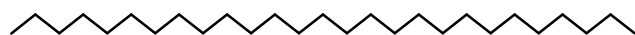
# [ C-1 ] Other: Acyclic comp. (xx)

C26 chain

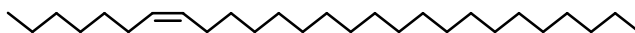


termite (gland secretion)

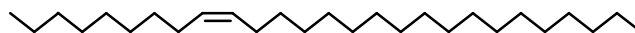
C27 chain



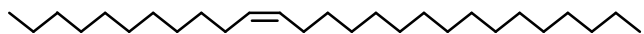
longhorn beetle (F sex phe.)



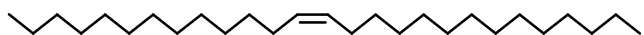
longhorn beetle, wood wasp (F sex phe.)



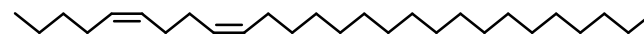
termite (allomone ?), stable fly (M sex phe. ?)  
stable fly, longhorn beetle, mining bee (F sex phe.)



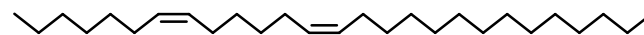
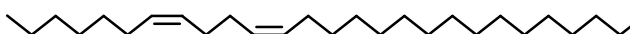
mining bee (F sex phe.)



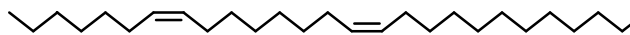
stable fly (M sex phe.)



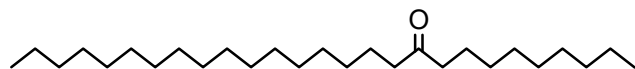
fruit fly (F sex phe.)



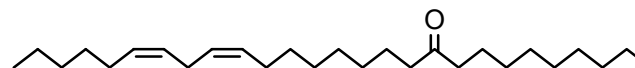
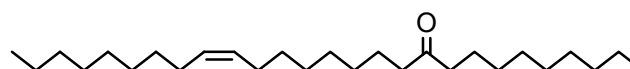
parasitoid wasp (F sex phe.)



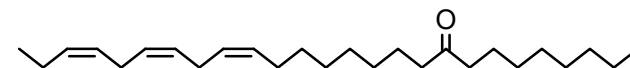
fruit fly (F sex phe.)



longhorn beetle (F sex phe.)

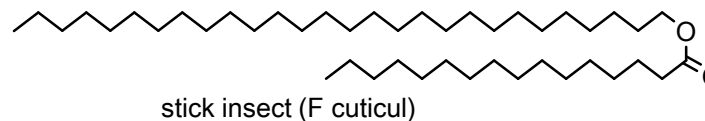
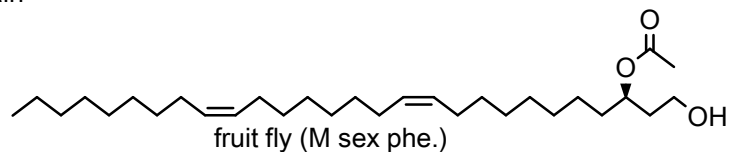


longhorn beetle (F sex phe.)

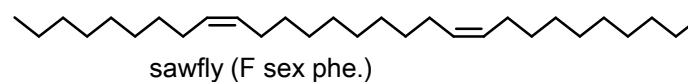
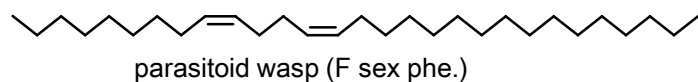
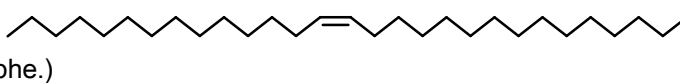
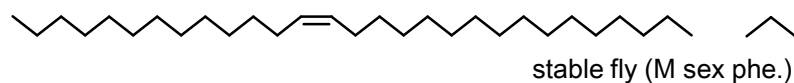
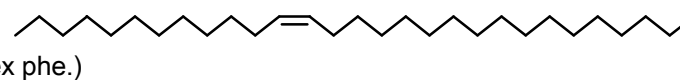
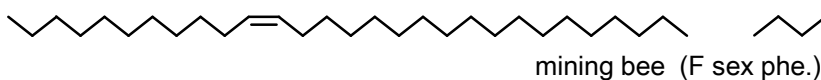
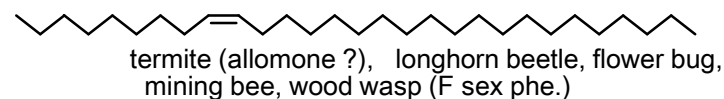
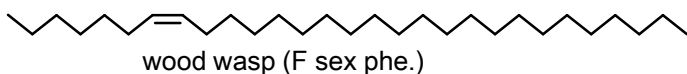
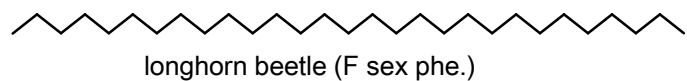


# [ C-1 ] Other: Acyclic comp. (xxi)

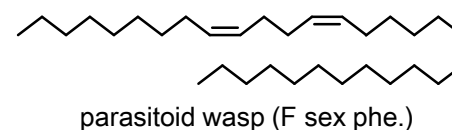
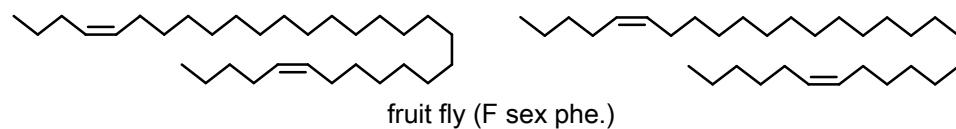
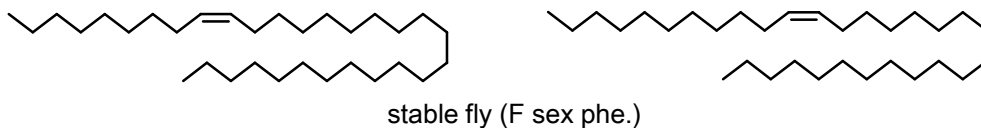
C28 chain



C29 chain

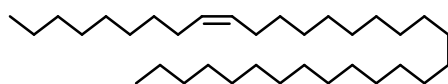


C31 chain

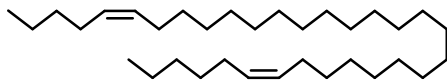


# [ C-1 ] Other: Acyclic comp. (xxii)

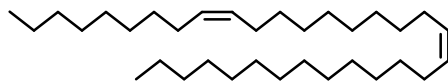
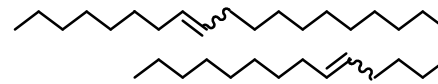
C33 chain



stable fly (F sex phe.)

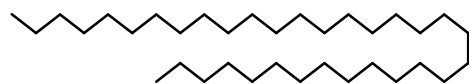


fruit fly (F sex phe.)



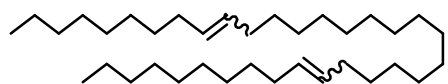
sawfly (F sex phe.)

C34 chain

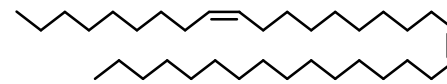


leaf beetle (sex phe. ?)

C35 chain

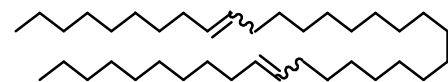


fruit fly (F sex phe.)



sawfly (F sex phe.)

C37 chain

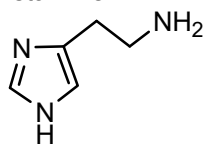


fruit fly (F sex phe.)

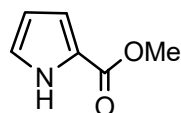
# [ C-2 ] Other: True alkaloids (i)

Aromatic comp.

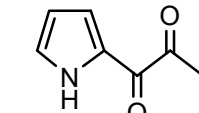
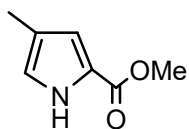
histamine



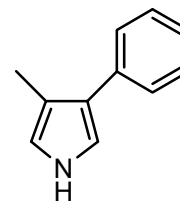
saturniid moth (larva allomone)  
true bug (aggregation phe.)



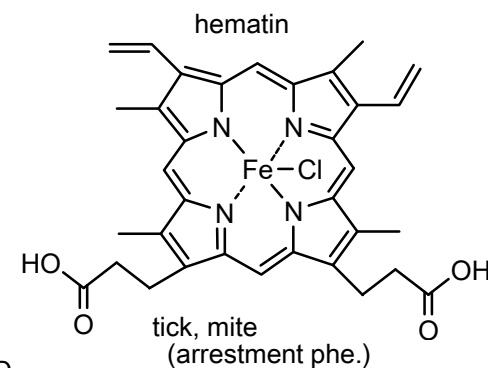
ant (trail phe.)



longhorn beetle (M aggregation phe.)

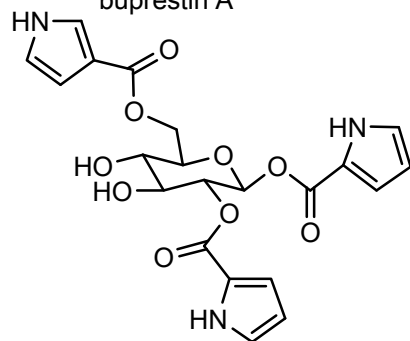


ant (gland secretion)



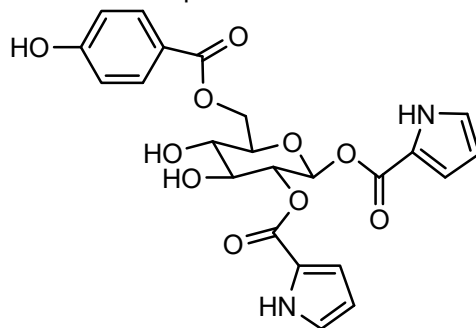
tick, mite (arrestment phe.)

buprestin A



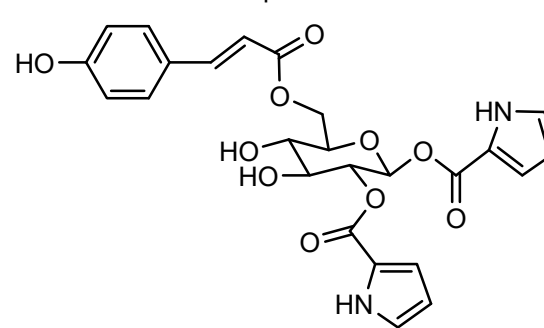
jewel beetle (allomone)

buprestin B

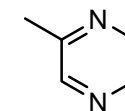


jewel beetle (allomone)

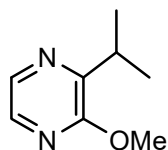
buprestin D



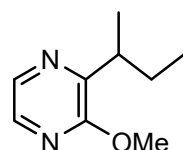
jewel beetle (allomone)



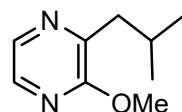
ant (trail phe.)  
fruit fly (gland secretion)



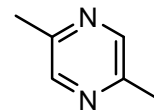
butterfly, stink bug, net-winged beetle (allomone), ladybug (aggregation phe.)



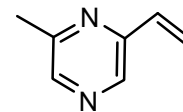
butterfly, arctiid moth stink bug, net-winged beetle (allomone) ladybug (aggregation phe.)



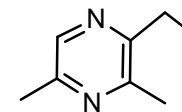
butterfly, arctiid moth (allomone) ladybug, leaf beetle (aggregation phe.)



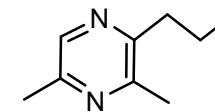
ant (trail phe., gland secretion) wasp (alarm phe.) fruit fly (M sex phe.)



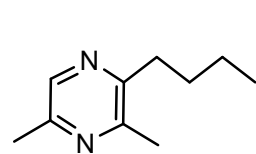
fruit fly (M sex phe.)



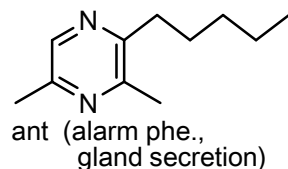
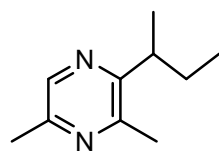
ant, fruit fly (gland secretion)



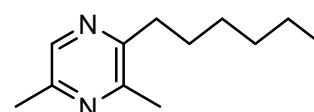
ant (gland secretion)



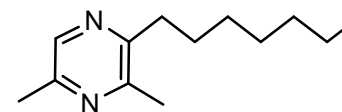
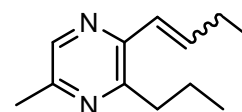
ant (gland secretion)



ant (alarm phe., gland secretion)



ant (gland secretion)

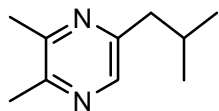


ant (gland secretion)

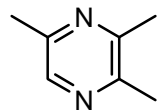


# [ C-2 ] Other: True alkaloids (ii)

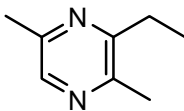
Aromatic comp.



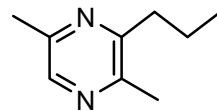
ant (trail phe.)



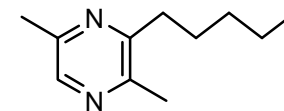
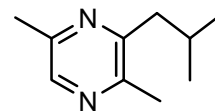
ant (trail phe.,  
gland secretion)  
fruit fly (M sex phe.,  
gland secretion)



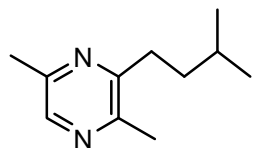
ant (trail phe.,  
alarm phe.)



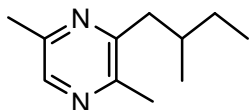
ant (gland secretion)



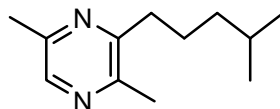
ant (gland secretion)



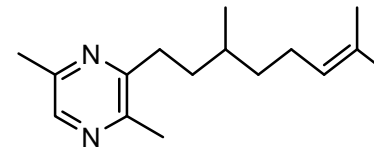
ant (alarm phe., gland  
secretion, allomone)  
flower wasp (F sex phe.)  
wasp (marking phe.)  
leaf insect (allomone)



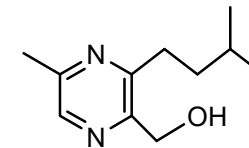
ant (alarm phe.,  
gland secretion)  
leaf insect (allomone)



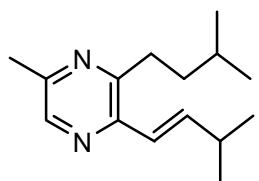
ant (gland secretion)



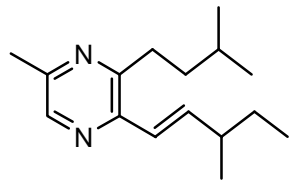
ant (alarm phe.)



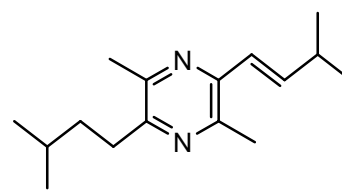
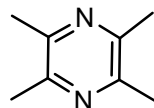
flower wasp  
(F sex phe.)



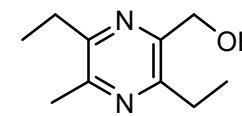
ant (gland secretion)



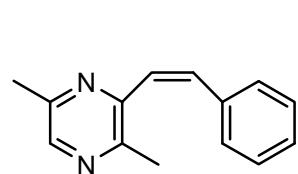
fruit fly (M sex phe.,  
gland secretion)



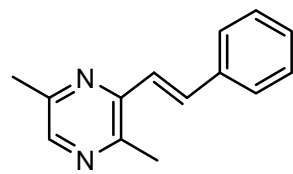
ant (gland secretion)



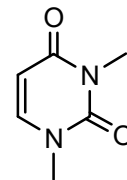
flower wasp  
(F sex phe.)



ant (gland secretion)

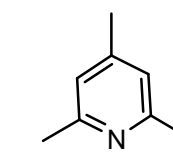
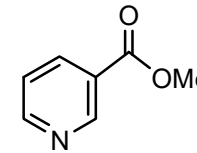


*N,N*-dimethyluracil

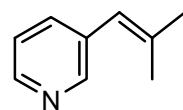


ant (trail phe.)

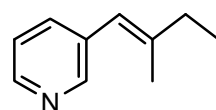
methyl nicotinate



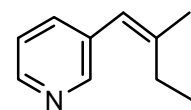
ladybug  
(aggregation phe.)



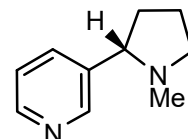
rove beetle (allomone)



rove beetle  
(allomone)

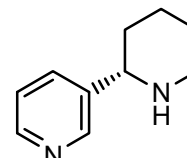


nicotine



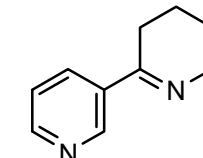
harvestman  
(allomone ?)

anabasine

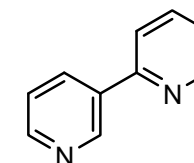


ant (gland secretion, allomone, trail phe.)

anabaseine



harvestman (allomone ?)

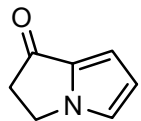


ant (gland secretion)

# [ C-2 ] Other: True alkaloids (iii)

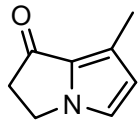
Aromatic comp.

nordanaidone

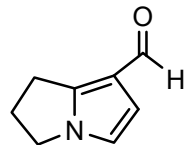


butterfly (M sex phe.)

danaidone

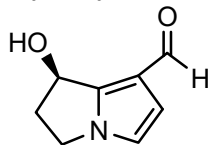


danaidal

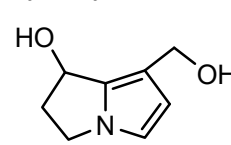


butterfly, arctiid moth (M sex phe.?)

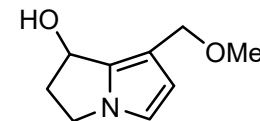
hydroxydanaidal



hydroxydanaidol

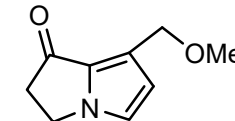


9-O-methyl-hydroxydanaidol

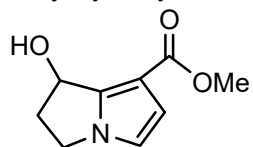


butterfly (M sex phe.?)

9-methoxydanaidon

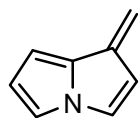


methyl hydroxydanaidoate



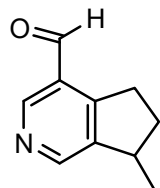
butterfly (M sex phe.?)

actinidine



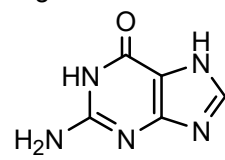
ant (alarm phe.)  
parasitoid wasp,  
rove beetle, tick insect  
(allomone)

boschniakine

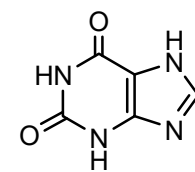


stick insect  
(allomone ?)

guanine

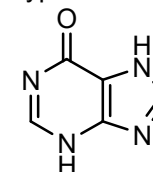


xanthine

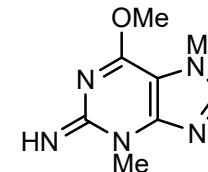


tick (arrestment phe.)

hypoxanthine

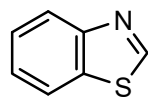


himantarine



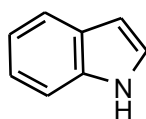
centipede  
(galand secretion)

benzothiazole



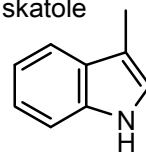
pleasing fungus  
beetle (allomone)  
butterfly (gland  
secretion)

indol



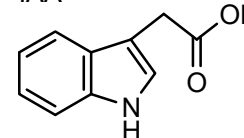
butterfly  
(M sex phe. ?)  
ant (trail phe.)  
pleasing fungus beetle,  
caddis fly (allomone)

skatole



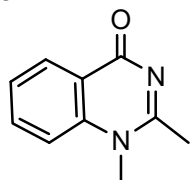
ant, wasp  
(alarm phe.)  
stingless bee,  
wasp, pleasing fungus beetle,  
caddis fly (allomone)  
green lacewing (gland secretion)

IAA



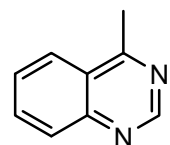
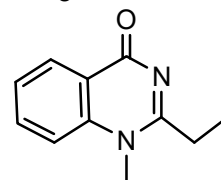
water beetle  
(allomone ?)

glomerin

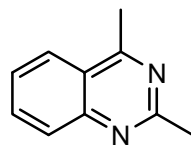


millipede (allomone)

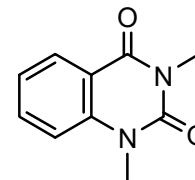
homoglomerin



assassin bug  
(aggregation phe.)  
parasitoid wasp  
(M sex phe.)



assassin bug  
(aggregation phe.)

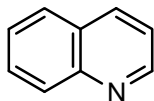


scarab beetle  
(F sex phe.)

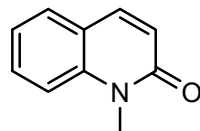
# [ C-2 ] Other: True alkaloids (iv)

Aromatic comp.

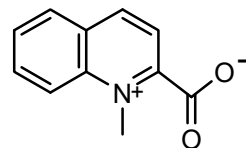
quinoline



walking stick  
(allomone)

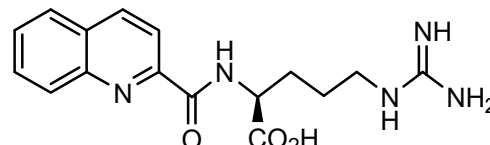


net-winged beetle  
(allomone?)

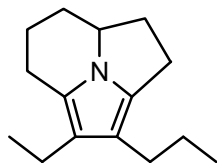


firefly (allomone)

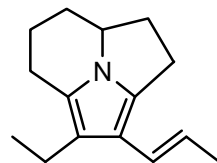
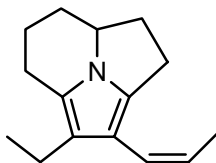
N $\alpha$ -quinaldyl-L-arginine



ladybug (allomone)



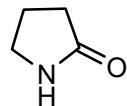
ant (allomone)



ant (allomone)

# [ C-2 ] Other: True alkaloids (v)

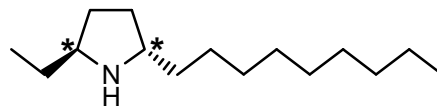
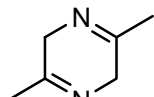
C4 ring



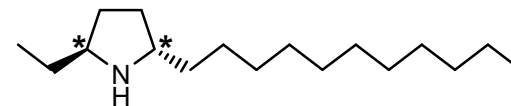
moth (larva allomone)



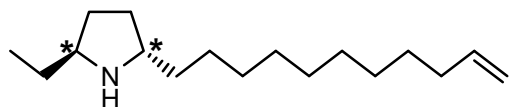
fruit fly (M sex phe.)



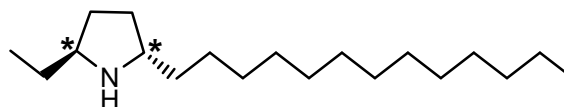
ant (allomone)



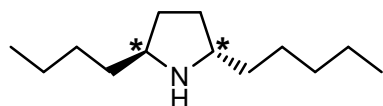
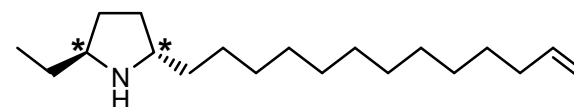
ant (allomone)



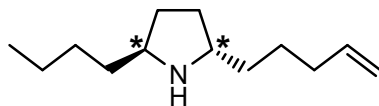
ant (allomone?)



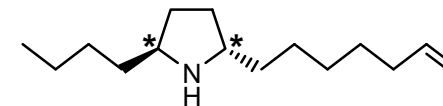
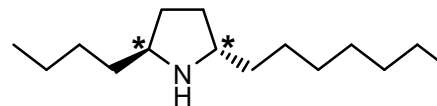
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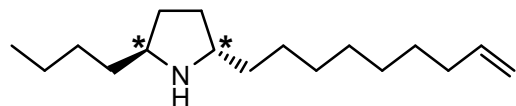
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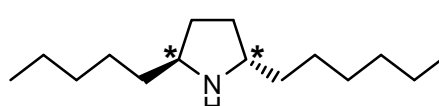
ant (allomone?)



ant (allomone?)

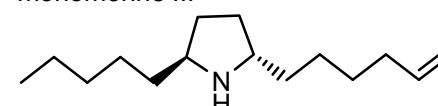


ant (allomone)

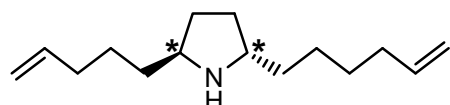


ant (allomone?)

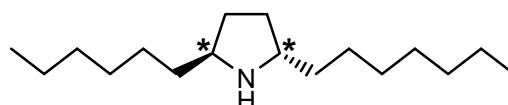
monomorine III



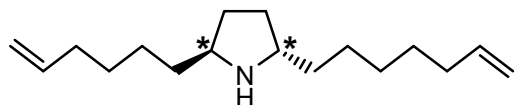
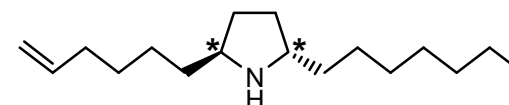
ant (trail phe.)



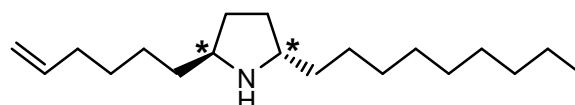
ant (allomone?)



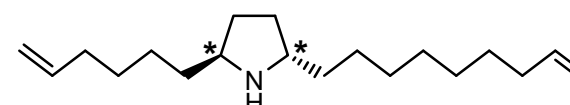
ant (allomone?)



ant (allomone?)

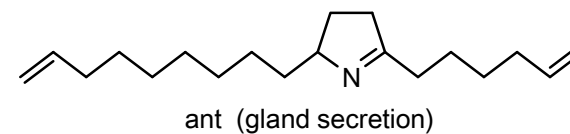
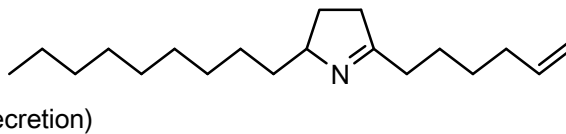
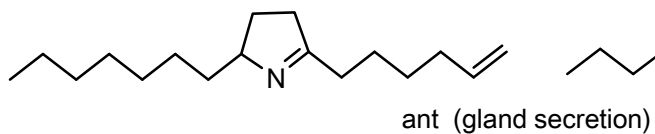
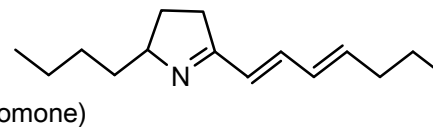
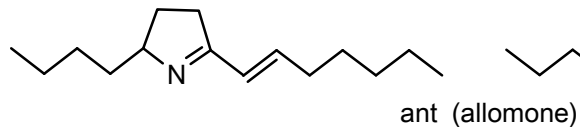
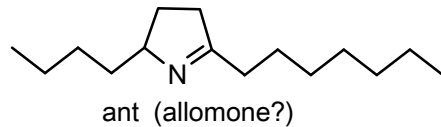
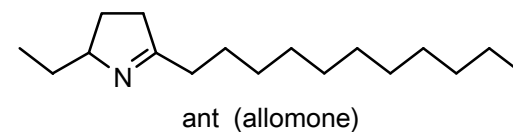
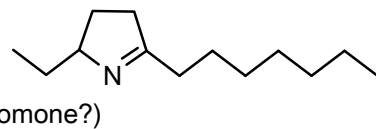
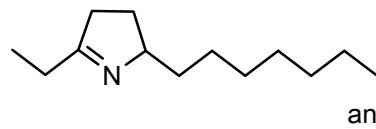
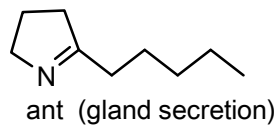
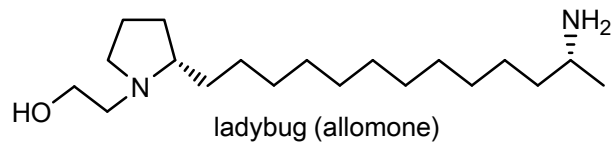
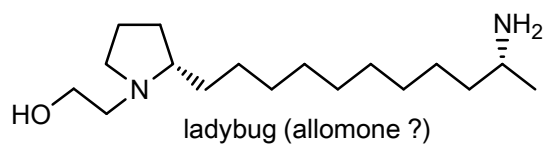
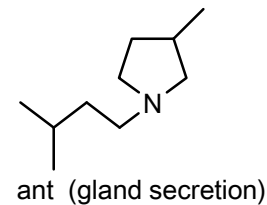
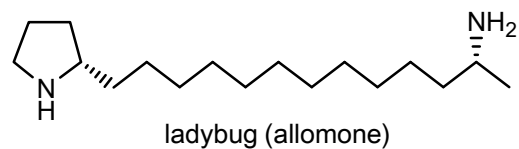
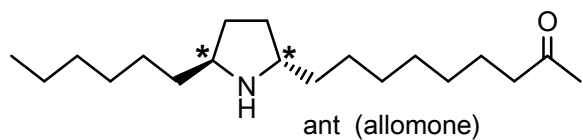


ant (allomone?)

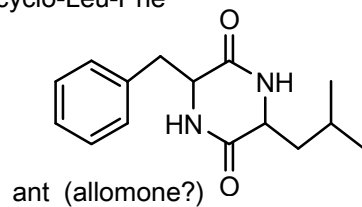


# [ C-2 ] Other: True alkaloids (vi)

C4 ring

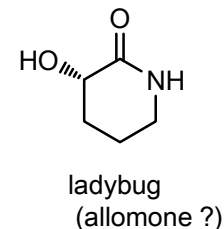
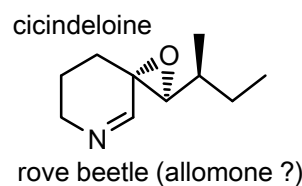
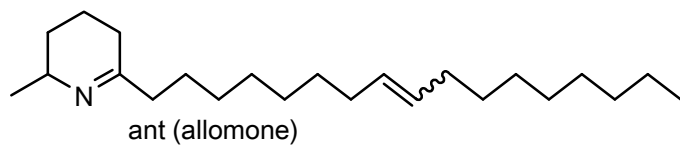
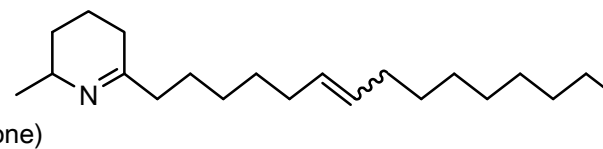
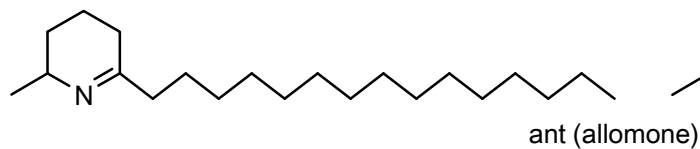
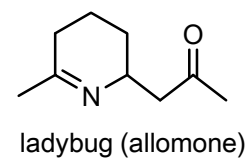
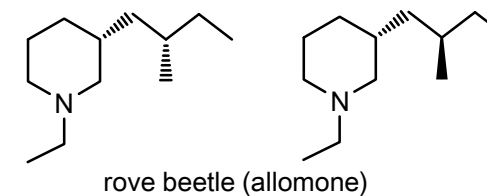
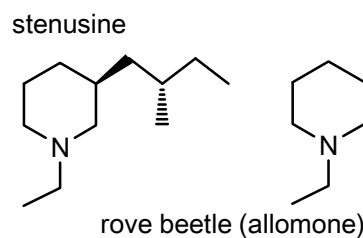
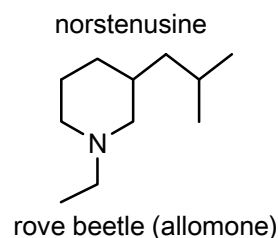
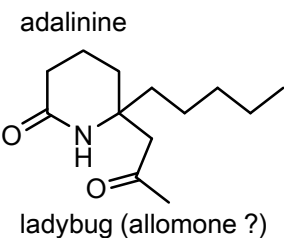
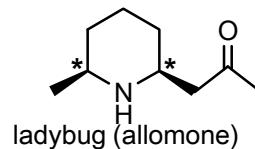
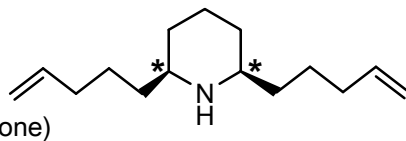
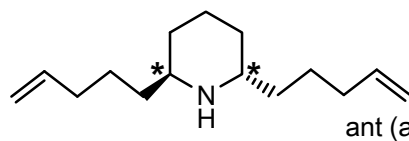
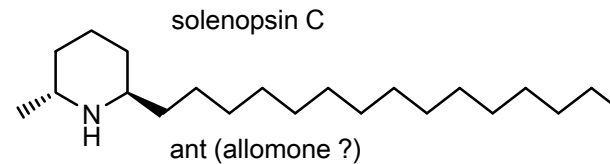
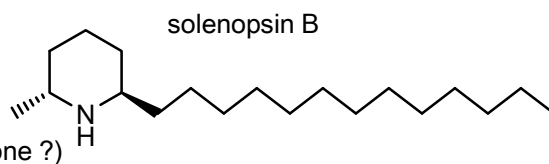
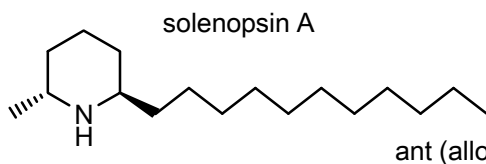
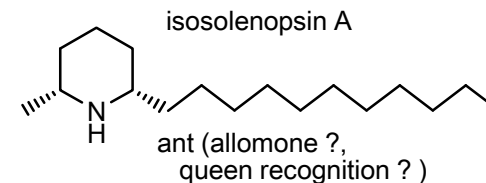
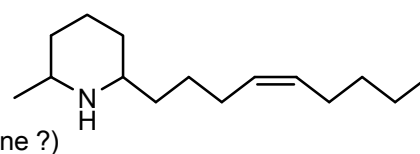
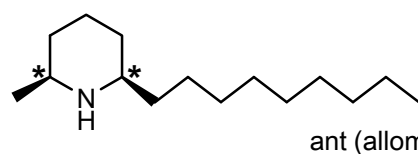
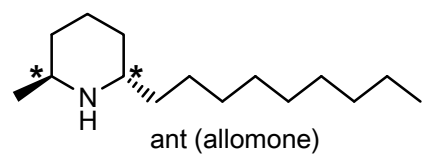


cyclo-Leu-Phe



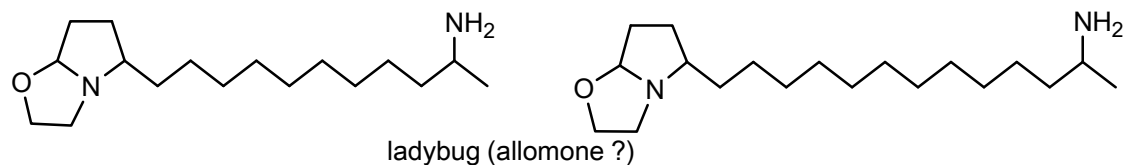
# [ C-2 ] Other: True alkaloids (vii)

C5 ring

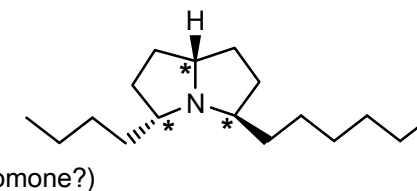
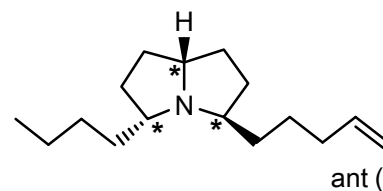
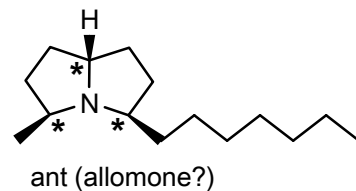
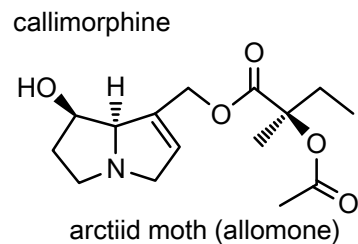
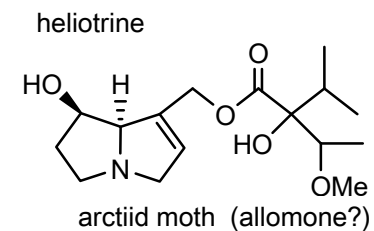
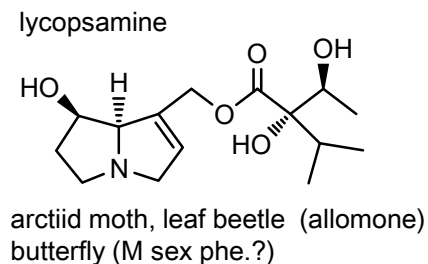
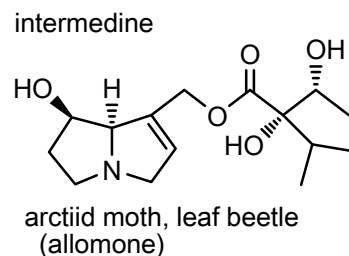
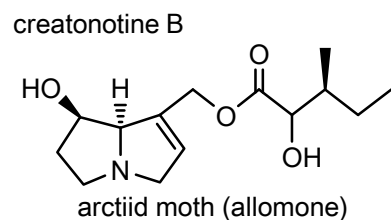
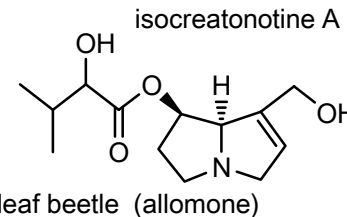
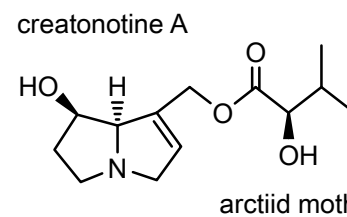
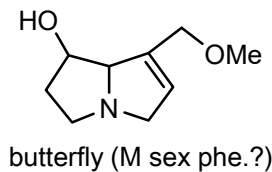
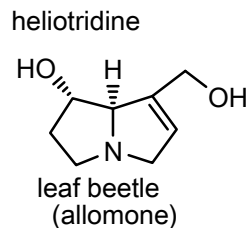
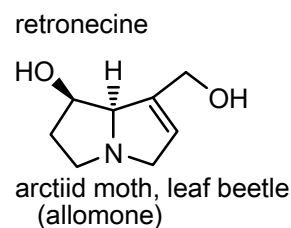
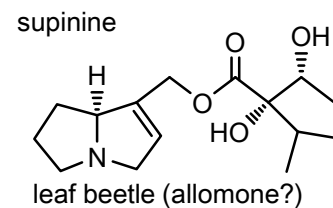
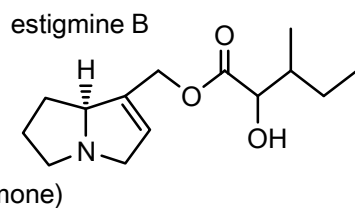
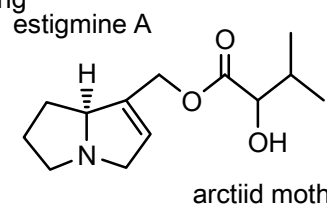


# [ C-2 ] Other: True alkaloids (viii)

C6 ring

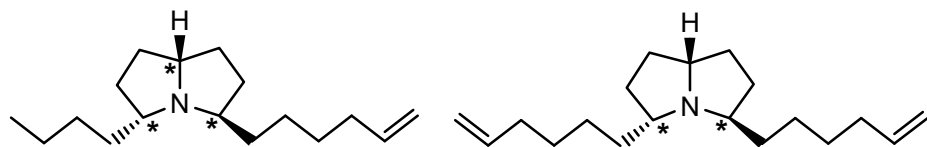


C7 ring

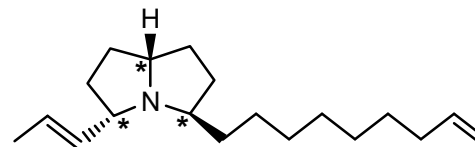


# [ C-2 ] Other: True alkaloids (ix)

C7 ring

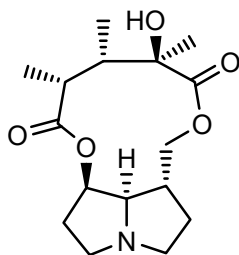


ant (allomone?)



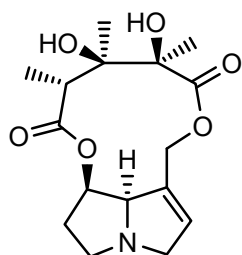
ant (allomone?)  
arctiid moth (allomone)

retusine



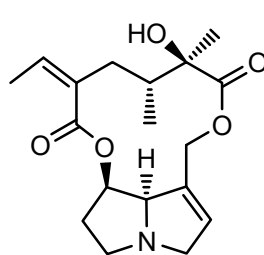
grasshopper  
(allomone ?)

monocrotaline



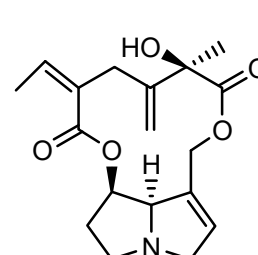
grasshopper, butterfly  
(allomone ?)

senecionine

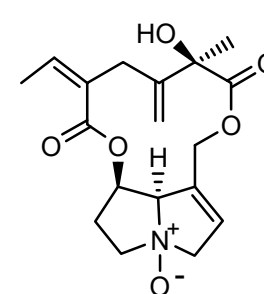


butterfly (allomone ?)

seneciophylline

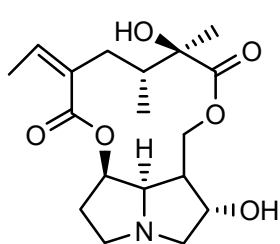


seneciophylline N-oxide



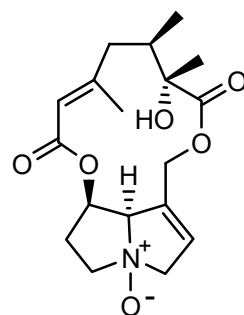
leaf beetle (allomone ?)

rosmarinine



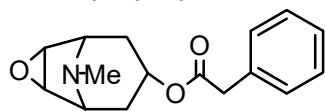
butterfly (allomone ?)

doronine N-oxide



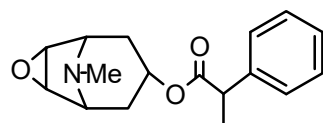
leaf beetle (allomone ?)

3-phenylacetoxy-  
6,7-epoxytropine



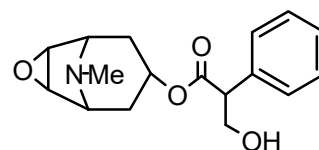
treehopper (allomone ?)

dihydroaposcopamine



butterfly (allomone)

scopolamine

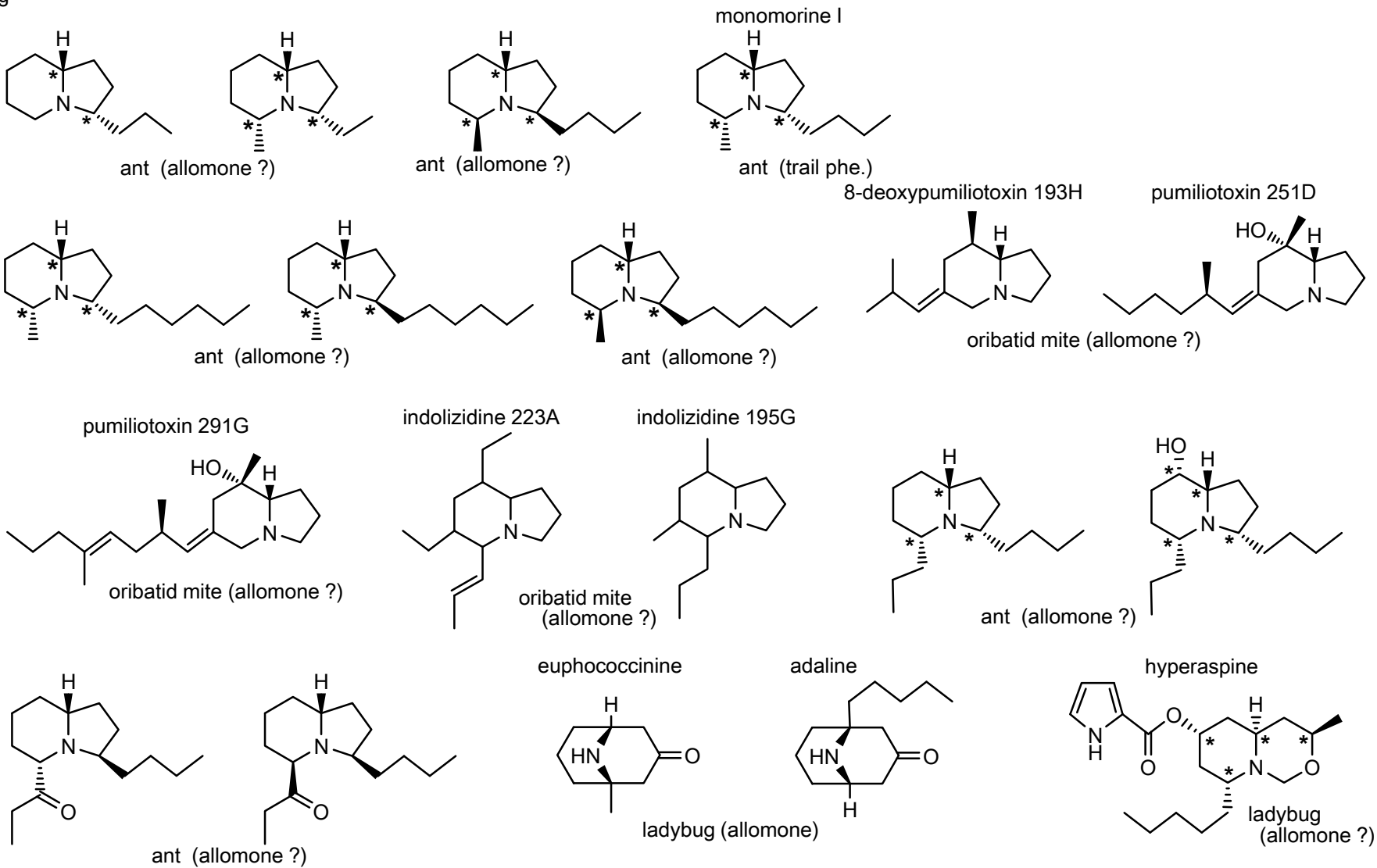


butterfly (allomone)  
treehopper (allomone ?)



# [ C-2 ] Other: True alkaloids (x)

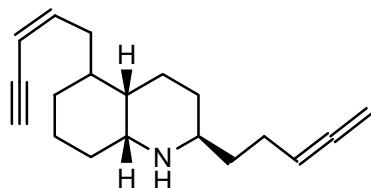
C8 ring



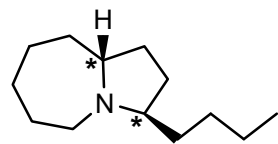
# [ C-2 ] Other: True alkaloids (xi)

C9 ring

*cis*-269AB

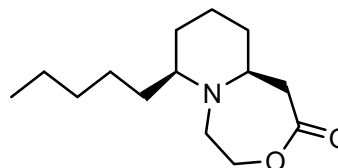


ant (allomone ?)



ant (allomone ?)

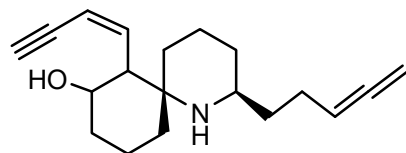
calvine



ladybug (allomone ?)

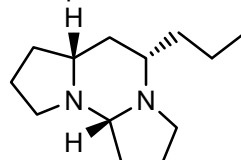
C10 ring

285A



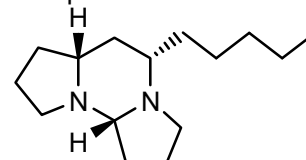
ant (allomone ?)

tetraponerine-2



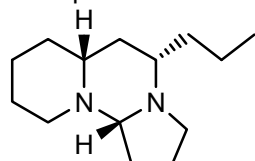
ant (allomone)

tetraponerine-6



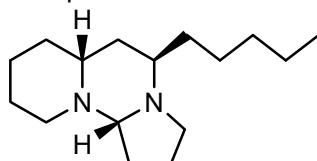
C11 ring

tetraponerine-4

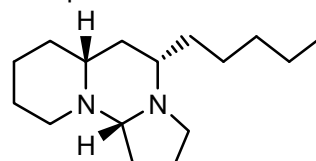


ant (allomone)

tetraponerine-7

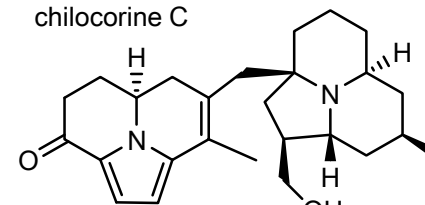


tetraponerine-8



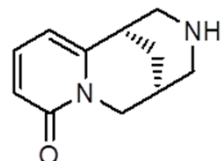
ant (allomone)

chilocorine C



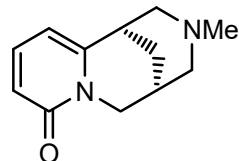
ladybug (allomone ?)

cytisine



aphid, pyralid moth (allomone)

*N*-methylcytisine

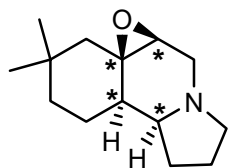


pyralid moth (allomone)

# [ C-2 ] Other: True alkaloids (xii)

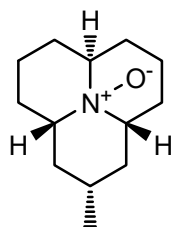
C12 ring

buzanamine



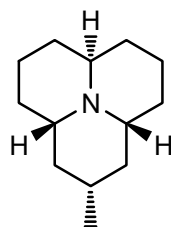
millipede (allomone)

coccinelline



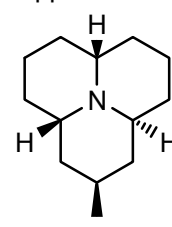
ladybug (allomone)

precoccinelline 193C



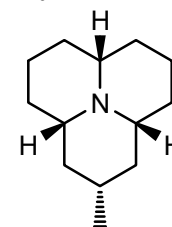
ladybug, soldier beetle, oribotriiid mite (allomone)

hippodamine



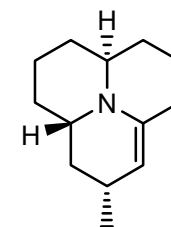
ladybug, soldier beetle, (allomone ?)

myrrhine



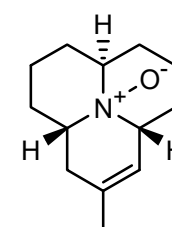
ladybug (allomone)

propyleine



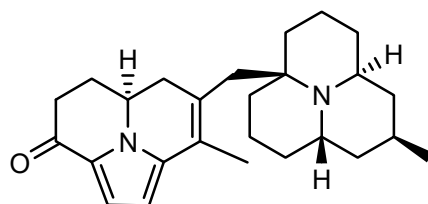
ladybug, soldier beetle, (allomone)

2-dehydrococcinelline



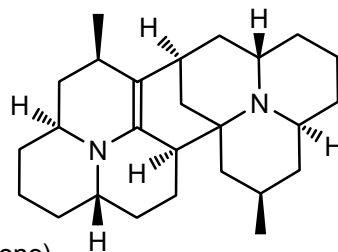
ladybug (allomone)

exochomine

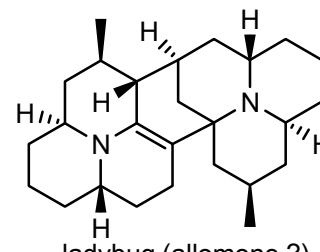


ladybug (allomone)

psylloborine A

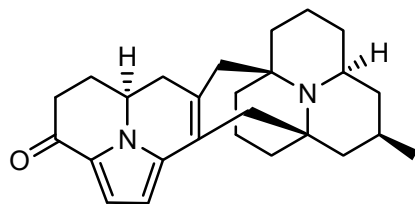


isopsylloborine A



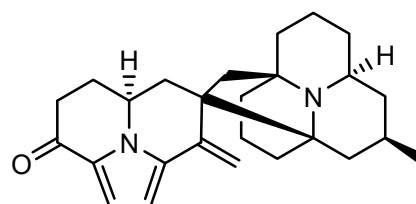
ladybug (allomone ?)

chilocorine A



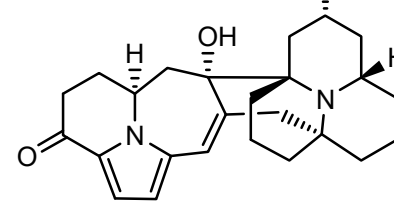
ladybug (allomone ?)

chilocorine B



ladybug (allomone)

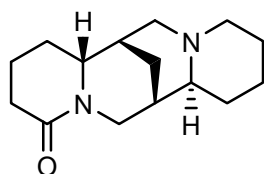
chilocorine D



ladybug (allomone ?)

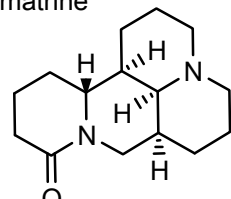
C15 ring

lupanine

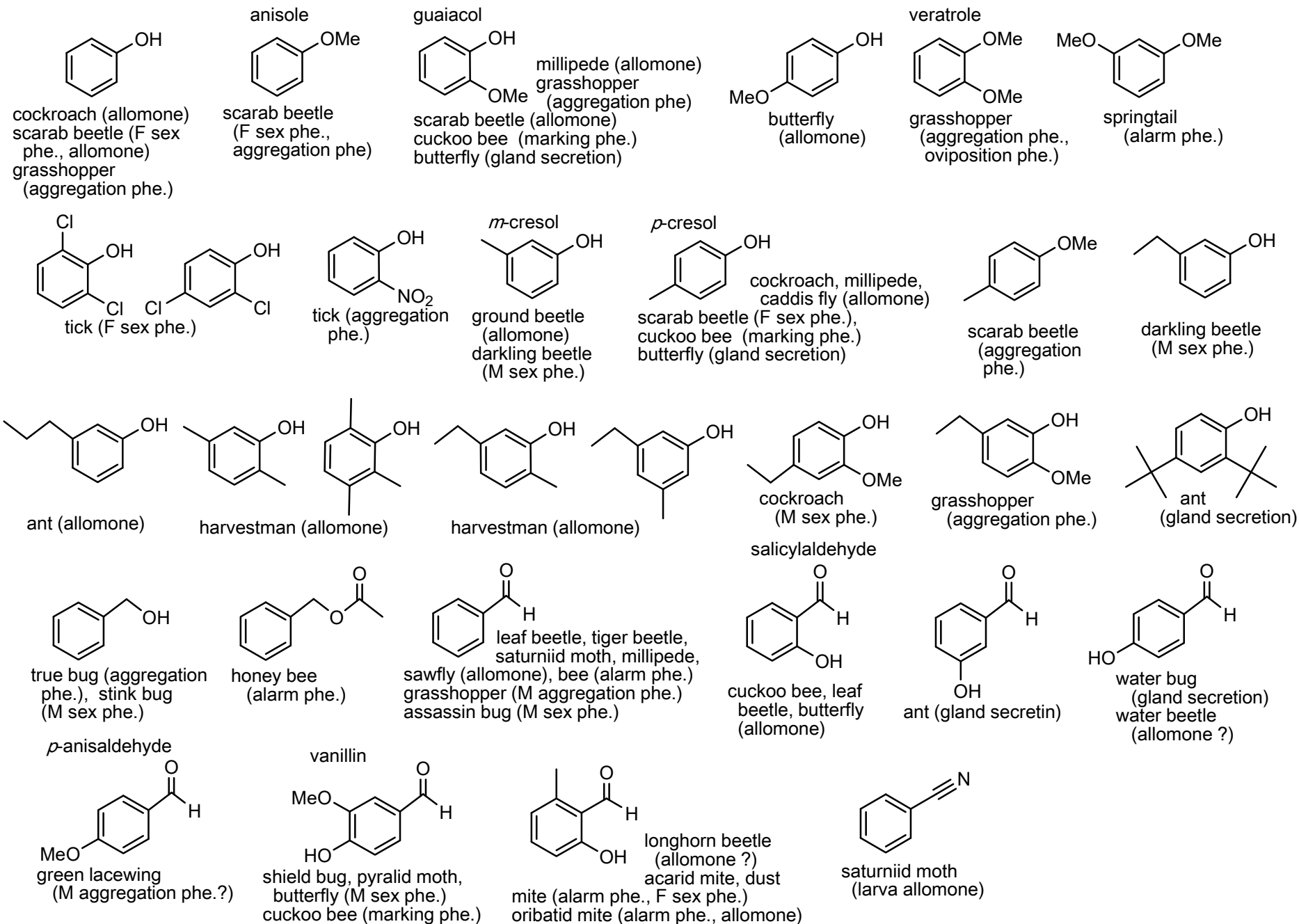


aphid (allomone ?)

matrine

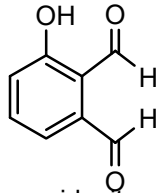


# [ C-3 ] Other: Aromatic comp. (i)



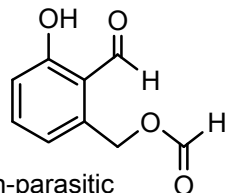
# [ C-3 ] Other: Aromatic comp. (ii)

$\gamma$ -acaridial

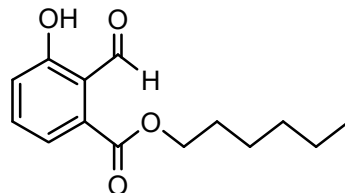


acarid mite, oribatid mite (F sex phe.)

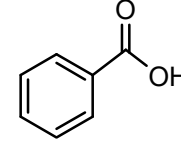
rhizoglyphinyl formate



non-parasitic mite, oribatid mite (gland secretion)

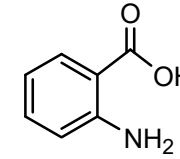


acarid mite (allomone ?)

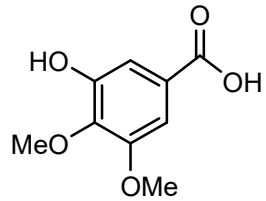


water beetle (allomone ?)

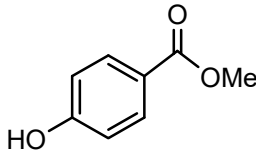
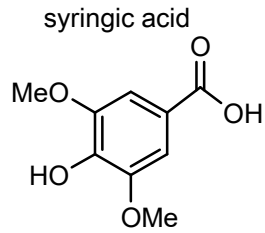
anthranilic acid



scarab beetle (F sex phe.)

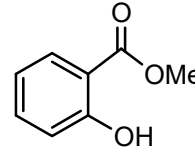


springtail (allomone)

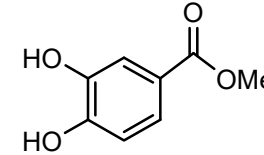


water bug (gland secretion)  
water beetle (allomone ?)  
bee (queen phe.)

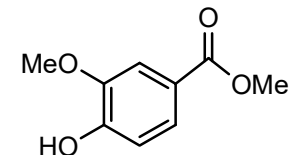
methyl salicylate



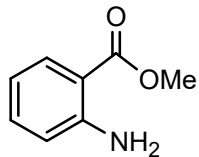
tick (aggregation phe.)  
butterfly (allomone,  
M anti-aphrodisiac phe.)  
dung beetle (allomone)



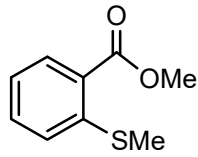
water beetle (allomone ?)



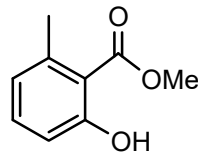
butterfly (M sex phe. ?)



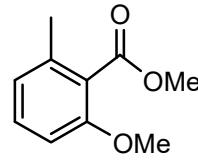
ant (alarm phe., trail phe.)



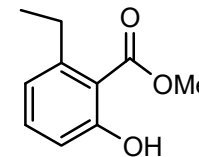
scarab beetle (F sex phe.)



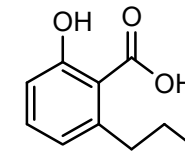
ant (primer phe., alarm phe., trail phe., queen sex phe., allomone)  
parasitoid wasp (F sex phe.)  
ground beetle, darkling beetle (allomone)



ant (trail phe.)

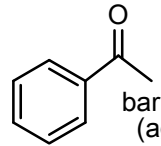


darkling beetle (allomone)

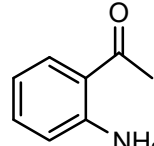


ant (allomone)

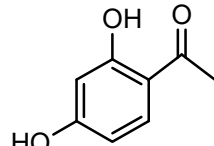
acetophenone



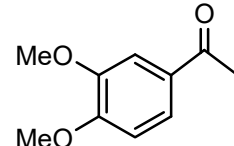
bark beetle (aggregation phe.)  
weevil (making phe.)  
grasshopper (oviposition phe.)  
caddisfly, spider (allomone)



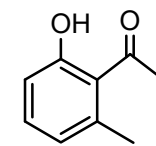
ant (alarm phe.)  
webspinning sawfly (F sex phe.)



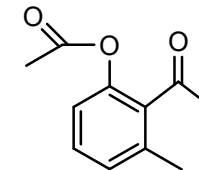
butterfly (M sex phe. ?)



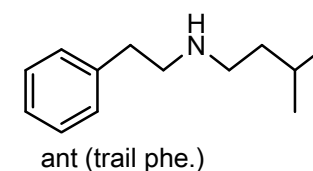
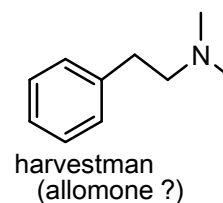
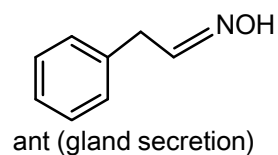
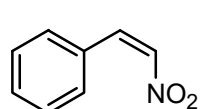
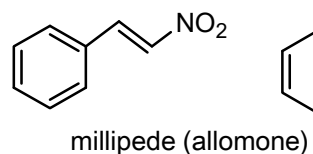
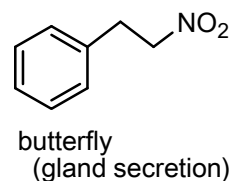
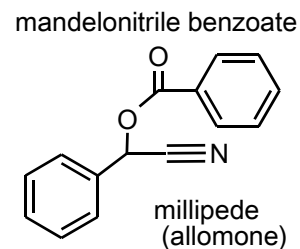
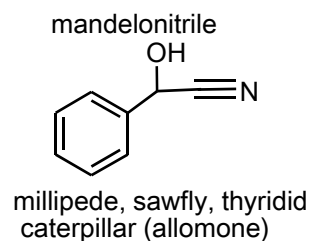
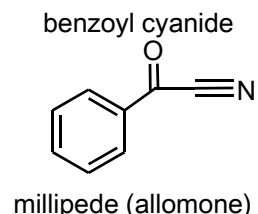
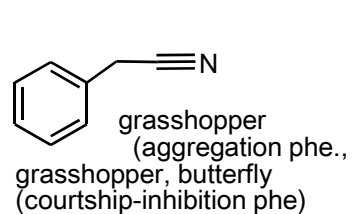
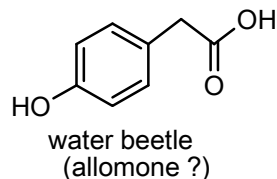
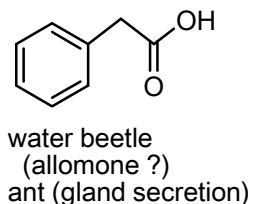
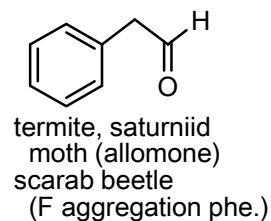
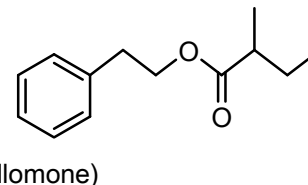
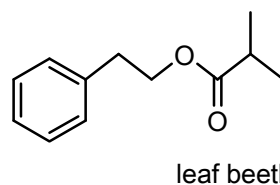
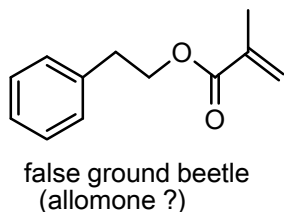
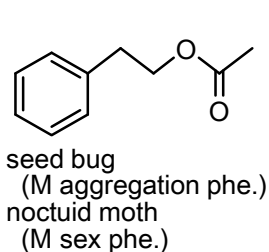
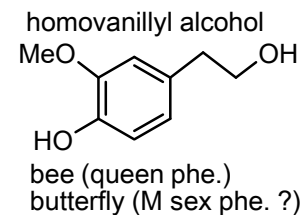
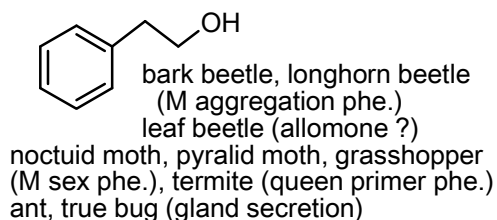
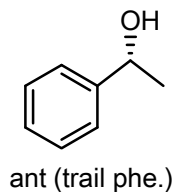
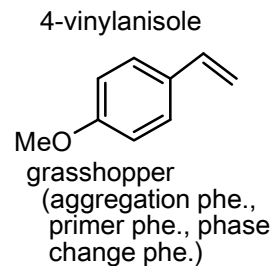
ant (allomone ?)



ant (gland secretion)  
flower wasp (F sex phe. ?)

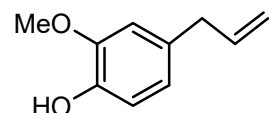


# [ C-3 ] Other: Aromatic comp. (iii)



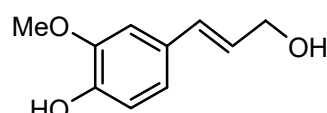
# [ C-3 ] Other: Aromatic comp. (iv)

eugenol

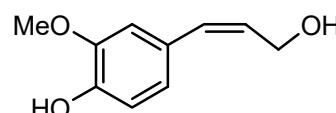


fairy wasp (F sex phe.)

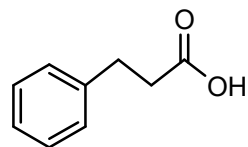
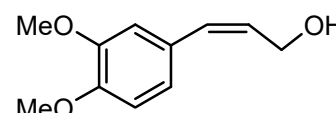
coniferyl alcohol



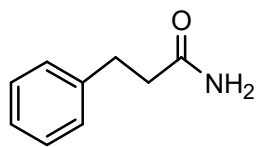
bee (queen phe.)  
fruit fly (M sex phe.,  
M allomone)



fruit fly (M sex phe.)

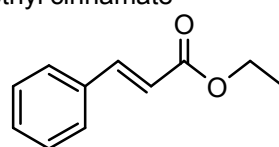


wasp (trail phe. ?)  
stingless bee  
(gland secretion)

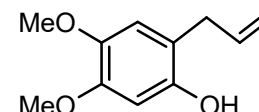


net-winged beetle  
(allomone ?)

ethyl cinnamate

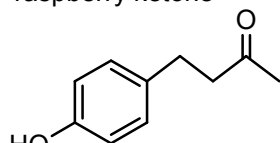


tortricid moth (M sex phe.)



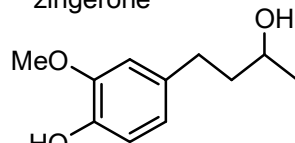
fruit fly (M sex phe.,  
allomone)

raspberry ketone



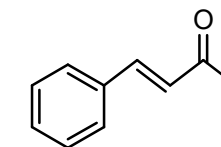
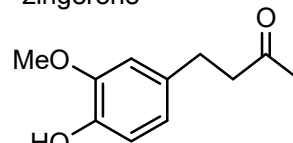
fruit fly (M sex phe.)

zingerone

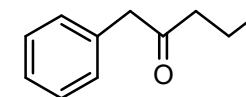


fruit fly (M sex phe.)

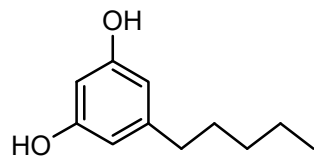
zingerone



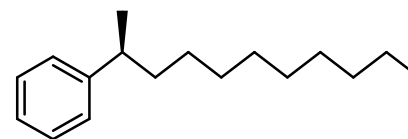
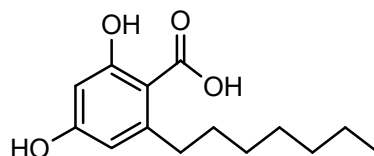
ant (alarm phe. ?)



millipede (allomone)

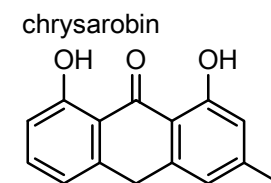
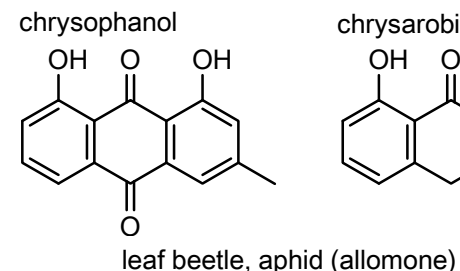
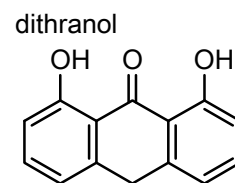
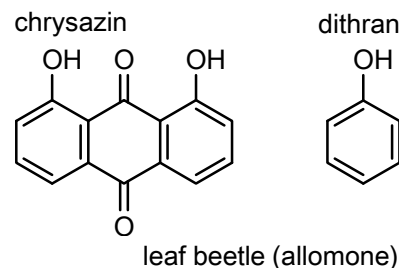
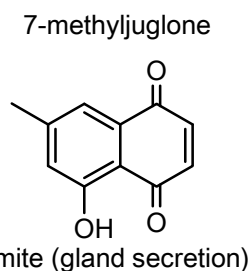
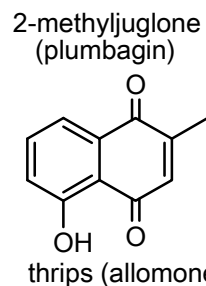
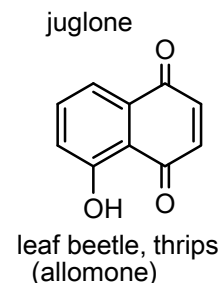
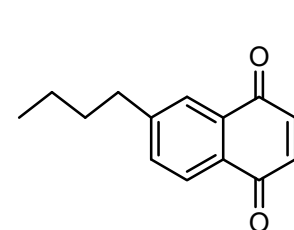
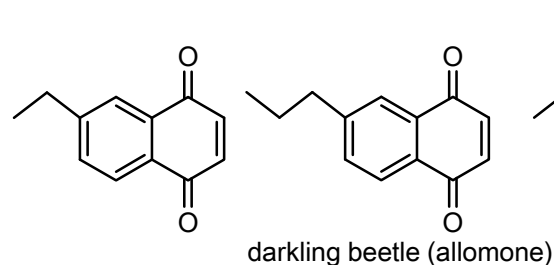
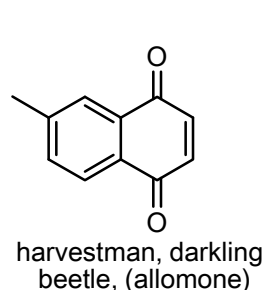
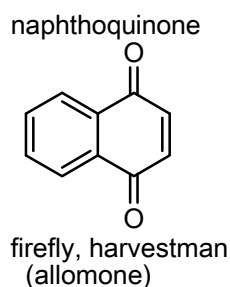
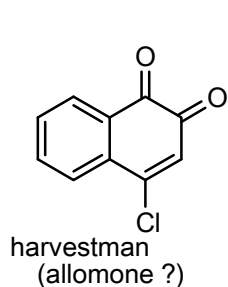
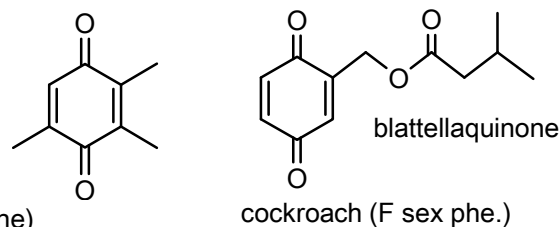
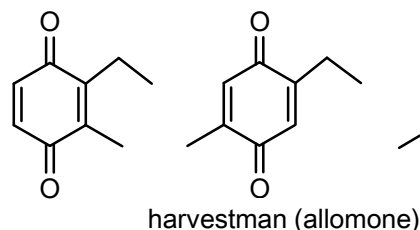
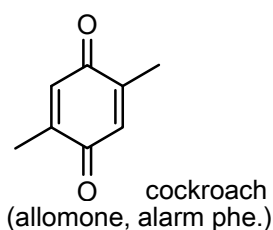
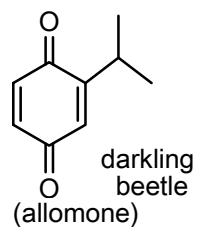
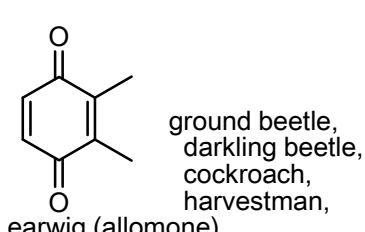
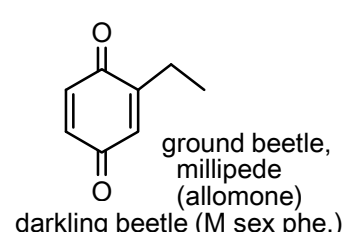
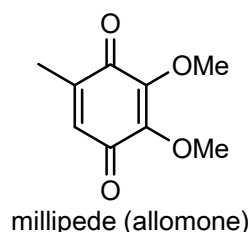
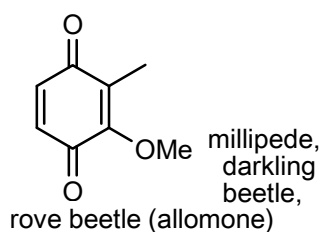
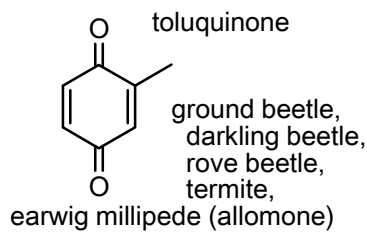
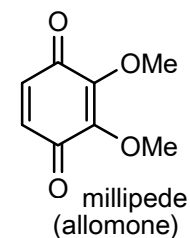
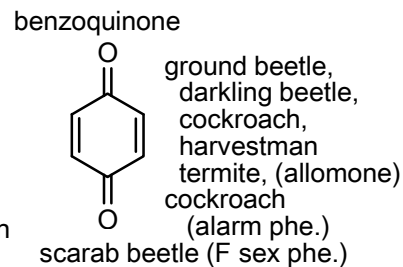
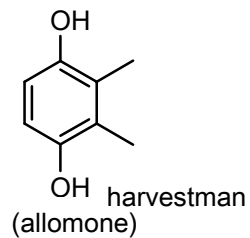
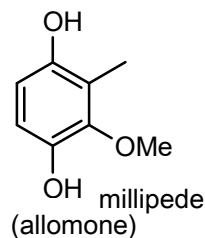
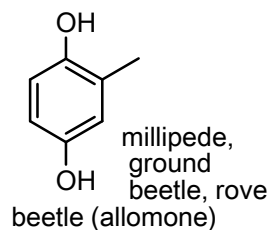
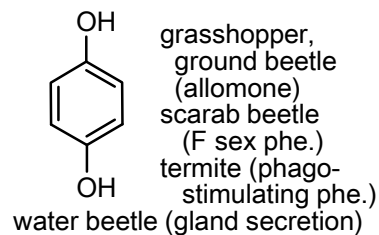


ant (allomone)



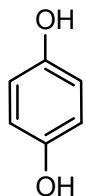
termite (aggregation phe.)

# [ C-3 ] Other: Aromatic comp. (v)

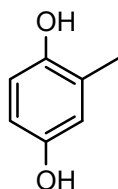




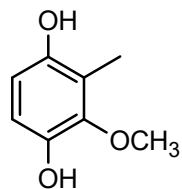
# [ C-3 ] Other: Aromatic comp. (v)



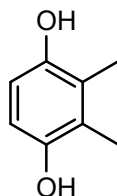
grasshopper, ground beetle (allomone)  
scarab beetle (F sex phe.), termite (phago-stimulating phe.)  
water beetle (gland secretion)



millipede, ground beetle, rove beetle (allomone)

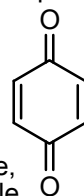


millipede (allomone)

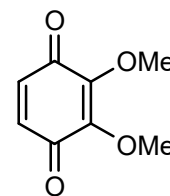


harvestman (allomone)

benzoquinone

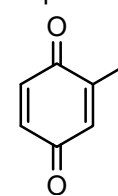


ground beetle, darkling beetle, termite, cockroach, harvestman (allomone)  
cockroach (alarm phe.)  
scarab beetle (F sex phe.)

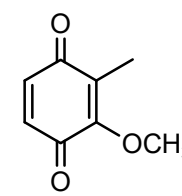


millipede (allomone)

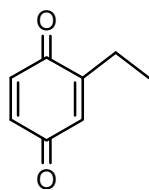
toluquinone



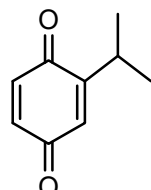
ground beetle, darkling beetle, rove beetle, termite, earwig millipede (allomone)



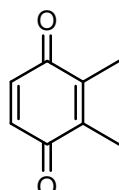
millipede, darkling beetle, rove beetle (allomone)



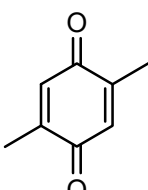
ground beetle, millipede (allomone)  
darkling beetle (M sex phe.)



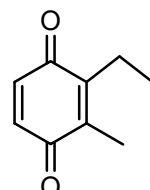
darkling beetle (allomone)



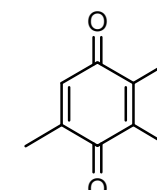
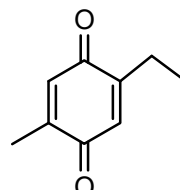
ground beetle, darkling beetle, cockroach, harvestman, earwig (allomone)



cockroach (allomone, alarm phe.)

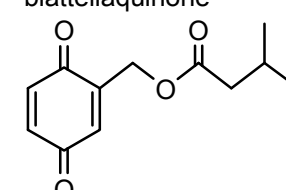


harvestman (allomone)



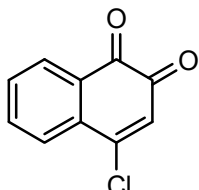
harvestman (allomone)

blattellaquinone

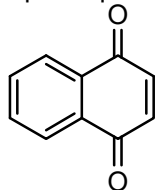


cockroach (F sex phe.)

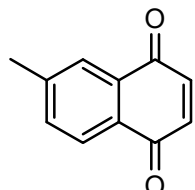
naphthoquinone



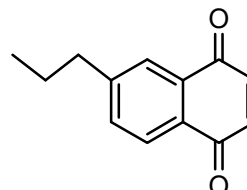
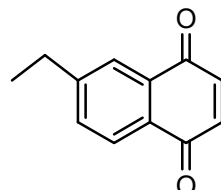
harvestman (allomone ?)



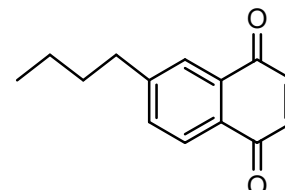
firefly, harvestman (allomone)



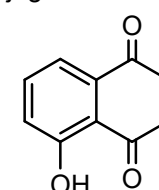
harvestman, darkling beetle, (allomone)



darkling beetle (allomone)

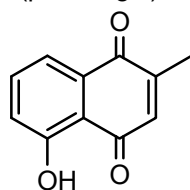


juglone



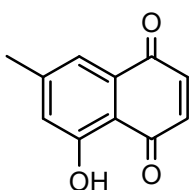
leaf beetle, thrips (allomone)

2-methyljuglone (plumbagin)

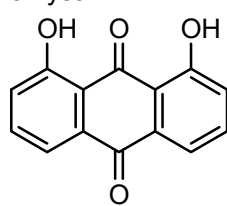


thrips (allomone)  
mite (gland secretion)

7-methyljuglone

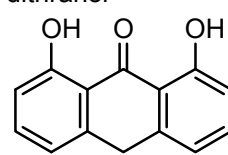


chryszin

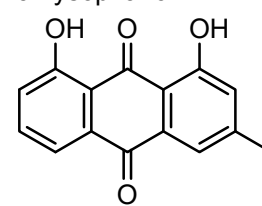


leaf beetle (allomone)

dithranol

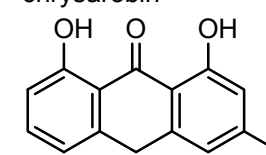


chrysophanol

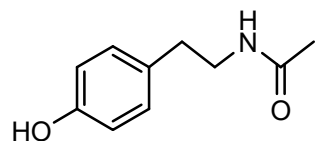


leaf beetle, aphid (allomone)

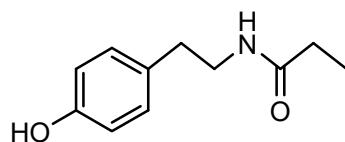
chrysarobin



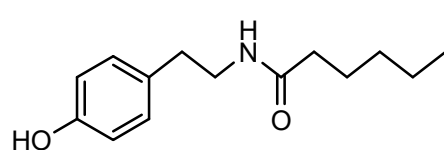
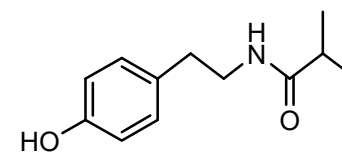
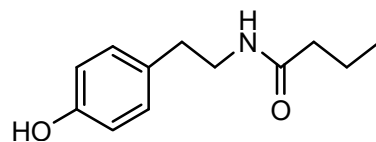
# [ C-3 ] Other: Aromatic comp. (vi)



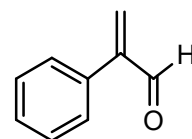
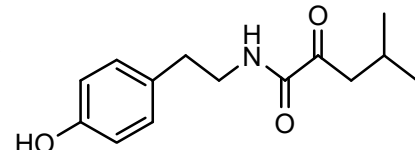
ant (M sex phe. ?)



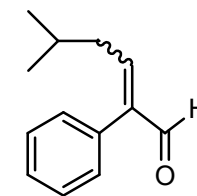
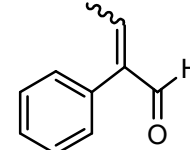
ant (M sex phe. ?)



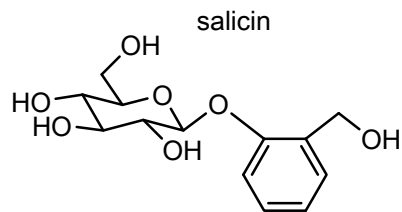
ant (M sex phe. ?)



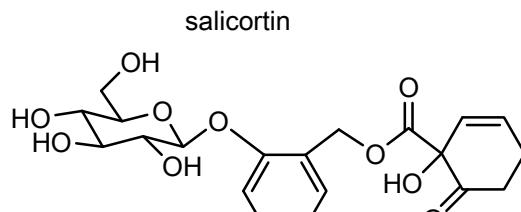
ant (gland secretion)



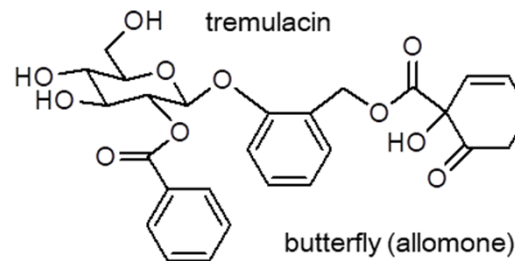
cave cricket  
(M gland secretion)



salicin



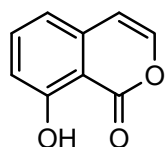
salicortin



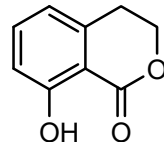
tremulacin

butterfly (allomone)

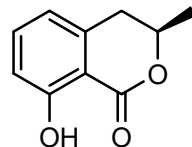
butterfly (allomone)



darkling beetle (allomone)

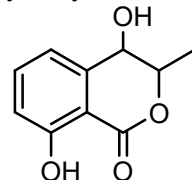


mellein

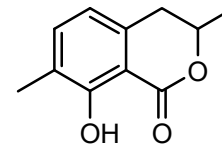


ant (M sex phe. ?, trail phe.  
allomone, gland secretion)  
termite, thrips (allomone)  
moth (M sex phe.)

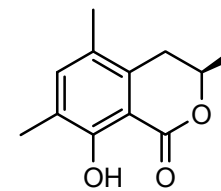
hydroxymellein



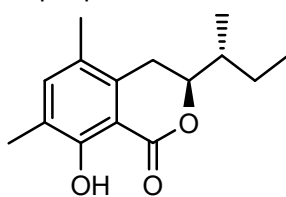
ant (gland secretion)



ant (trail phe.)



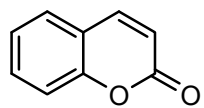
periplanotide E



cockroach  
(aggregation phe.)

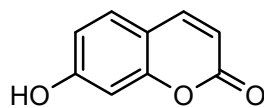
# [ C-3 ] Other: Aromatic comp. (vii)

coumarin

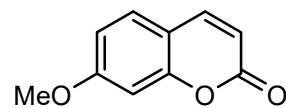


ermine moth (allomone ?)

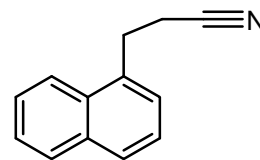
umbelliferone



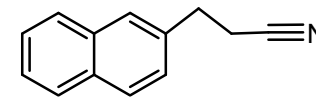
herniarin



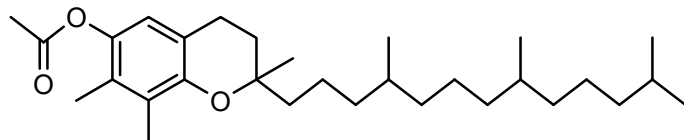
ermine moth (allomone ?)



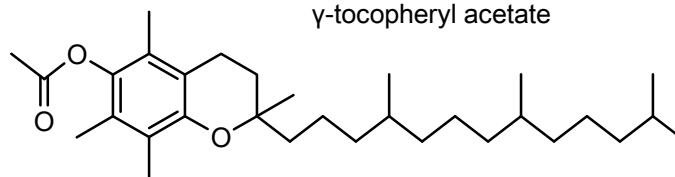
grasshopper (M sex phe. ?)



$\alpha$ -tocopheryl acetate

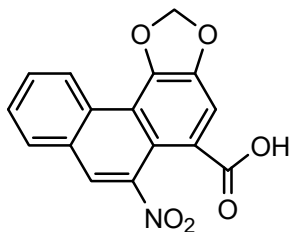


$\gamma$ -tocopheryl acetate



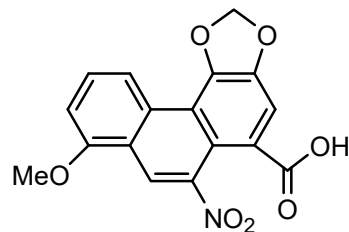
ladybug (allomone ?)

aristolochic acid II



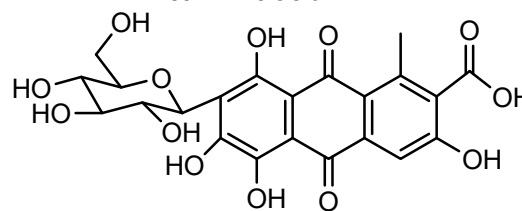
butterfly (allomone)

aristolochic acid I



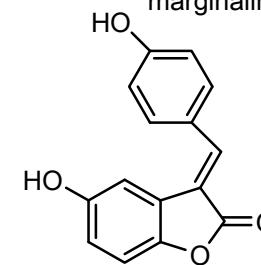
butterfly, pyralid moth  
(allomone)

carminic acid



pyralid moth, ladybug, chamaemyiid fly  
(larva allomone)

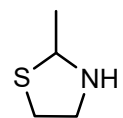
marginalin



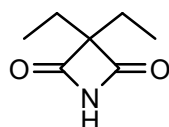
ground beetle  
(allomone)

# [ C-4 ] Other: Ring comp. (i)

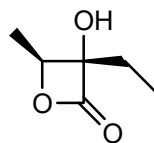
C3 ring



cockroach  
(M sex phe.)

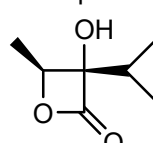


scarab beetle  
(F sex phe.?)

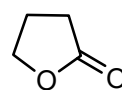


butterfly (M sex phe.)

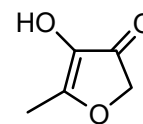
viridifloric  $\beta$ -lactone



C4 ring

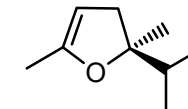
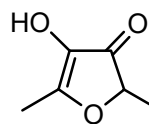


burrowing bug  
(gland secretion)



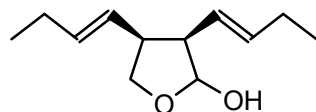
cockroach (M sex phe.)

furaneol

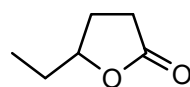


ship-timber beetle  
(F sex phe. ?)

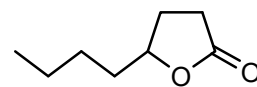
biprorulure



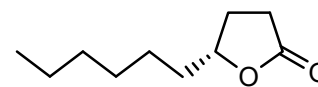
stink bug (M sex phe.)



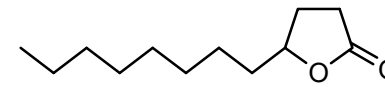
hide beetle  
(F sex phe.)



parasitoid wasp, honey  
bee (gland secretion)

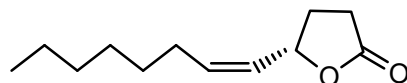


scarab beetle (M sex phe.,  
M aggregation phe.)  
rove beetle, thrips (allomone)  
butterfly (M scent secretion)



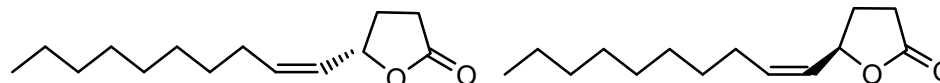
rove beetle (allomone ?)  
parasitoid wasp (gland secretion)

buibuilactone

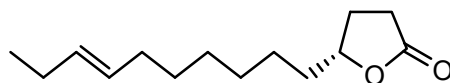


scarab beetle (F sex phe.)

japonilure

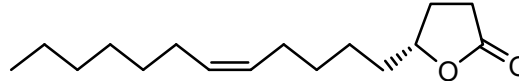


scarab beetle (F sex phe.)

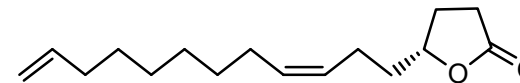


parasitoid wasp (M aggregation phe.)

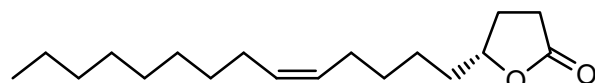
desmolactone



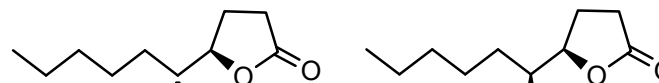
longhorn beetle (F sex phe.)



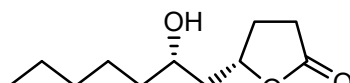
scarab beetle (F sex phe.)



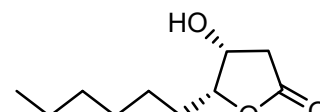
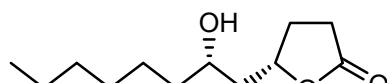
ant (secretion), stem sawfly (F sex phe.)



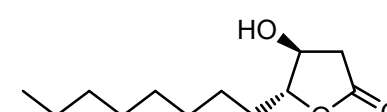
parasitoid wasp (M sex phe.)



butterfly (M sex phe.)



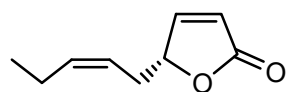
fruit fly (M sex phe.?)



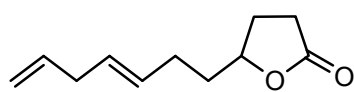
harvestman (allomone)

# [ C-4 ] Other: Ring comp. (ii)

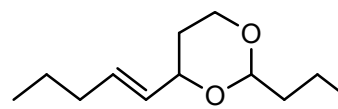
C4 ring



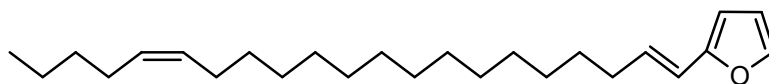
pyralid moth (M sex phe.)



fruit fly (gland secretion)



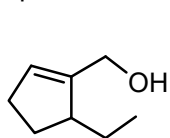
cockroach (allomone ?)



ant (allomone ?)

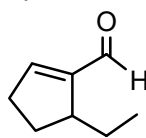
C5 ring

phoracanthol

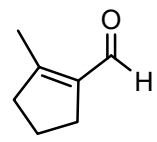


longhorn beetle (allomone?)

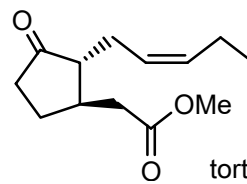
phoracanthal



ant (gland secretion)

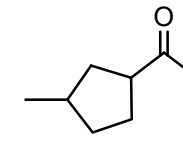
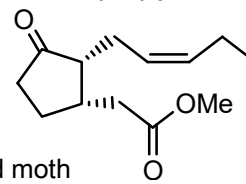


methyl jasmonate



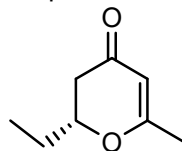
tortricid moth (M sex phe.)

methyl epijasmonate

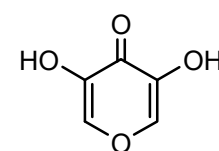
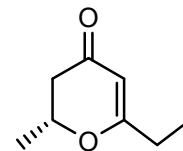


stick insect (allomone ?)

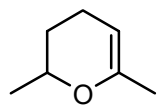
hepialone



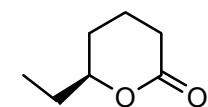
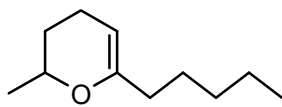
swift moth (M sex phe.)



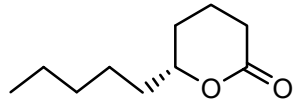
shield bug (M sex phe.)



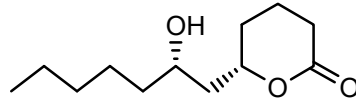
bee (cephalic secretion)



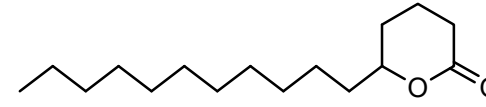
fruit fly (M sex phe.)



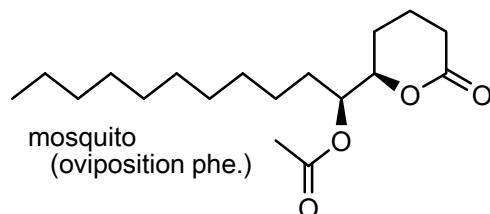
butterfly (M sex phe. ?)



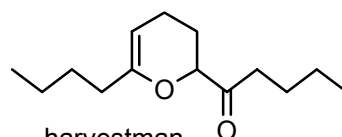
butterfly (M sex phe.)



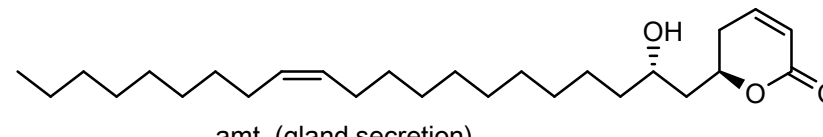
wasp (queen primer phe.)



mosquito (oviposition phe.)



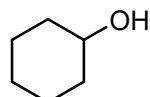
harvestman (allomone ?)



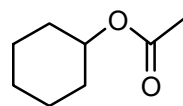
ant (gland secretion)

# [ C-4 ] Other: Ring comp. (iii)

C6 ring

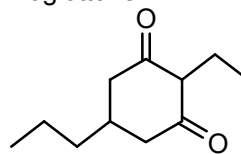


grasshopper  
(aggregation phe.)

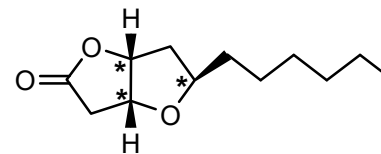


butterfly (F sex phe. ?)

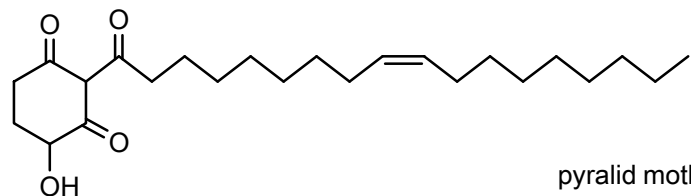
chiloglottone



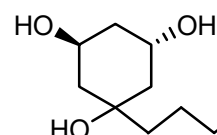
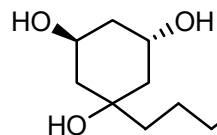
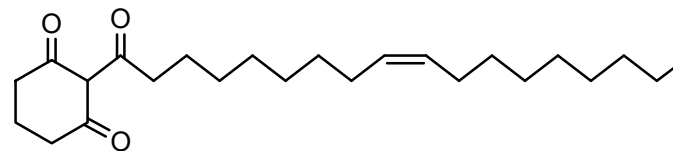
solitary wasp (F sex phe.)



parasitoid wasp (gland secretion)



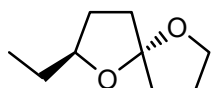
pyralid moth (larva trail phe.)



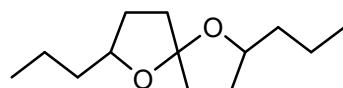
ant (gland secretion)

C7 ring

chalcogran



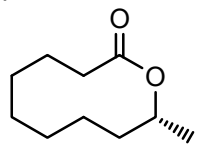
bark beetle  
(aggregation phe.)



mining bee  
(gland secretion)

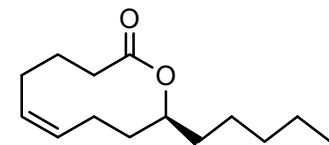
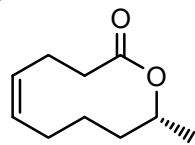
C9 ring

phoracantholide I



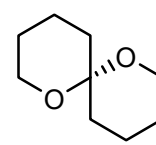
longhorn beetle (allomone ?)

phoracantholide J

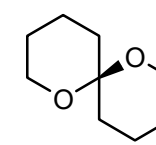
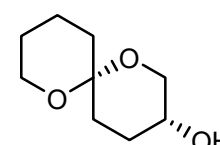


termite (queen recognition ?)

olean



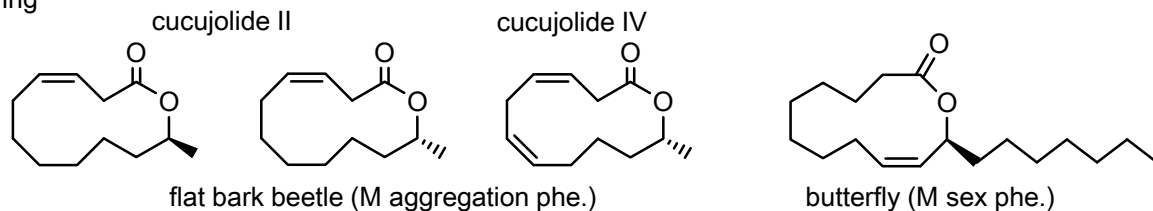
fruit fly (F sex phe.)



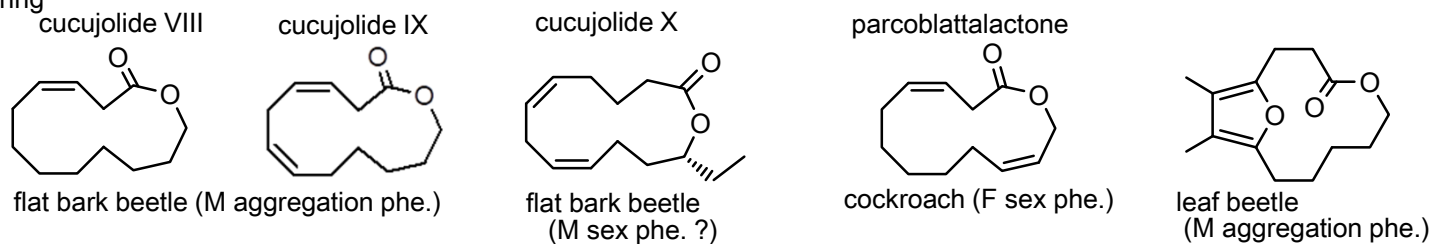
fruit fly  
(F sex phe.)

# [ C-4 ] Other: Ring comp. (iv)

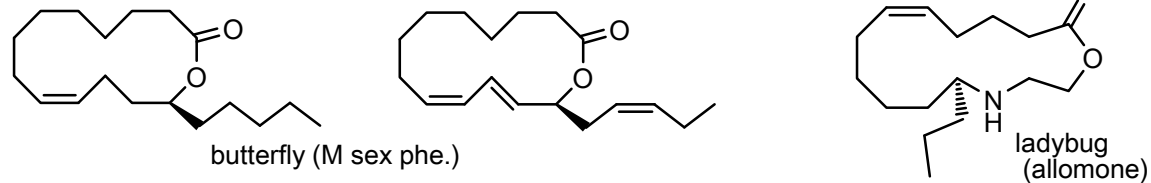
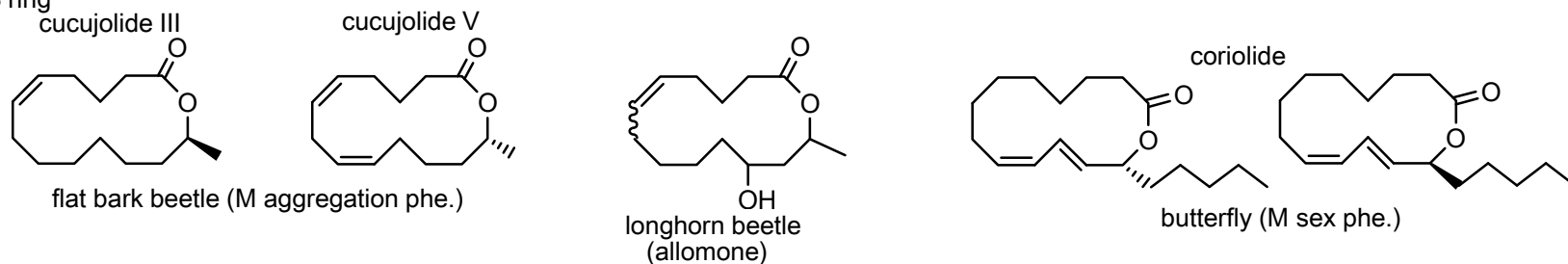
C11 ring



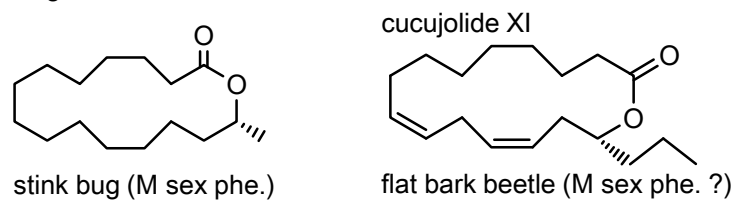
C12 ring



C13 ring

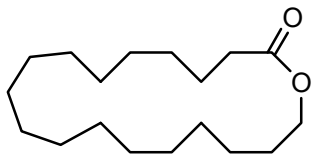


C15 ring

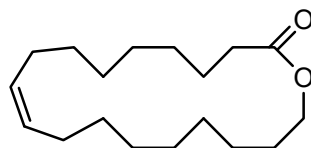


# [ C-4 ] Other: Ring comp. (v)

C18 ring

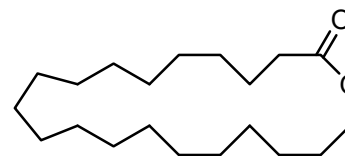


sweat bee (gland secretion,  
F sex phe., queen phe.)



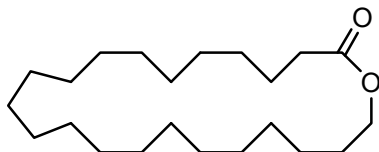
wasp (trail phe. ?)

C20 ring

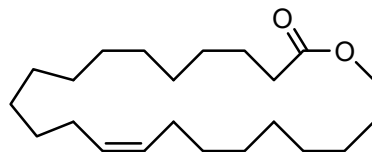


sweat bee (gland secretion,  
F sex phe., queen phe.)  
mining bee, plasterer bee  
(gland secretion)

C22 ring

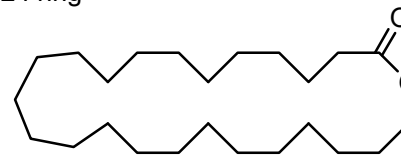


sweat bee (gland secretion,  
F sex phe., queen phe.)  
plasterer bee (gland secretion)

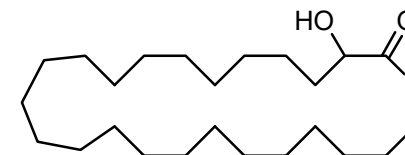


sweat bee (gland secretion)

C24 ring

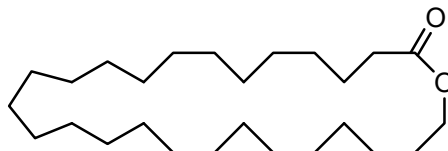


sweat bee (gland secretion,  
F sex phe.)  
plasterer bee (gland secretion)  
termite (allomone ?)

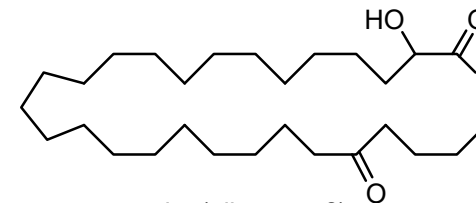
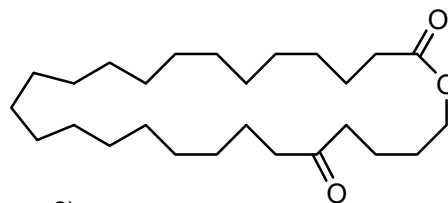


termite (allomone ?)

C26 ring

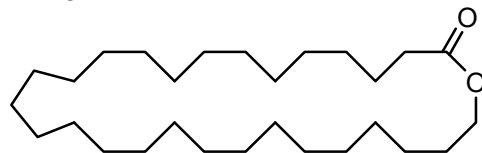


termite (allomone ?)



termite (allomone ?)

C28 ring



termite (allomone ?)

