

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

Update: Feb. 2, 2025

### (C) Other Compounds

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

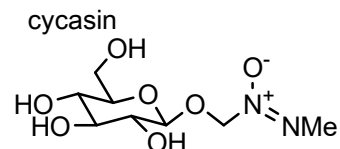
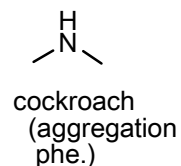
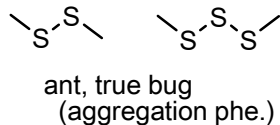
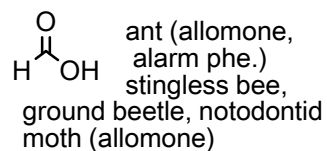
[ C-1 ]	Other: Acyclic compounds	i – xxii	(511 compounds)
[ C-2 ]	Other: True alkaloids	i – xii	(229 compounds)
[ C-3 ]	Other: Aromatic compounds	i – ix	(165 compounds)
[ C-4 ]	Other: Ring compounds	i – v	(100 compounds)

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

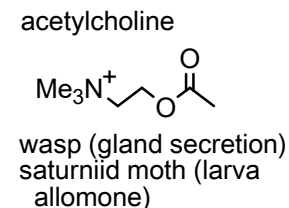
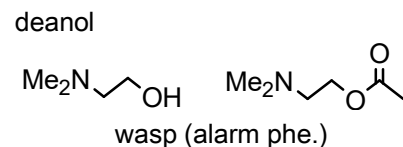
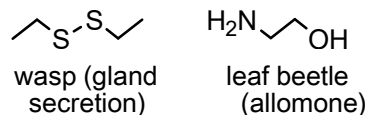
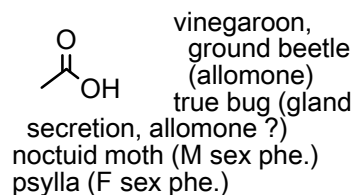
Lepidopteran female sex pheromones and male attractants are listed in **Part I**. Other arthropod pheromones and allomones are listed in **Part II**, which is composed of **(A)** terpenoid compounds without alkaloids, **(B)** non-terpene methyl-branched compounds, and **(C)** other compounds including terpene alkaloids.

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

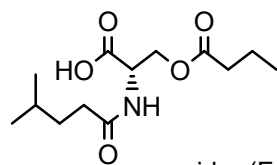
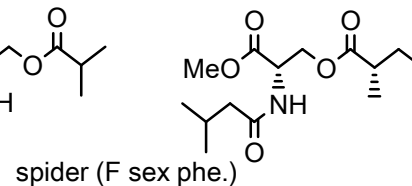
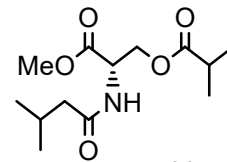
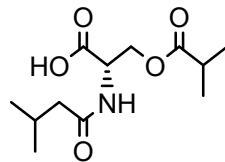
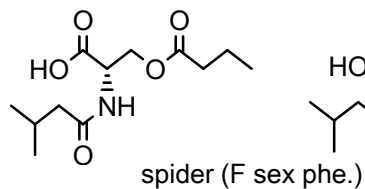
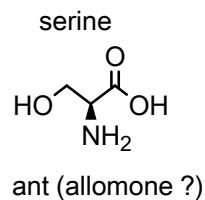
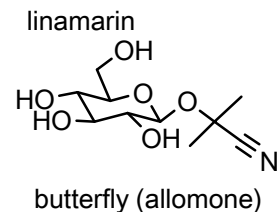
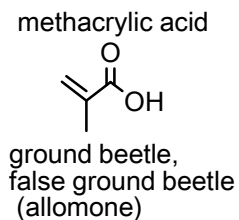
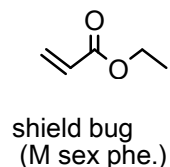
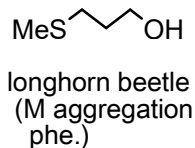
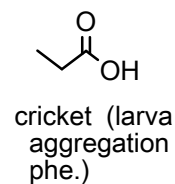
## C1 chain



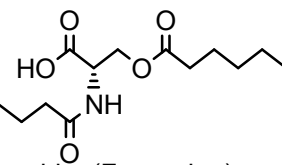
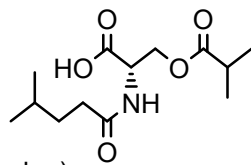
## C2 chain



## C3 chain



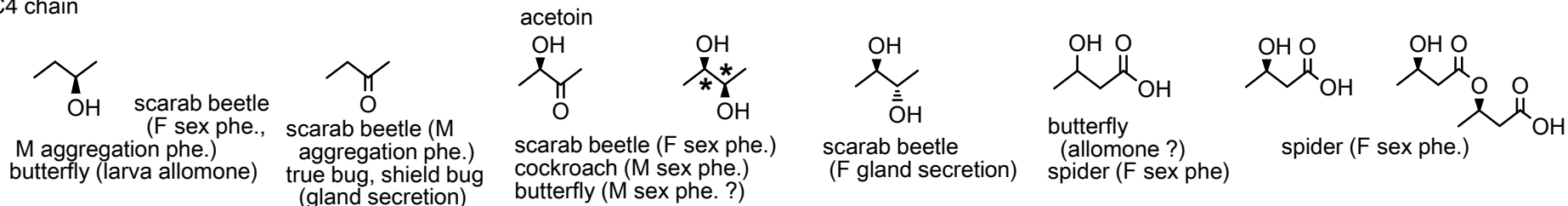
spider (F sex phe.)



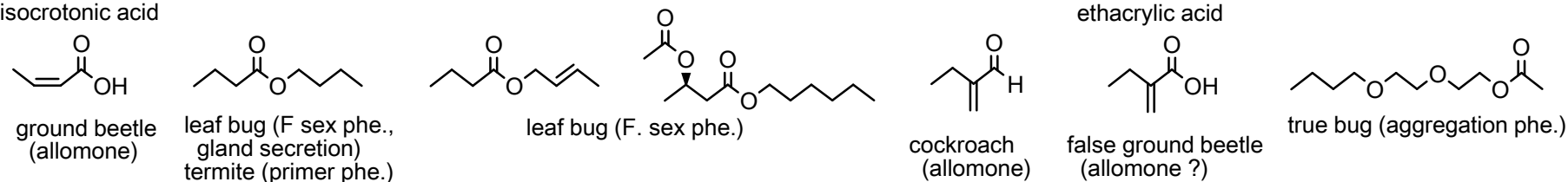
spider (F sex phe.)

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

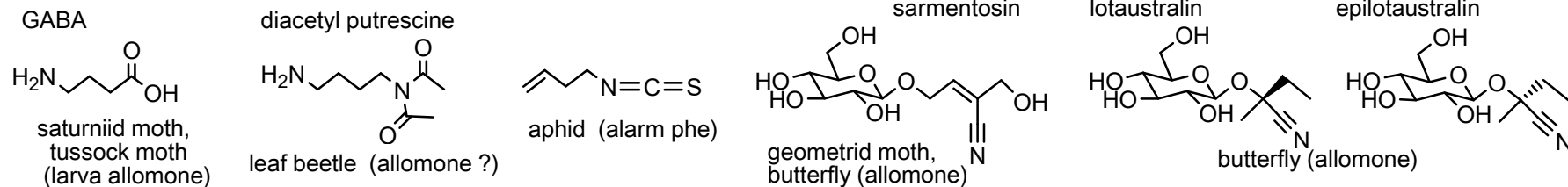
## C4 chain



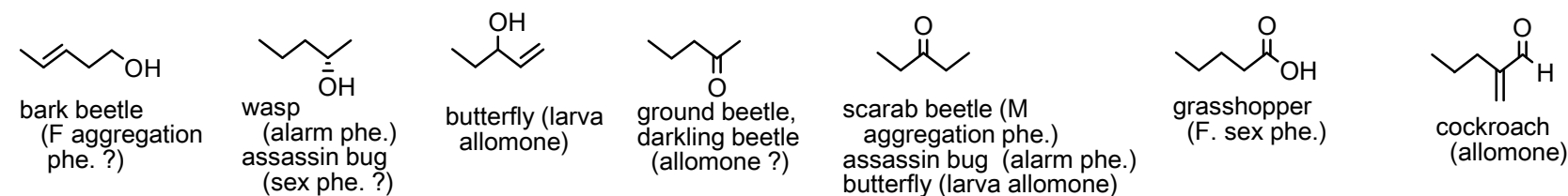
## isocrotonic acid



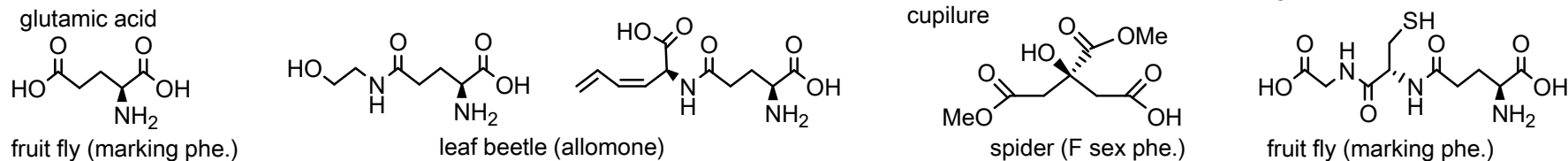
## GABA



## C5 chain

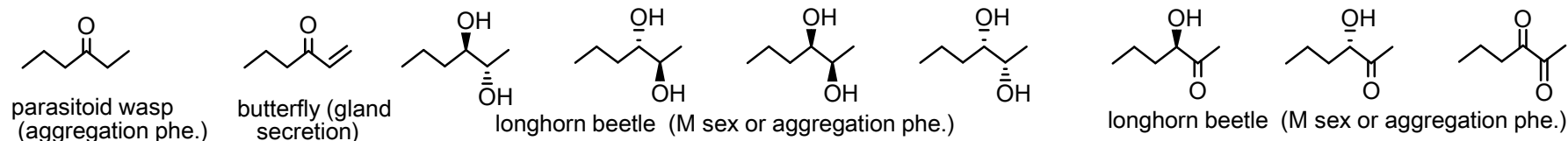
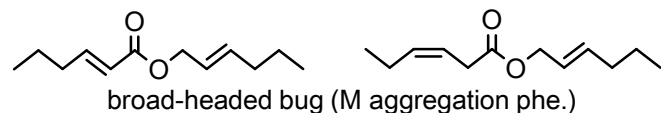
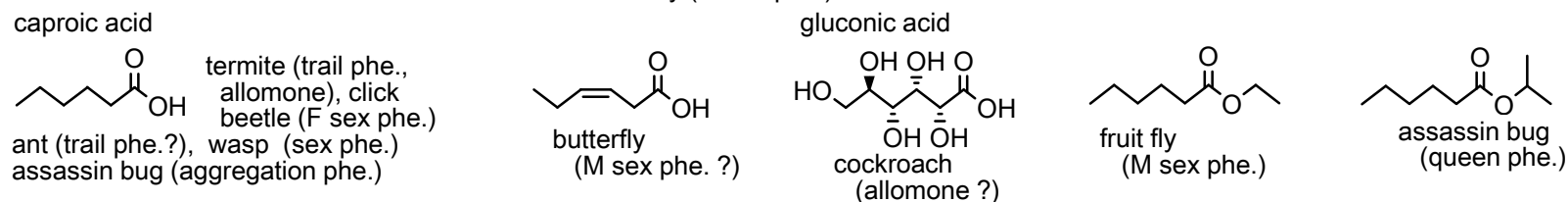
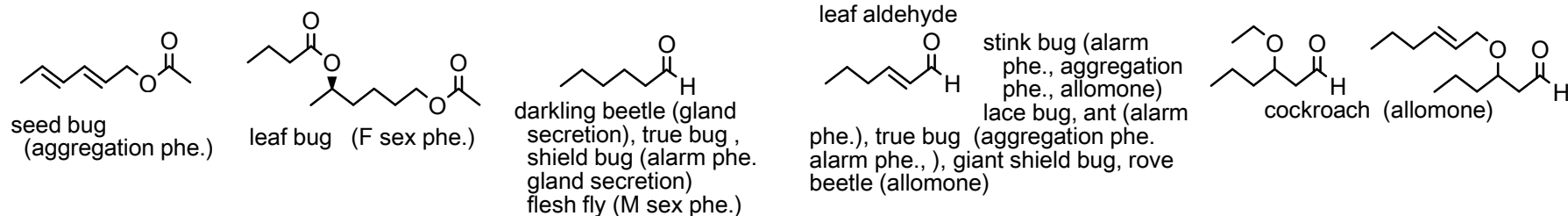
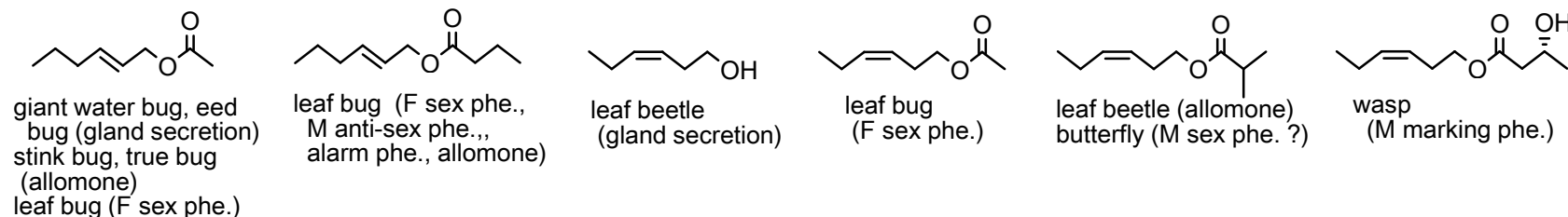
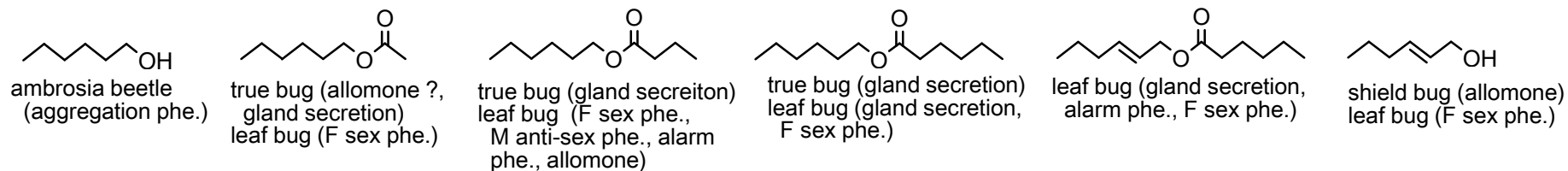


## glutamic acid



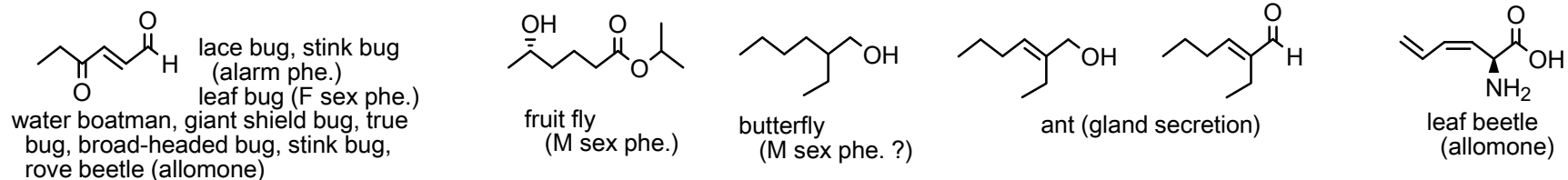
# [ C-1 ] Other: Acyclic comp. (iii)

C6 chain

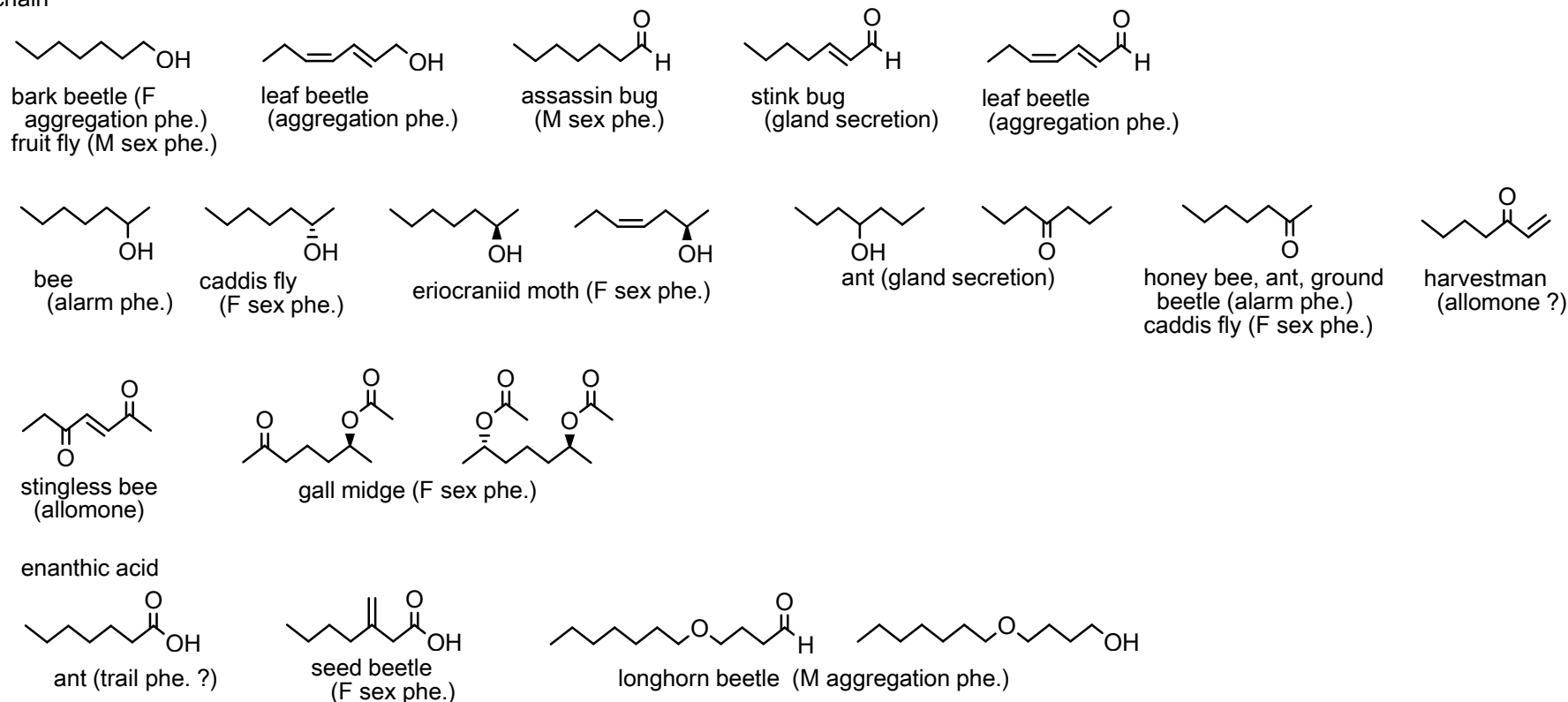


# [ C-1 ] Other: Acyclic comp. (iv)

C6 chain

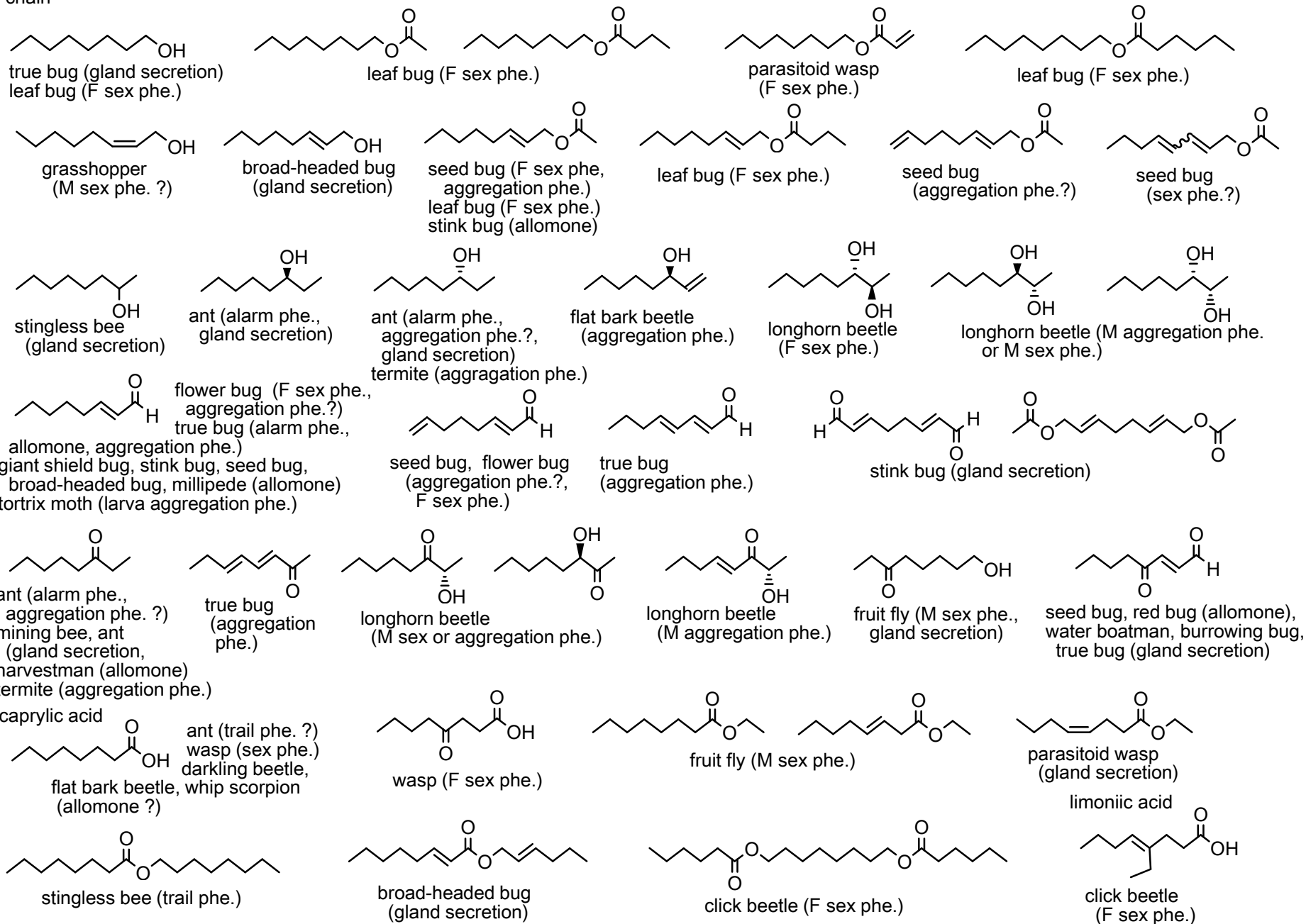


C7 chain



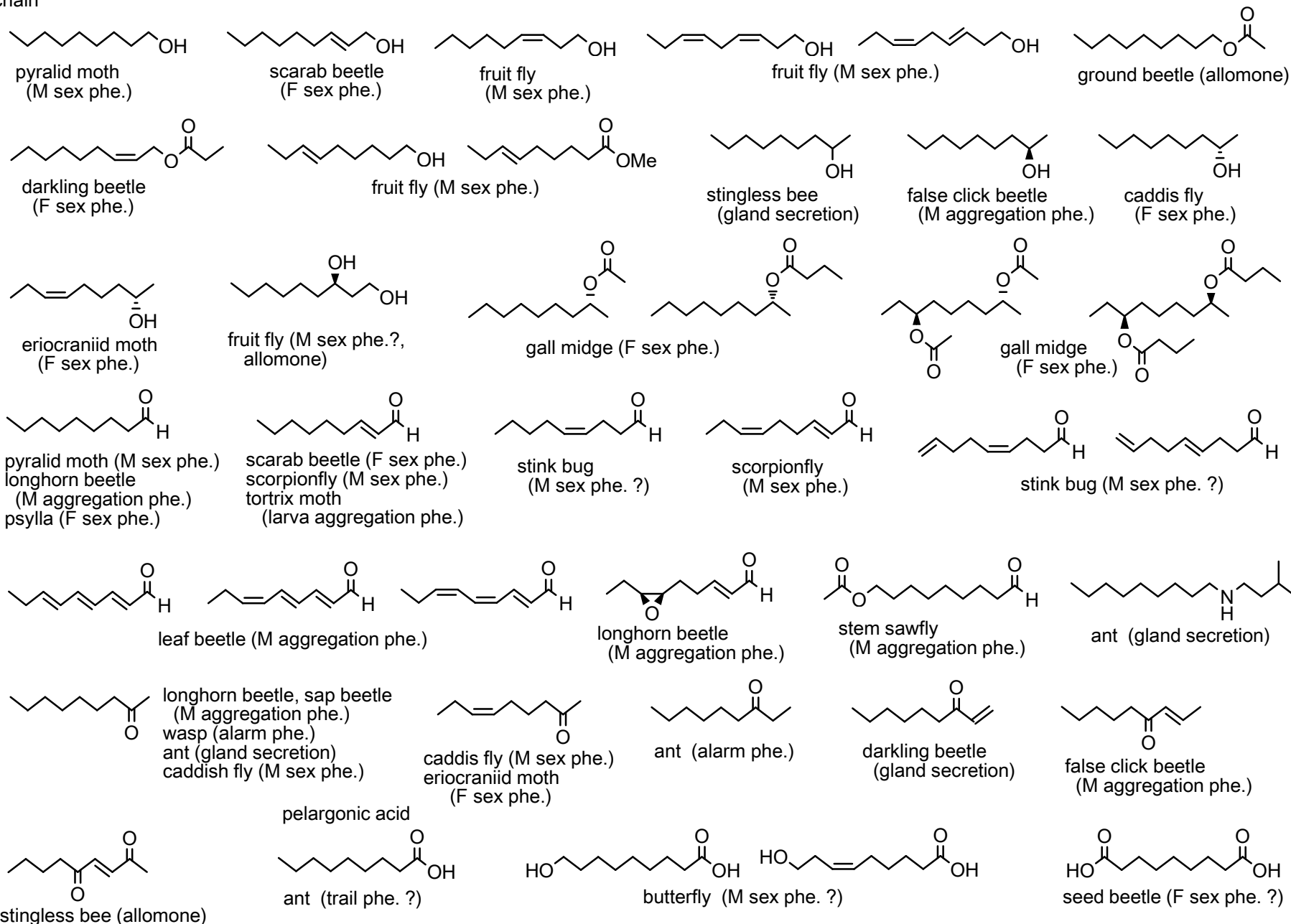
# [ C-1 ] Other: Acyclic comp. (v)

C8 chain



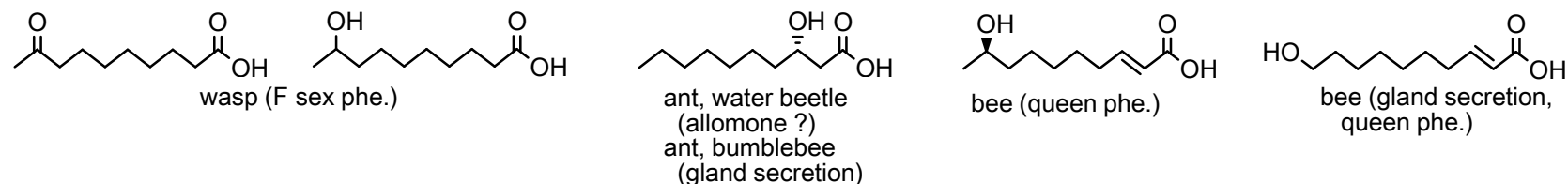
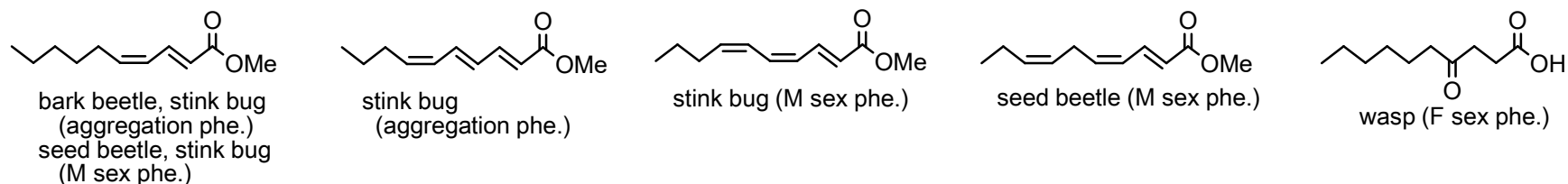
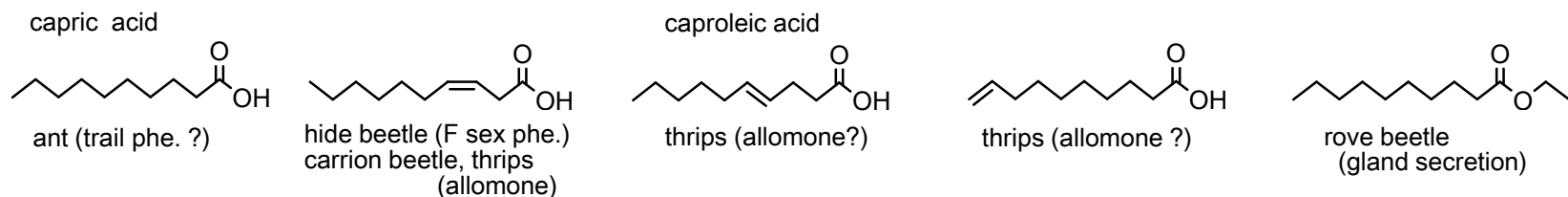
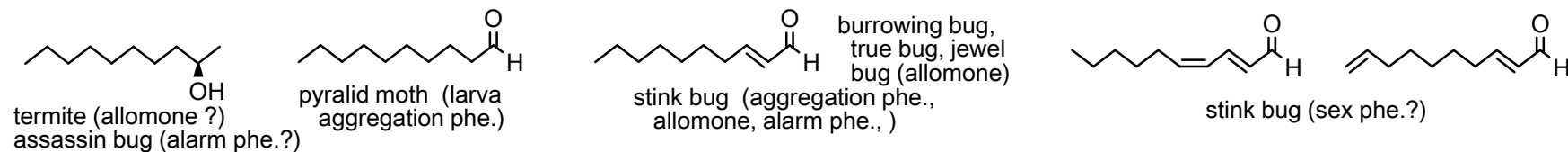
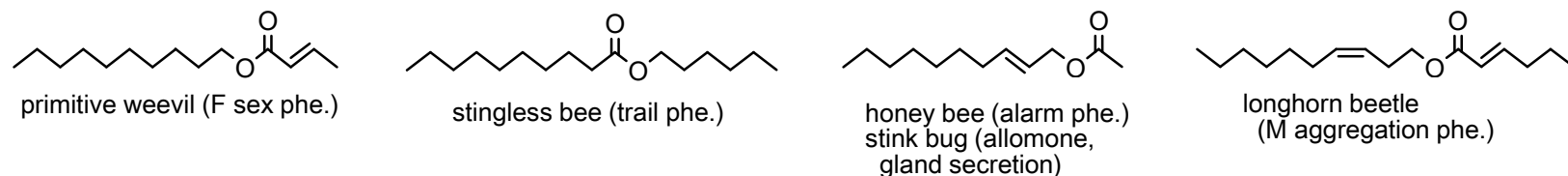
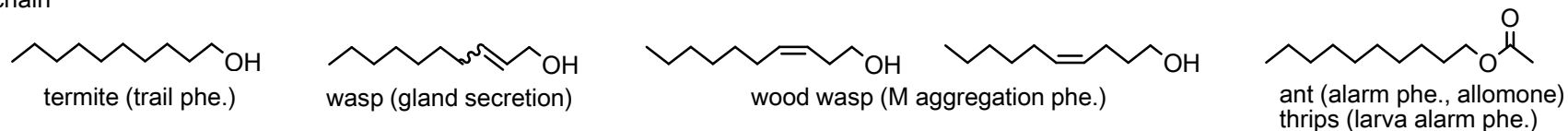
# [ C-1 ] Other: Acyclic comp. (vi)

C9 chain



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

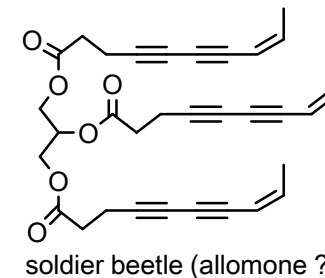
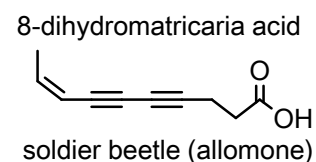
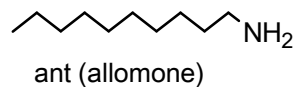
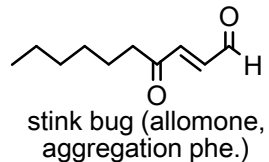
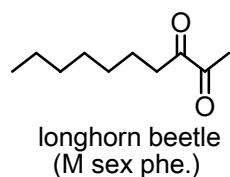
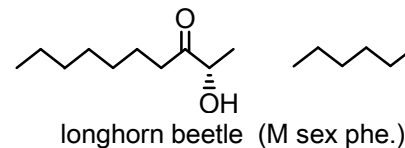
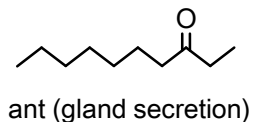
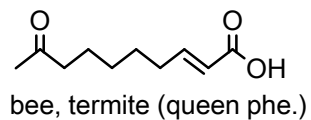
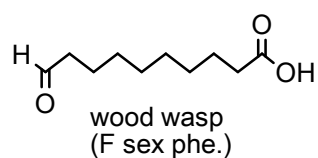
C10 chain



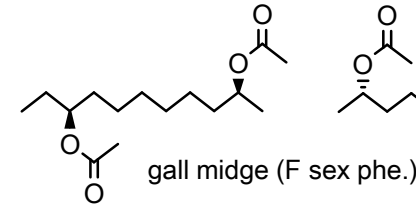
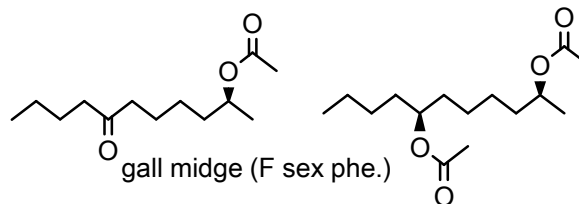
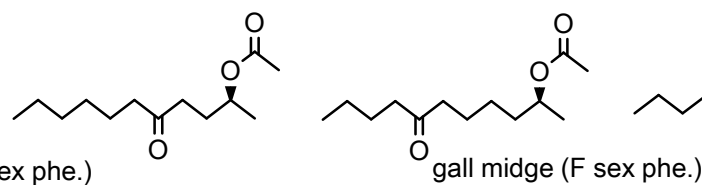
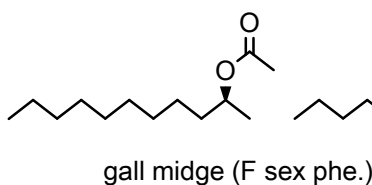
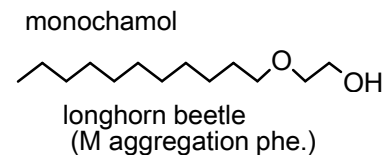
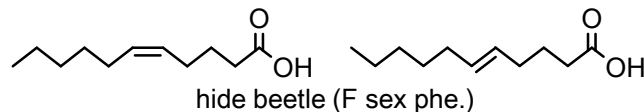
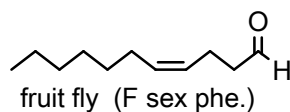
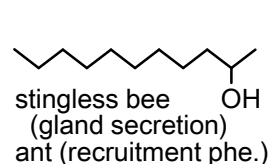
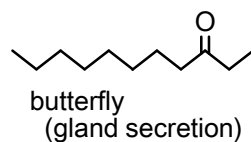
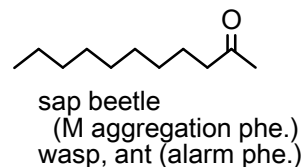
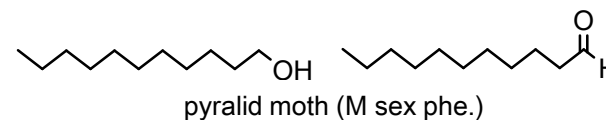
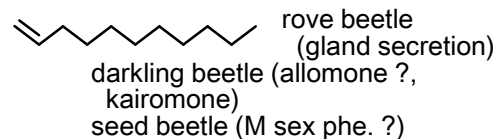
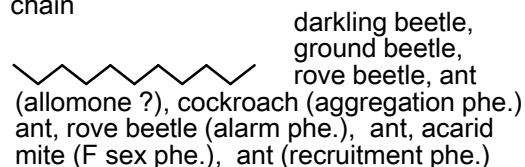


# [ C-1 ] Other: Acyclic comp. (viii)

## C10 chain



## C11 chain

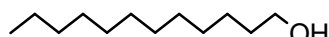


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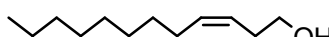
C12 chain



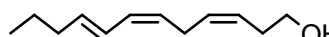
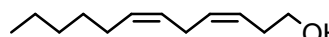
ant (gland secretion)



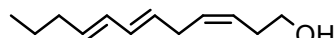
termite (trail phe.)



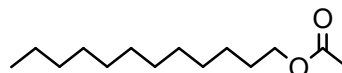
termite (trail phe.)



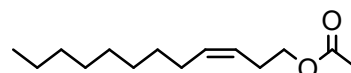
termite (trail phe., F sex phe.)



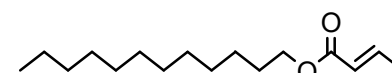
termite (trail phe.)



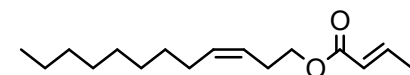
ant (secretion, alarm phe., allomone)  
click beetle (F sex phe.), thrips (larva  
alarm phe., larva aggregation phe.)



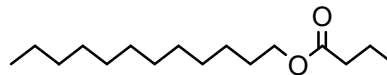
darkling beetle (M sex phe.)



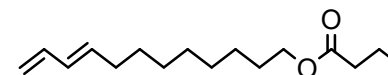
primitive weevil (F sex phe.)



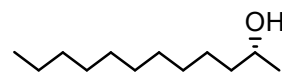
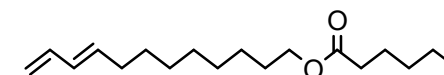
primitive weevil (F sex phe.)



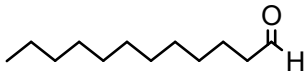
longhorned bee  
(M gland secretion)



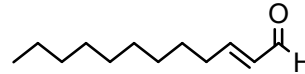
click beetle (F sex phe.)



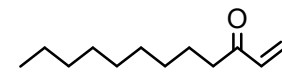
ant (trail phe.)



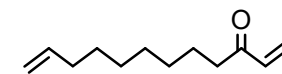
rove beetle (aphrodisiac phe.,  
allomone), parasitoid wasp  
(M aggregation phe.)



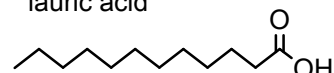
millipede (allomone ?)



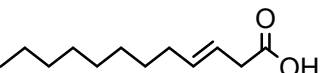
sweat bee (gland secretion)



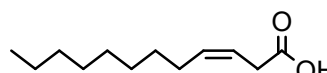
lauric acid



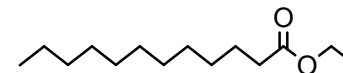
ant (trail phe. ?)  
sand fly (oviposition phe.)



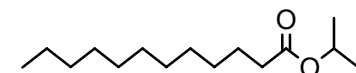
thrips (gland secretion)



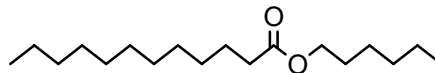
ant (gland secretion)



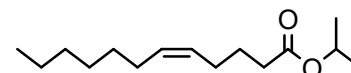
cuckoo bee (allomone ?)  
fruit fly (M sex phe.)  
bark beetle (aggregation phe.)



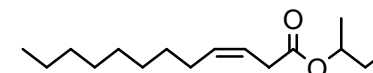
rove beetle (gland secretion)  
hide beetle  
(M aggregation phe. ?)



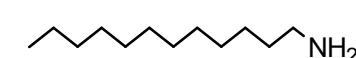
millipede (allomone ?)



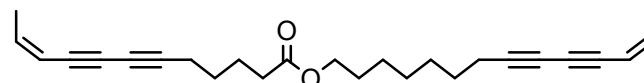
hide beetle (M gland secretion)



rove beetle (gland secretion)



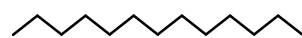
ant (allomone)



soldier beetle (allomone ?)

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

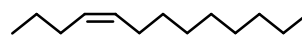
## C13 chain



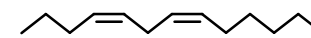
ant (gland secretion, F sex phe., alarm phe. allomone)  
 burrowing bug, jewel bug, stink bug (gland secretion)  
 darkling beetle, rove beetle, true bug, red bug (allomone)



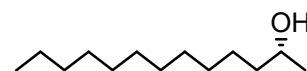
green lacewing, stink bug (allomone ?)  
 darkling beetle (M sex phe.)



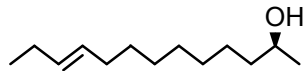
ant (F sex phe., gland secretion)  
 green lacewing (allomone, alarm phe., gland secretion)  
 rove beetle (allomone, aphrodisiac phe.)  
 stink bug (allomone ?)



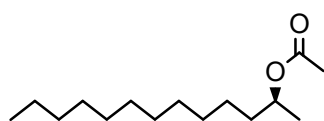
green lacewing (gland secretion)



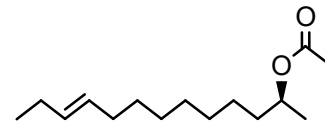
ant (trail phe.)



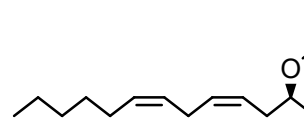
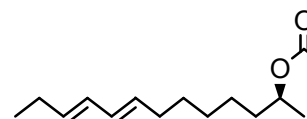
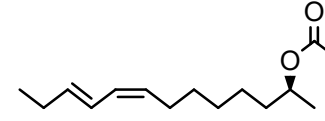
gall midge (F sex phe.)



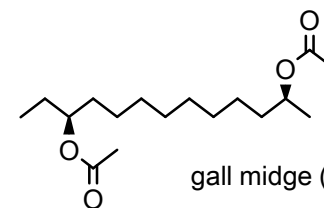
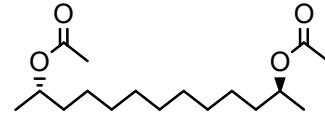
gall midge (F sex phe.)  
 fruit fly (M aggregation phe.)



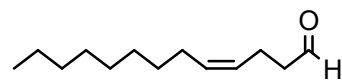
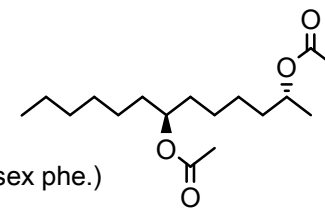
gall midge (F sex phe.)



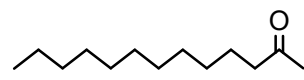
gall midge (F sex phe.)



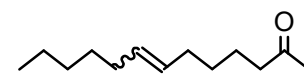
gall midge (F sex phe.)



parasitoid wasp (F sex phe.)



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

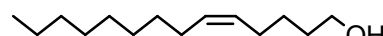


harvestman (allomone ?)

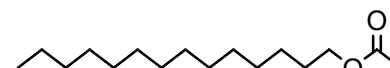
## C14 chain



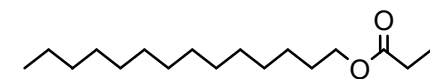
cockroach (aggregation phe.)



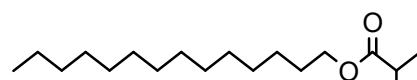
sawfly (F sex phe.)



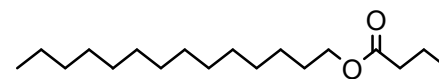
ant (alarm phe.)  
 ground beetle, bee (allomone)  
 parasitoid wasp (F sex phe.)  
 bumblebee (gland secretion)  
 thrips (larva aggregation phe.)



termite (F sex phe.)



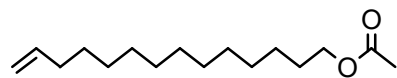
broad-headed bug (M aggregation phe.)



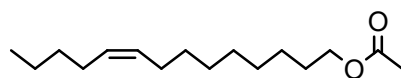
longhorned bee (M gland secretion)

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

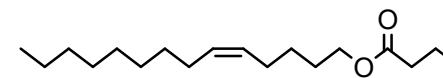
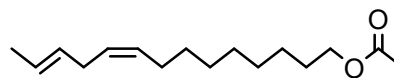
C14 chain



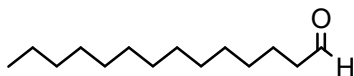
click beetle (F sex phe.)



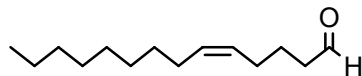
bolas spider (allomone: prey attractant)



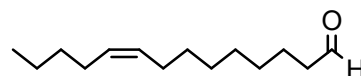
stingless bee (secretion)



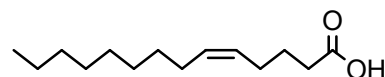
mantid, parasitoid wasp  
(F sex phe.)  
ant (queen allomone)



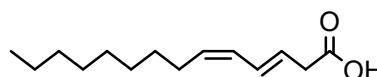
rove beetle (aphrodisiac phe.)



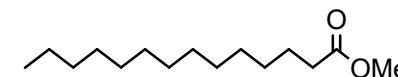
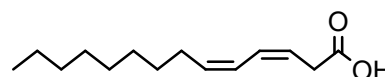
bolas spider  
(allomone: prey attractant)



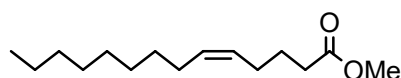
thrips (allomone?)



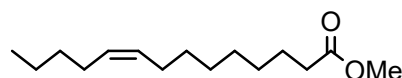
hide beetle (F sex phe.)



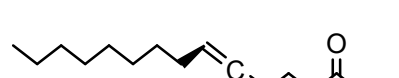
bark beetle (gland secretion)  
cuckoo bee (F marking phe.)



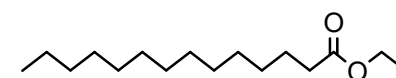
scarab beetle (F sex phe.)



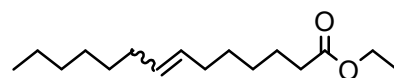
fruit fly (M anti-aphrodisiac phe.)



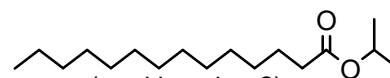
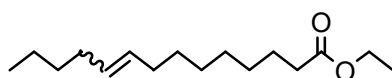
seed beetle (M sex phe.)



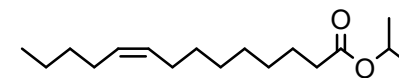
cuckoo bee (allomone ?)  
wasp (marking phe. ?)  
fruit fly (M sex phe.)



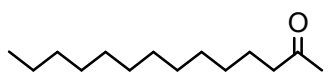
bumblebee (M marking phe. ?)



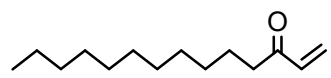
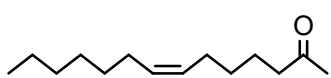
wasp (marking phe. ?)  
hide beetle (M aggregation phe. ?)



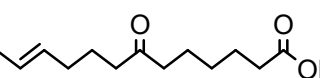
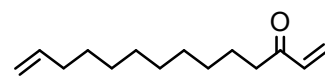
hide beetle (M aggregation phe. ?)



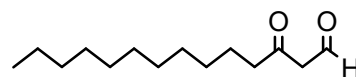
scarab beetle (F sex phe.)



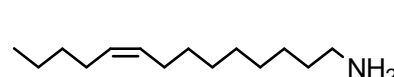
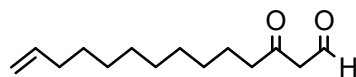
termite (allomone)



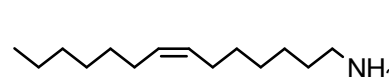
butterfly (M sex phe. ?)



termite (allomone)

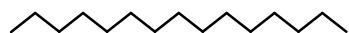


ant (allomone ?)

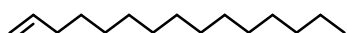


# [ C-1 ] Other: Acyclic comp. (xii)

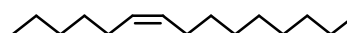
C15 chain



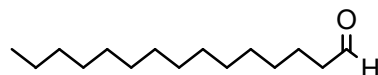
true bug, small carpenter bee  
(allomone ?), wasp (F sex phe.)  
ant (gland secretion)



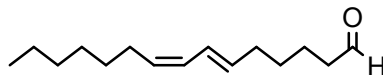
darkling beetle (allomone)



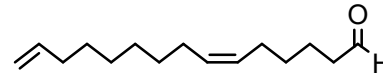
acarid mite (alarm phe.)



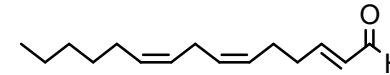
mantid (F sex phe.)



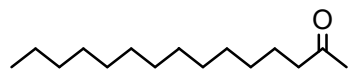
longhorn beetle (M aggregation phe.)



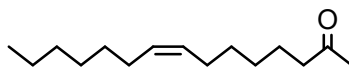
webspinning sawfly (F sex phe.)



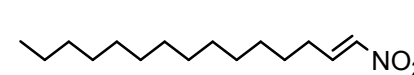
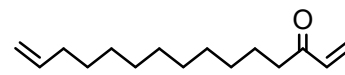
longhorn beetle (aggregation phe.)



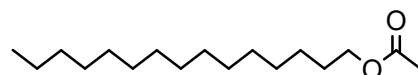
wasp (marking phe.?, trail phe.?)  
fruit fly (M aggregation phe.)  
darkling beetle (allomone ?)  
ant, cuckoo bee (gland secretion)



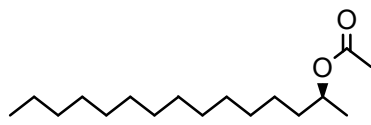
termite (allomone)



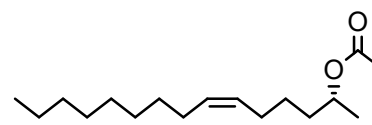
termite (allomone)



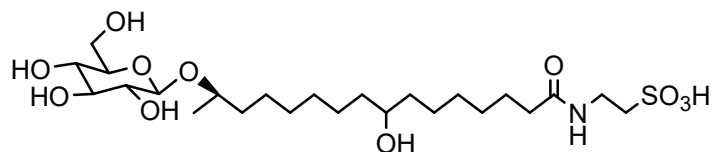
scarab beetle (aggregation phe.)



fruit fly (M aggregation phe.)



gall midge (F sex phe.)



fruit fly (marking phe.)

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

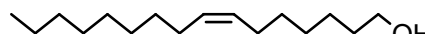
C16 chain



acrolepiid moth (M sex phe.)



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

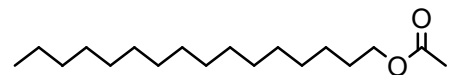


scarab beetle (F sex phe.)

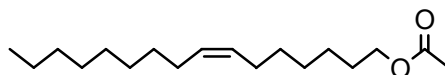
palmitoleyl alcohol



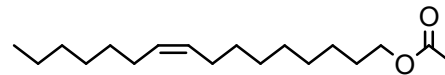
bumblebee (M marking phe. ?)  
seed beetle, bark beetle, darkling beetles (gland secretion)



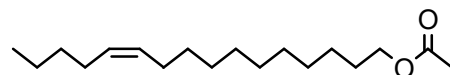
ground beetle, millipede (allomone)  
cuckoo bee (marking phe. ?)  
noctuid moth, bumblebee (gland secretion), spider (F sex phe.)



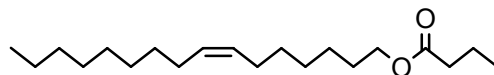
bumblebee (M marking phe. ?)



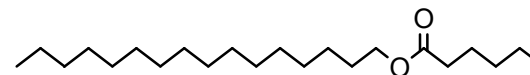
millipede (allomone ?)  
thrips (gland secretion)



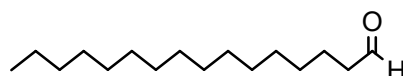
parasitoid wasp (F sex phe.)



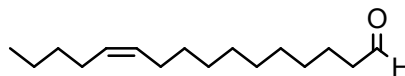
stingless bee (secretion)



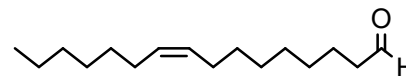
sweat bee (gland secretion)



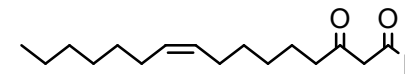
wasp (M marking phe. ?)



bolas spider (allomone: prey attractant)

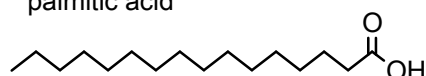


ant (trail phe., aggregation phe.)  
parasitoid wasp (F sex phe.)



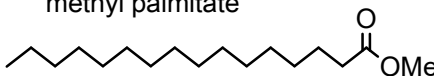
termite (allomone)

palmitic acid

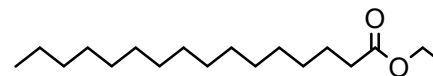


leafroller moth (M-to-M inhibitory phe.)  
longhorned bee (F gland secretion)  
termite (aggregation phe.)

methyl palmitate

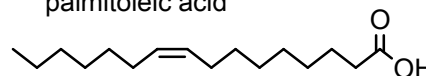


cuckoo bee (F marking phe.)  
wasp (F allomone)  
tineid moth (M aggregation phe.)  
fruit fly (marking phe. ?)



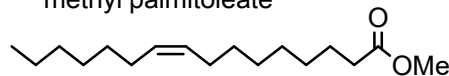
hide beetle (aggregation phe.)  
bark beetle, plasterer bee (gland secretion)  
cuckoo bee (allomone ?)

palmitoleic acid

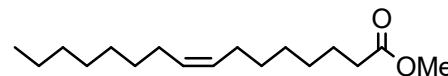


wasp (marking phe. ?)  
termite (aggregation phe.)

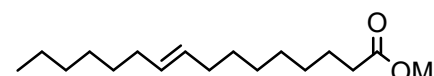
methyl palmitoleate



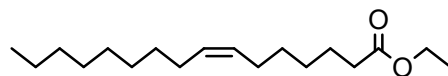
tineid moth (M aggregation phe.)  
tsetse fly (F sex phe.)



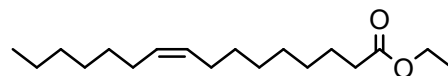
stink bug (M sex phe.)



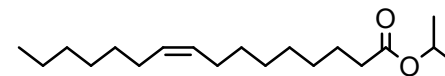
fruit fly (marking phe. ?)



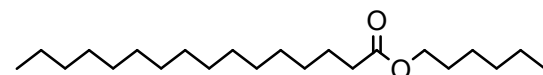
wasp (M marking phe. ?)



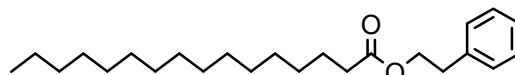
parasitoid wasp (F sex phe.)



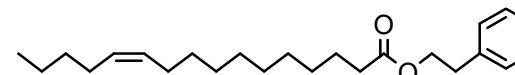
rove beetle (M aggregation phe.)



butterfly (M aphrodisiac phe.)

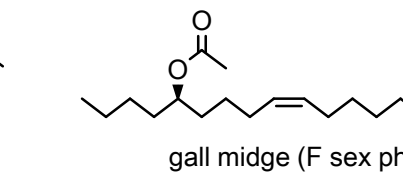
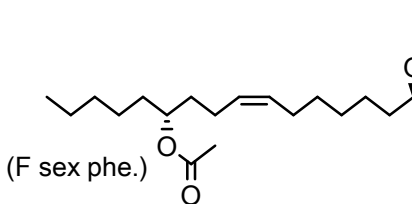
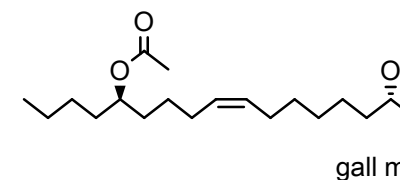
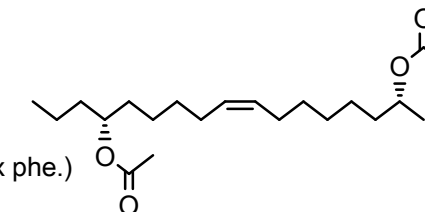
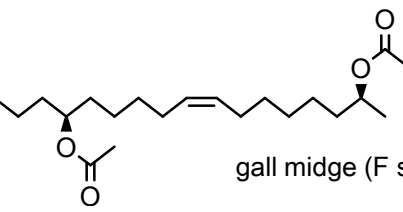
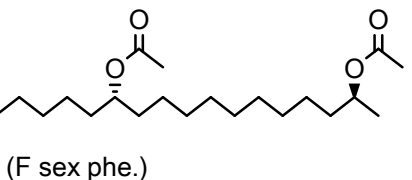
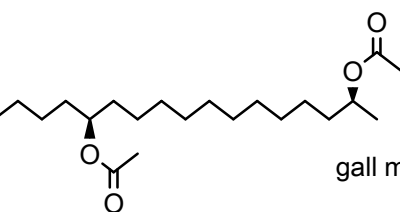
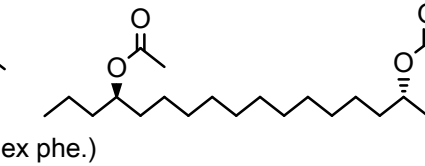
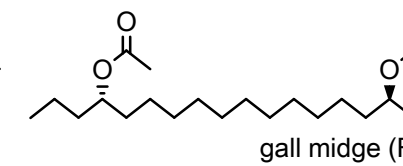
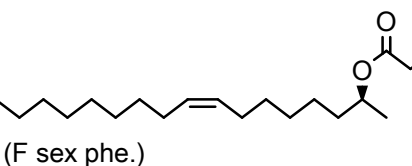
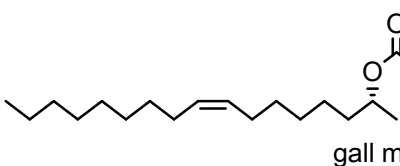
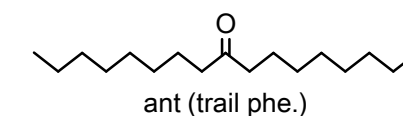
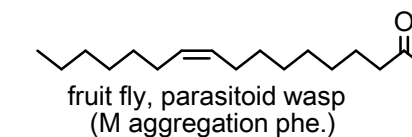
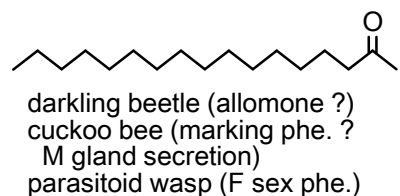
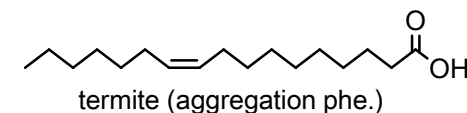
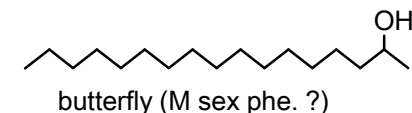
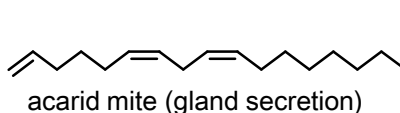
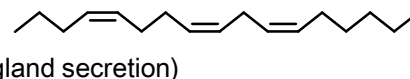
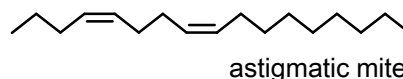
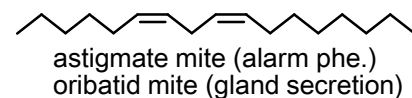
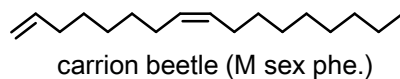
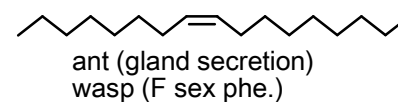
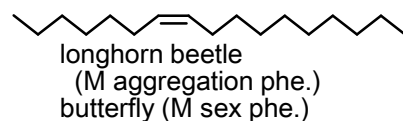
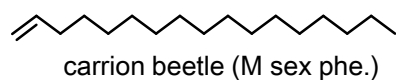
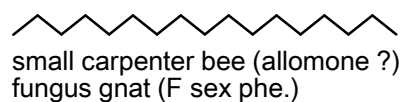


butterfly (M sex phe. ?)



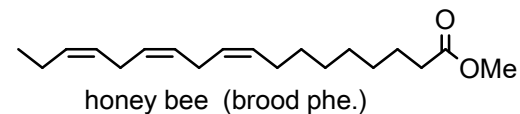
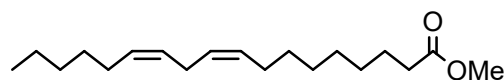
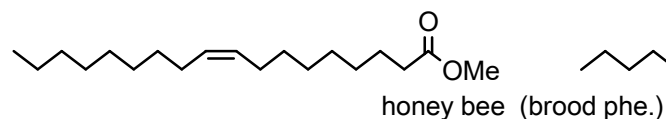
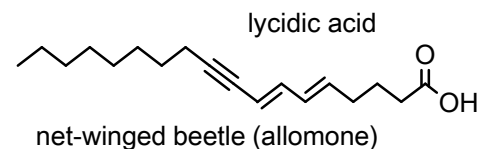
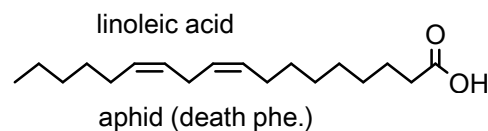
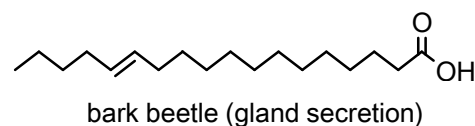
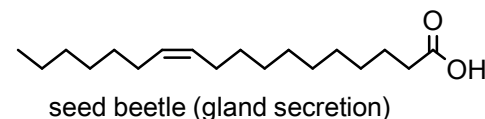
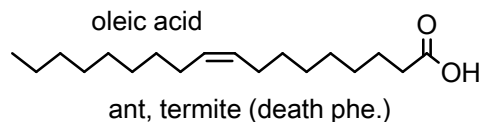
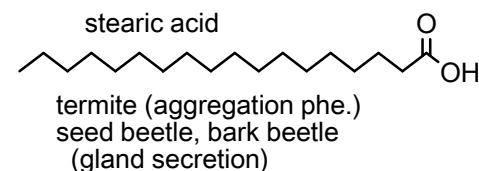
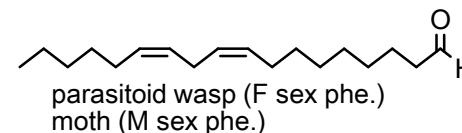
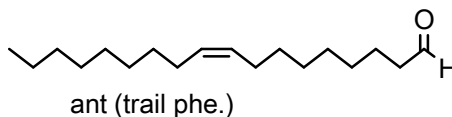
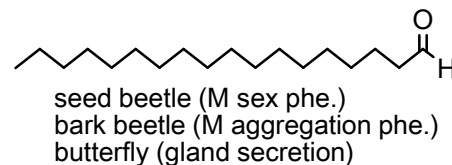
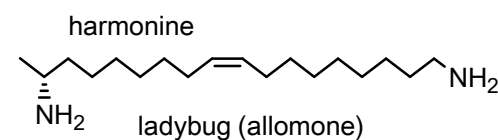
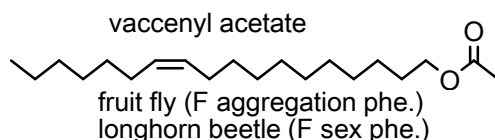
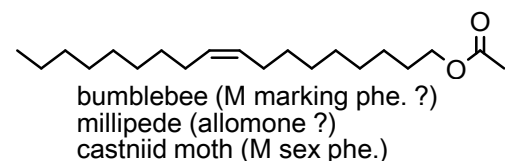
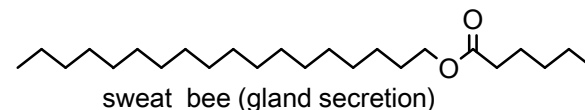
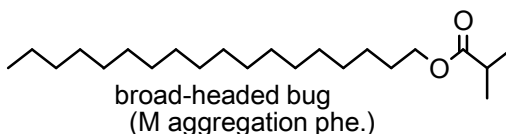
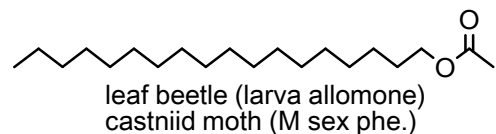
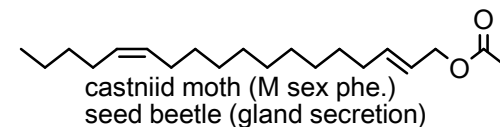
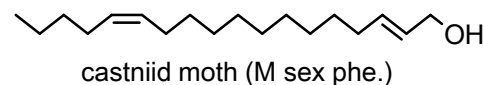
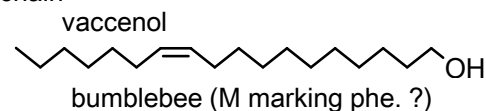
# [ C-1 ] Other: Acyclic comp. (xiv)

C17 chain



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

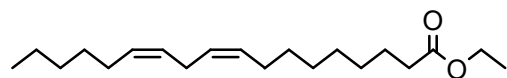
C18 chain



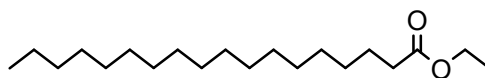


# [ C-1 ] Other: Acyclic comp. (xvi)

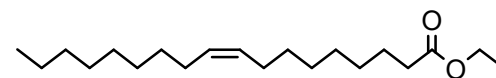
C18 chain



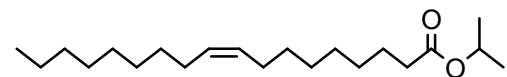
hide beetle (aggregation phe.)



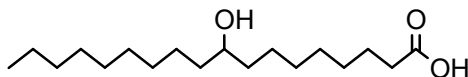
plasterer bee (gland secretion)



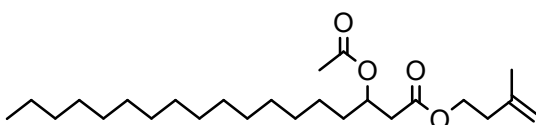
hide beetle (aggregation phe.)  
cuckoo bee (M sex phe. ?)



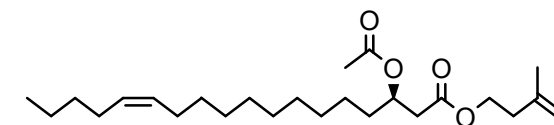
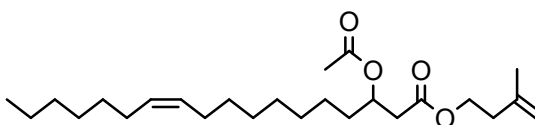
carpenter bee (M gland secretion)



butterfly (M sex phe. ?)

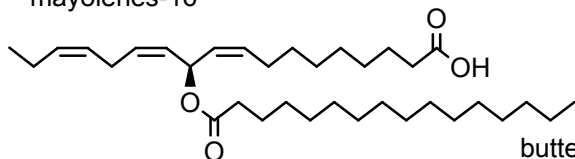


butterfly (M gland secretion)

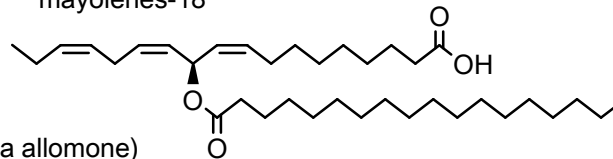


butterfly (M gland secretion)

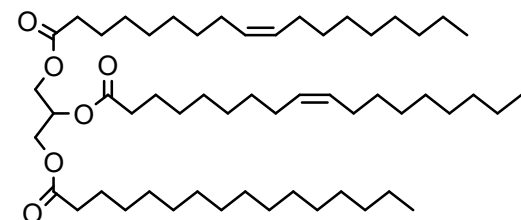
mayolenes-16



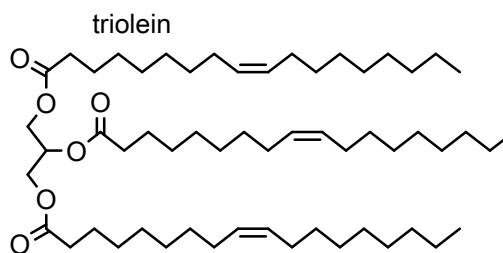
mayolenes-18



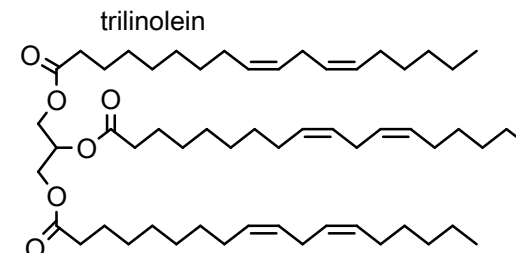
butterfly (larva allomone)



honey bee (brood phe.)



ant (brood phe.)



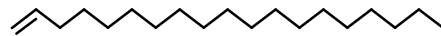
termite (F sex phe. ?)

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

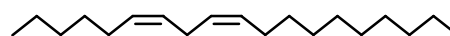
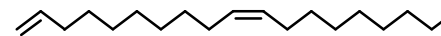
## C19 chain



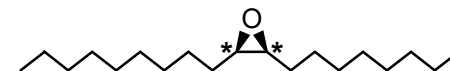
ant (marking phe.)  
thrips (gland secretion)



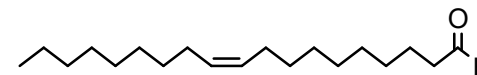
carrion beetle (M sex phe. ?)



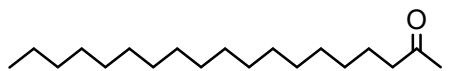
mite (alarm phe.?)



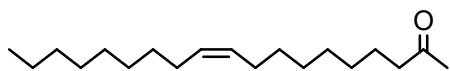
ant (gland secretion)



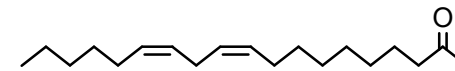
sawfly (F sex phe.)



seed beetle (F sex phe.)



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



termite (trail phe.)

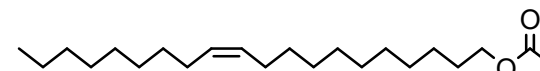
## C20 chain



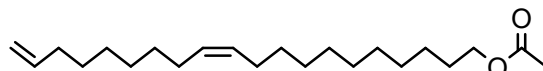
longhorned bee  
(F gland secretion)



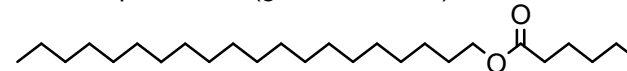
honey bee (worker alarm phe.)  
wasp (M marking phe.)  
carpenter bee (gland secretion)



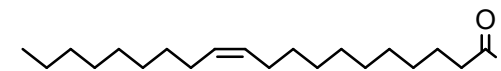
leaf beetle (larva allomone)  
fruit fly (M aggregation phe.)



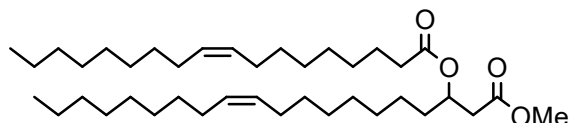
thrips (allomone)



sweat bee (gland secretion)

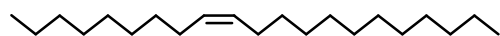


ant (trail phe.)

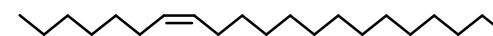


pyralid moth (larva trail phe.)

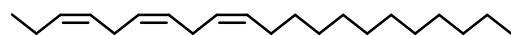
## C21 chain



fruit fly (M aggregation phe.)



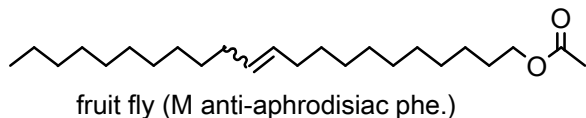
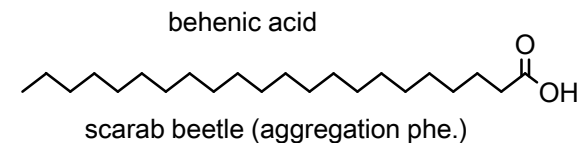
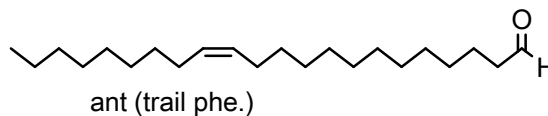
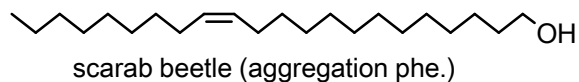
rove beetle, plasterer bee (F sex phe.)



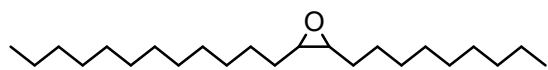
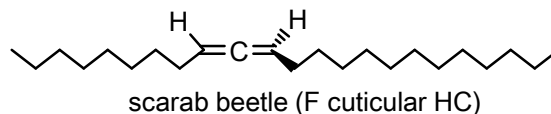
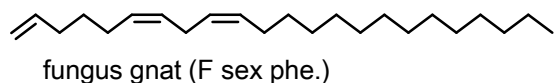
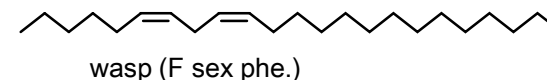
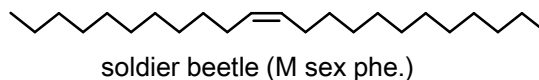
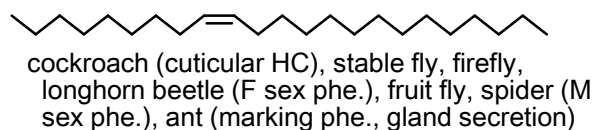
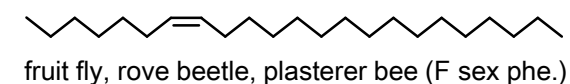
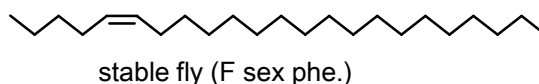
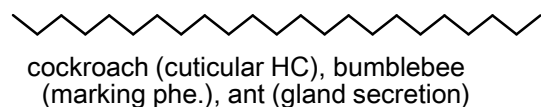
erebid moth (M sex phe.)

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

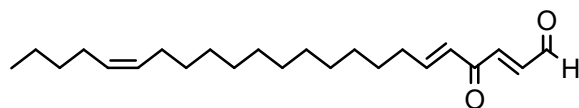
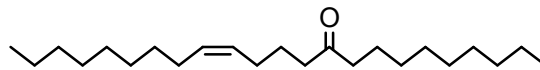
C22 chain



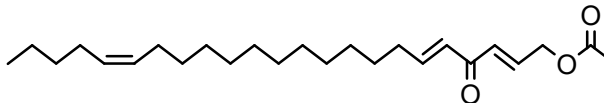
C23 chain



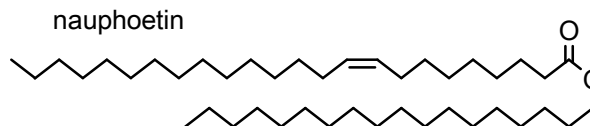
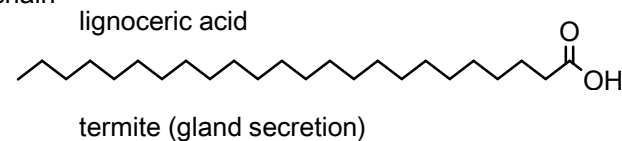
stable fly (F sex phe.)



ant (allomone)



C24 chain

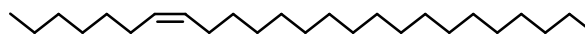


# [ C-1 ] Other: Acyclic comp. (xix)

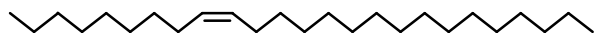
C25 chain



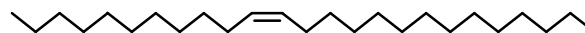
cuckoo bee (gland secretion)



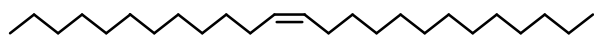
longhorn beetle, plasterer bee (F sex phe.)



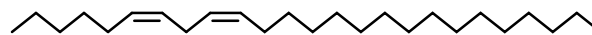
fly, longhorn beetle, mining bee, leaf bug  
(F sex phe.), wasp (brood phe.)



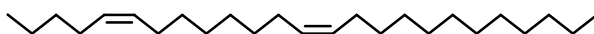
fruit fly (F sex phe.)



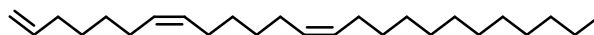
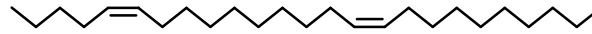
ladybug (oviposition-deterring phe.)



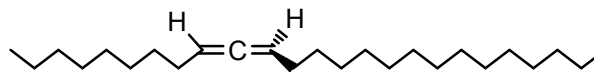
wasp (F sex phe.)



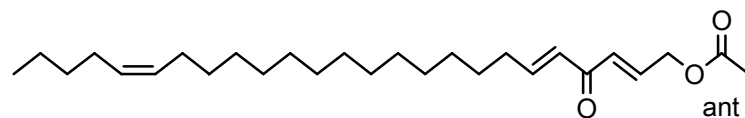
fruit fly (F sex phe.)



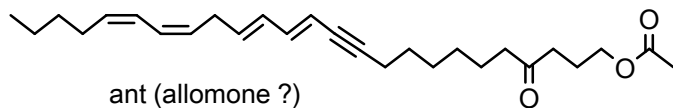
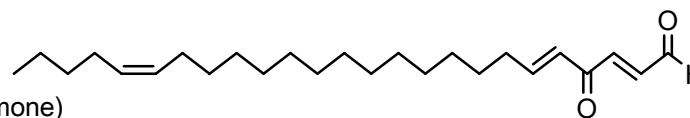
stable fly (M sex phe. ?)



scarab beetle (F cuticular HC)



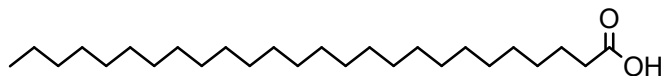
ant (allomone)



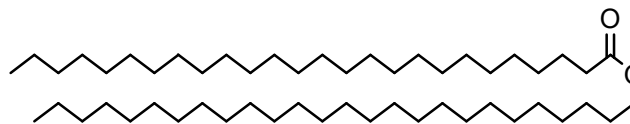
ant (allomone ?)

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

C26 chain

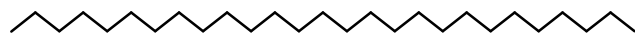


termite (gland secretion)

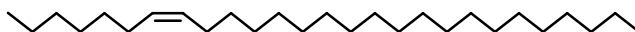


scale (wax)

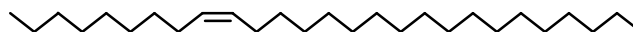
C27 chain



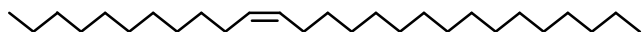
longhorn beetle (F sex phe.)



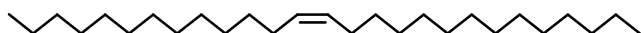
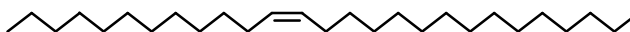
longhorn beetle, wood wasp (F sex phe.)



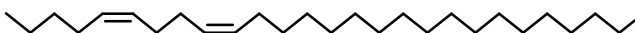
termite (allomone ?), stable fly (M sex phe. ?)  
stable fly, longhorn beetle, mining bee (F sex phe.)



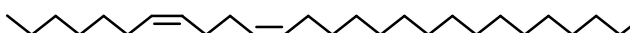
mining bee (F sex phe.)



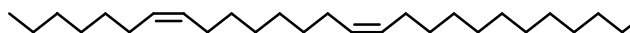
stable fly (M sex phe.)



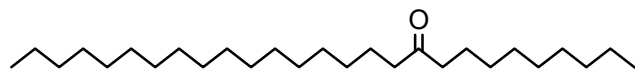
fruit fly (F sex phe.)



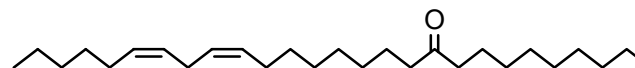
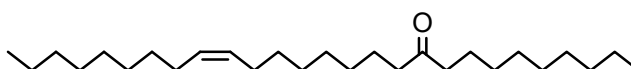
parasitoid wasp (F sex phe.)



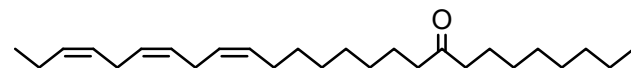
fruit fly (F sex phe.)



longhorn beetle (F sex phe.)

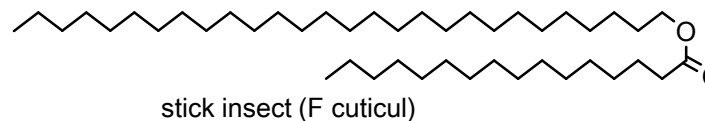
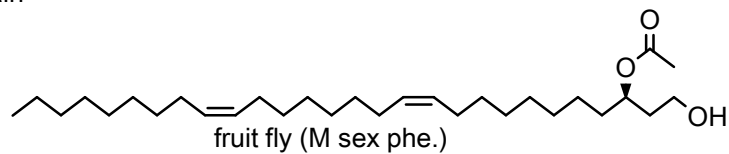


longhorn beetle (F sex phe.)

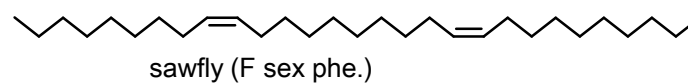
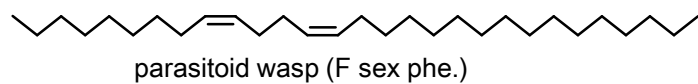
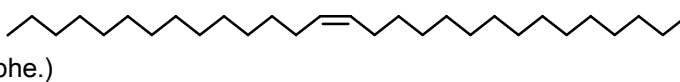
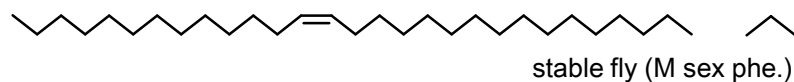
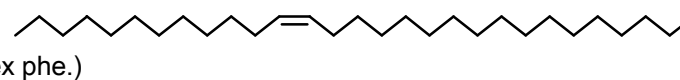
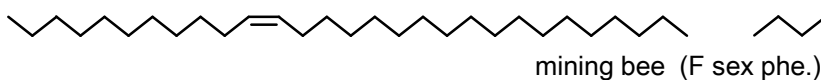
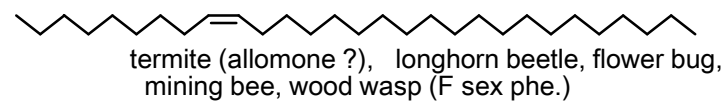
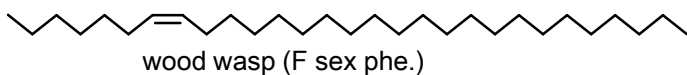
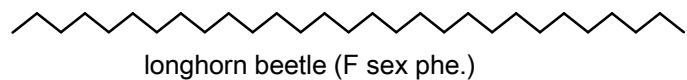


# [ C-1 ] Other: Acyclic comp. (xxi)

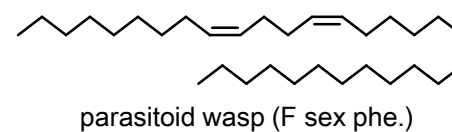
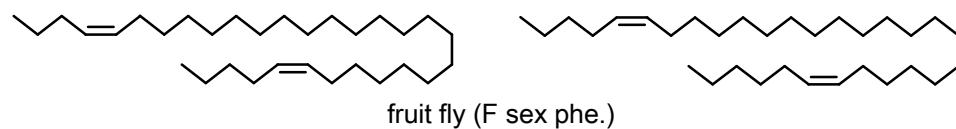
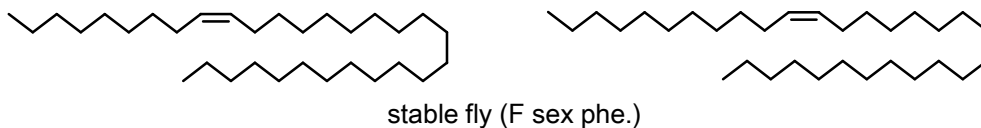
C28 chain



C29 chain

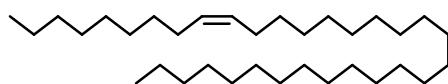


C31 chain

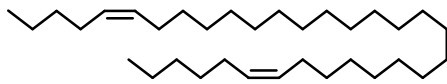


# [ C-1 ] Other: Acyclic comp. (xxii)

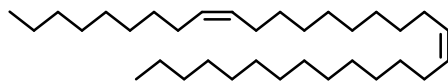
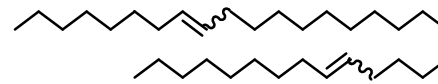
C33 chain



stable fly (F sex phe.)



fruit fly (F sex phe.)



sawfly (F sex phe.)

C34 chain

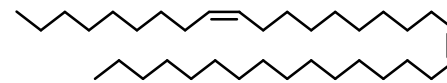


leaf beetle (sex phe. ?)

C35 chain

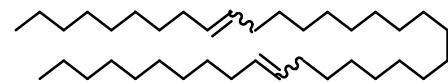


fruit fly (F sex phe.)



sawfly (F sex phe.)

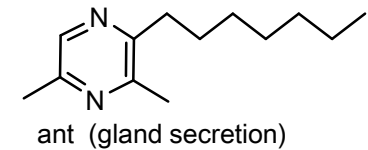
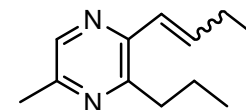
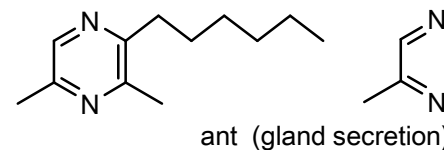
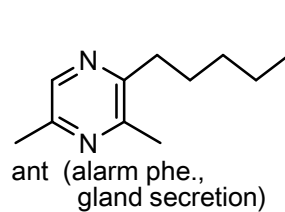
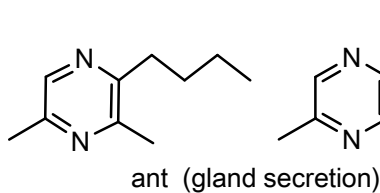
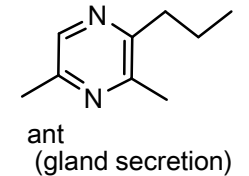
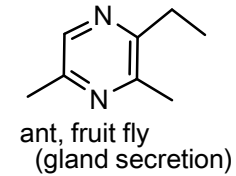
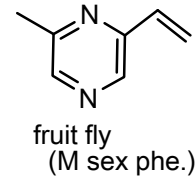
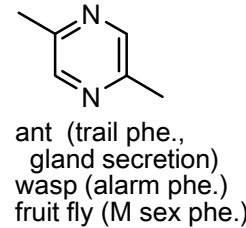
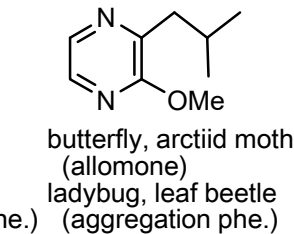
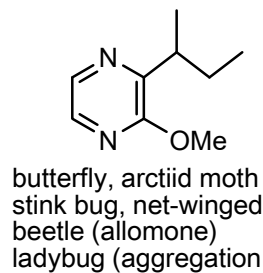
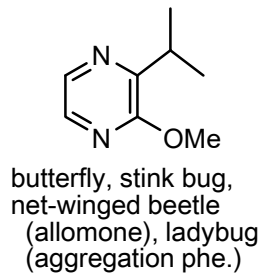
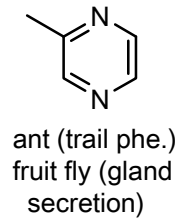
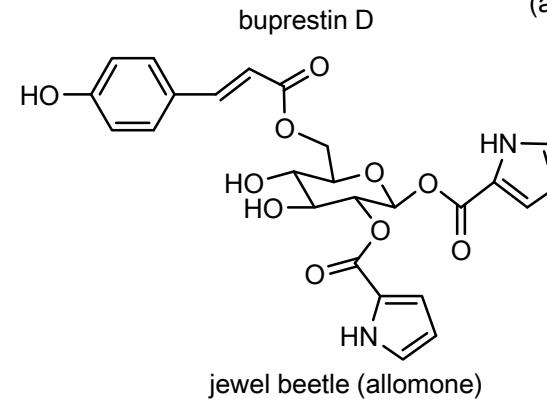
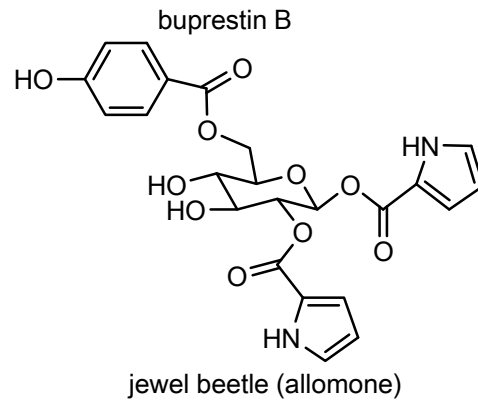
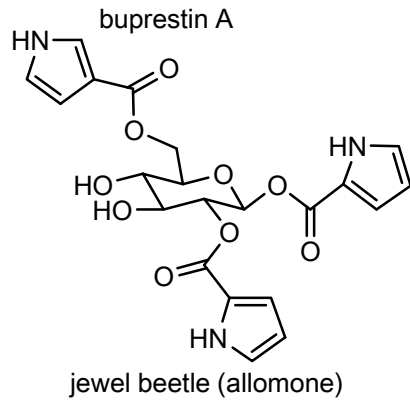
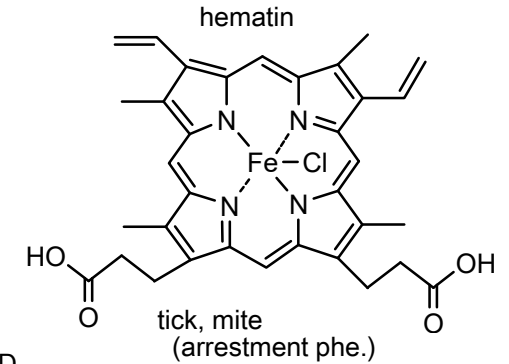
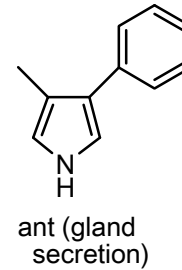
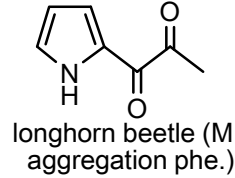
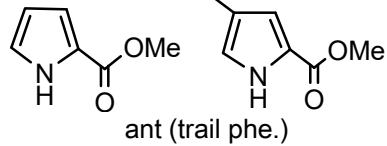
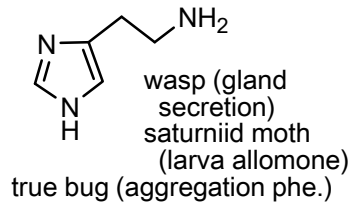
C37 chain



fruit fly (F sex phe.)

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

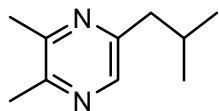
Aromatic comp.  
histamine



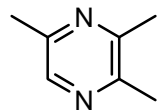


# [ C-2 ] Other: True alkaloids (ii)

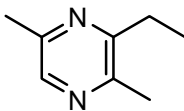
Aromatic comp.



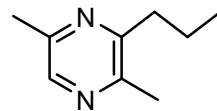
ant (trail phe.)



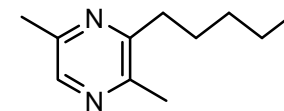
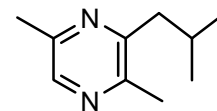
ant (trail phe.,  
gland secretion)  
fruit fly (M sex phe.,  
gland secretion)



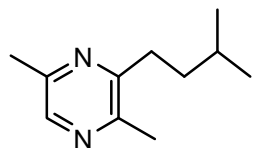
ant (trail phe.,  
alarm phe.)



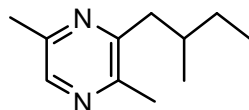
ant (gland secretion)



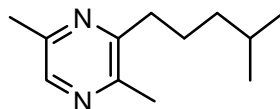
ant (gland secretion)



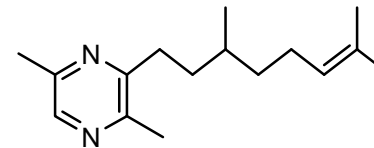
ant (alarm phe., gland  
secretion, allomone)  
flower wasp (F sex phe.)  
wasp (marking phe.)  
leaf insect (allomone)



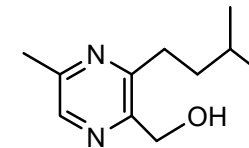
ant (alarm phe.,  
gland secretion)  
leaf insect (allomone)



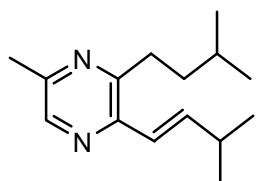
ant (gland secretion)



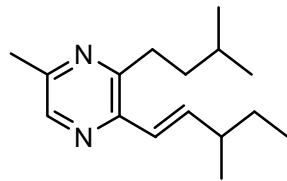
ant (alarm phe.)



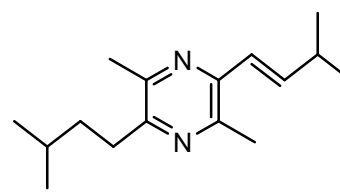
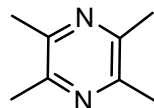
flower wasp  
(F sex phe.)



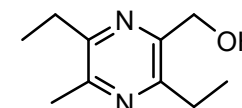
ant (gland secretion)



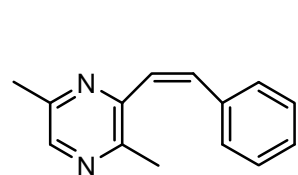
fruit fly (M sex phe.,  
gland secretion)



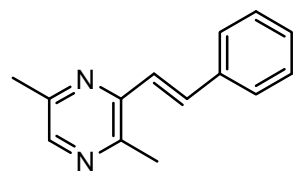
ant (gland secretion)



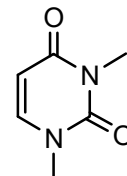
flower wasp  
(F sex phe.)



ant (gland secretion)

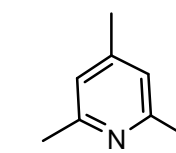
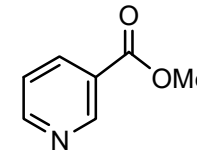


*N,N*-dimethyluracil

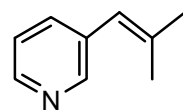


ant (trail phe.)

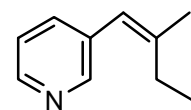
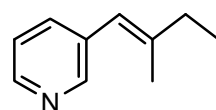
methyl nicotinate



ladybug, tsetse fly  
(aggregation phe.)

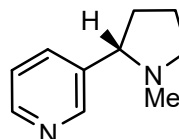


rove beetle (allomone)



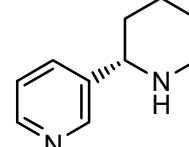
rove beetle  
(allomone)

nicotine



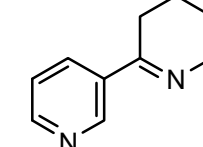
harvestman  
(allomone ?)

anabasine

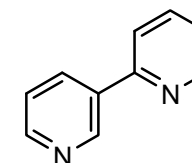


ant (gland secretion, allomone, trail phe.)

anabaseine



harvestman (allomone ?)

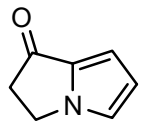


ant (gland secretion)

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

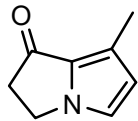
Aromatic comp.

nordanaidone

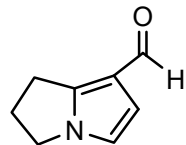


butterfly (M sex phe.)

danaidone

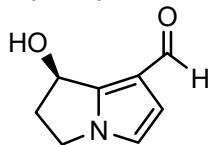


danaidal

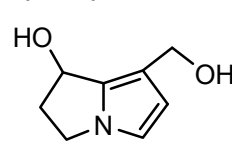


butterfly, arctiid moth (M sex phe.?)

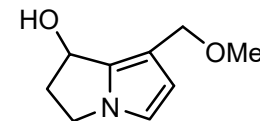
hydroxydanaidal



hydroxydanaidol

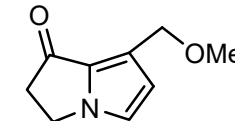


9-O-methyl-hydroxydanaidol

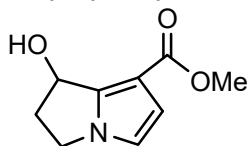


butterfly (M sex phe.?)

9-methoxydanaidone

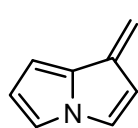


methyl hydroxydanaidoate



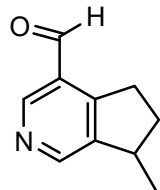
butterfly (M sex phe.?)

actinidine



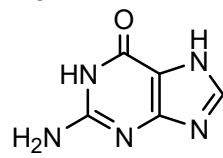
ant (alarm phe.)  
parasitoid wasp,  
rove beetle, tick insect  
(allomone)

boschniakine

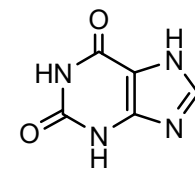


stick insect  
(allomone ?)

guanine

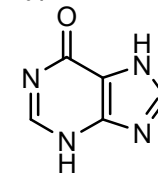


xanthine

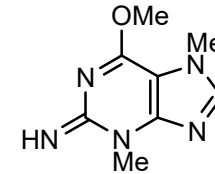


tick (arrestment phe.)

hypoxanthine

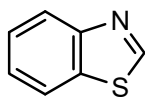


himantarine



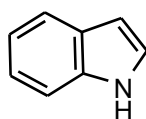
centipede  
(galand secretion)

benzothiazole



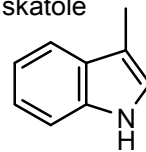
pleasing fungus  
beetle (allomone)  
butterfly (gland  
secretion)

indol



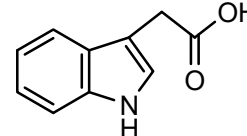
butterfly  
(M sex phe. ?)  
ant (trail phe.)  
pleasing fungus beetle,  
caddis fly (allomone)

skatole



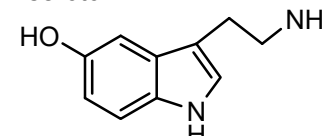
green lacewing,  
stingless bee,  
wasp, caddis fly,  
pleasing fungus  
beetle (allomone)  
ant, wasp (alarm phe.)  
green lacewing (gland secretion)

IAA



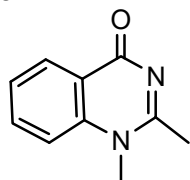
water beetle  
(allomone ?)

serotonin



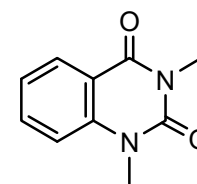
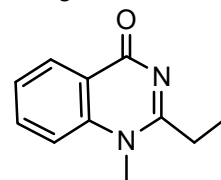
wasp, scorpion, spider  
(venom secretion)

glomerin

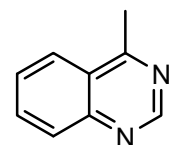


millipede (allomone)

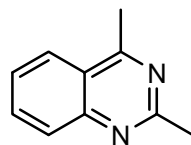
homoglomerin



scarab beetle  
(F sex phe.)



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

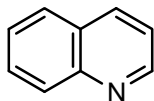


assassin bug  
(aggregation phe.)

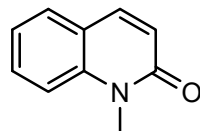
# [ C-2 ] Other: True alkaloids (iv)

Aromatic comp.

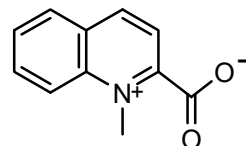
quinoline



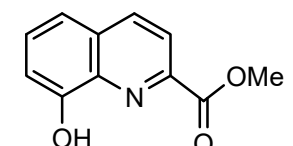
walking stick  
(allomone)



net-winged beetle  
(allomone?)

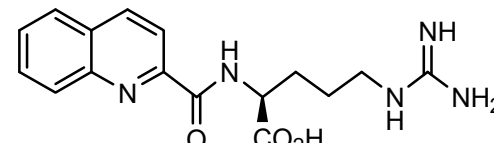


firefly (allomone)

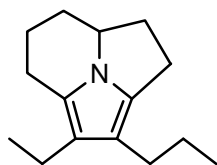


water beetle (allomone)

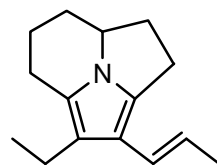
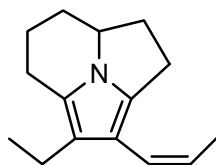
N $\alpha$ -quinaldyl-L-arginine



ladybug (allomone)



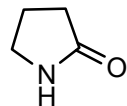
ant (allomone)



ant (allomone)

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

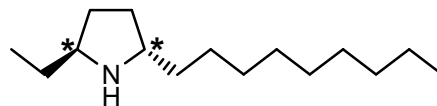
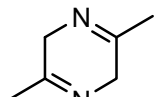
C4 ring



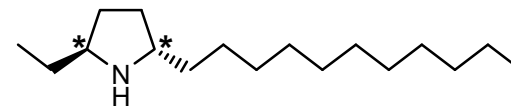
moth (larva allomone)



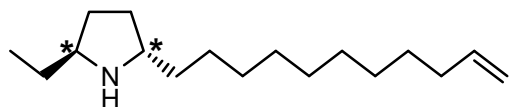
fruit fly (M sex phe.)



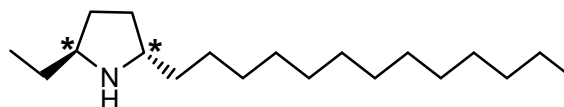
ant (allomone)



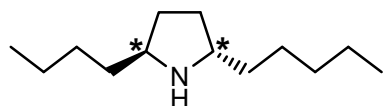
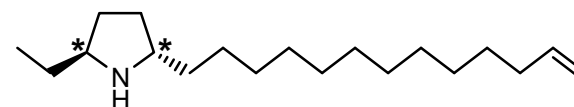
ant (allomone)



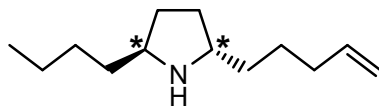
ant (allomone?)



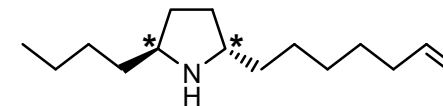
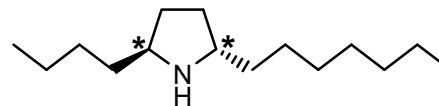
ant (allomone)



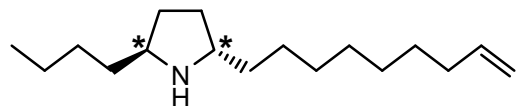
ant (allomone?)



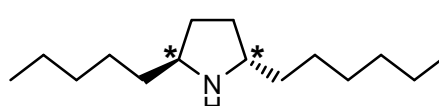
ant (allomone?)



ant (allomone?)

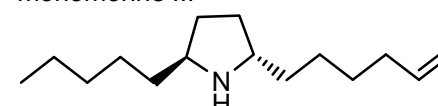


ant (allomone)

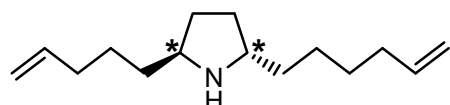


ant (allomone?)

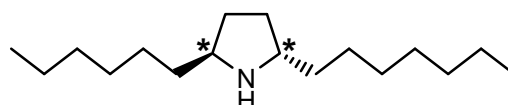
monomorine III



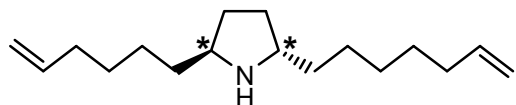
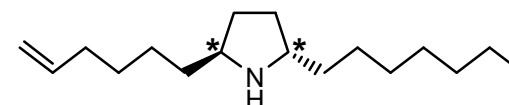
ant (trail phe.)



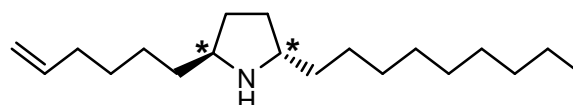
ant (allomone?)



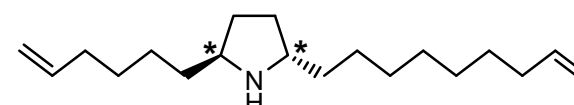
ant (allomone?)



ant (allomone?)

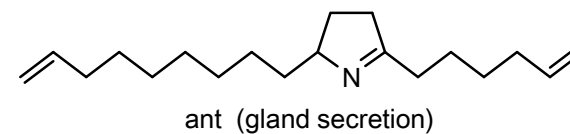
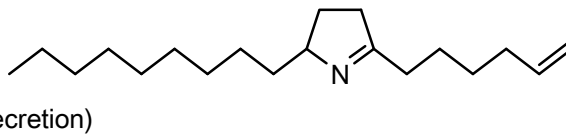
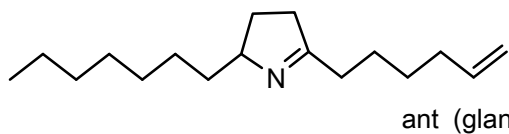
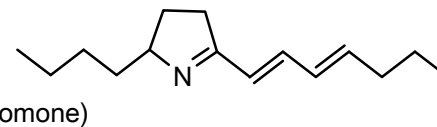
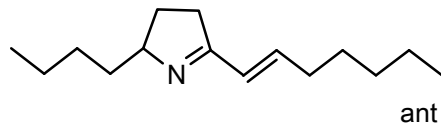
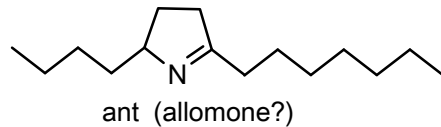
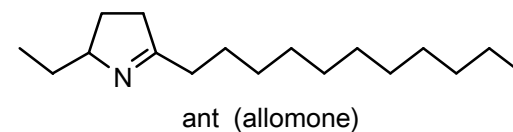
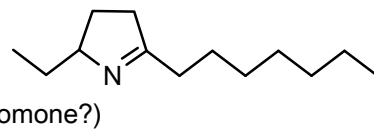
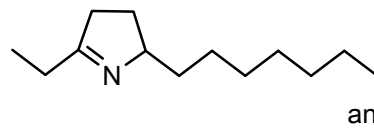
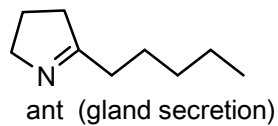
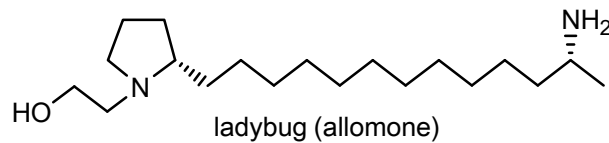
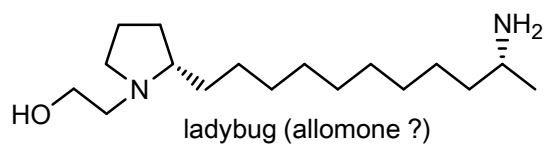
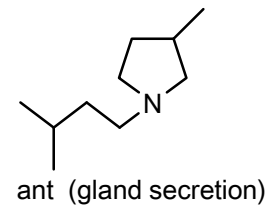
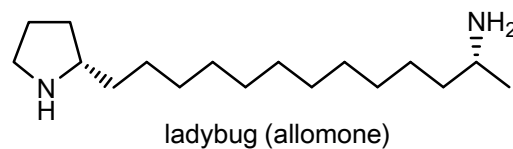
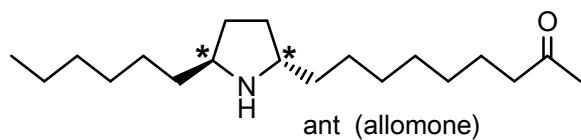


ant (allomone?)

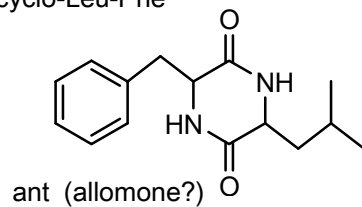


# [ C-2 ] Other: True alkaloids (vi)

C4 ring

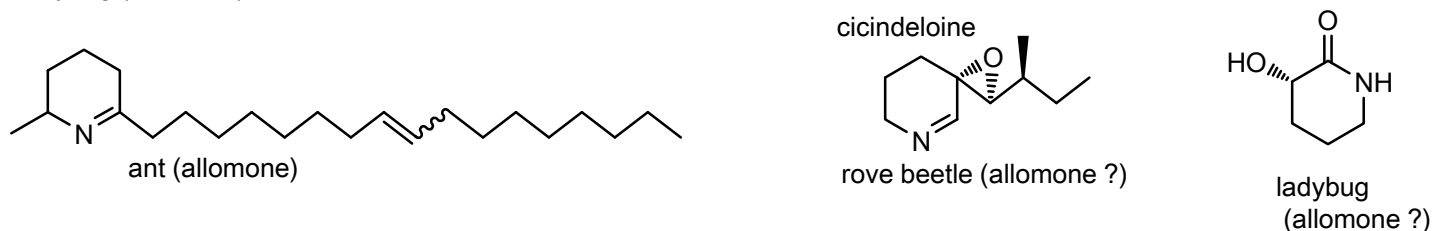
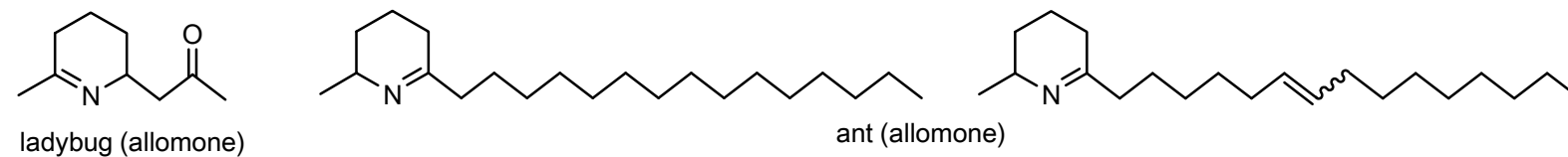
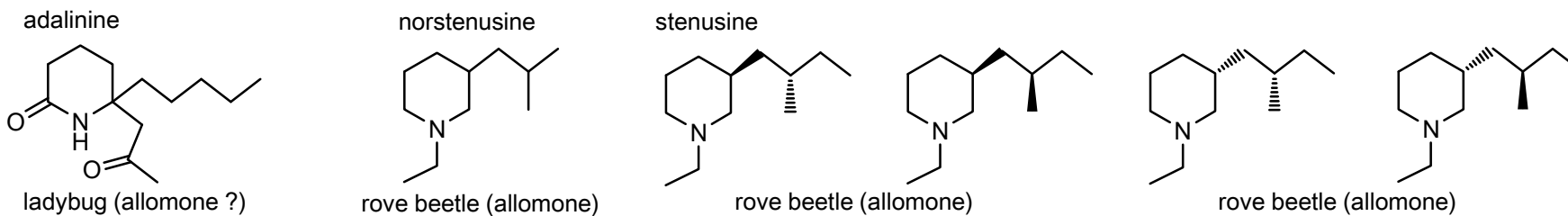
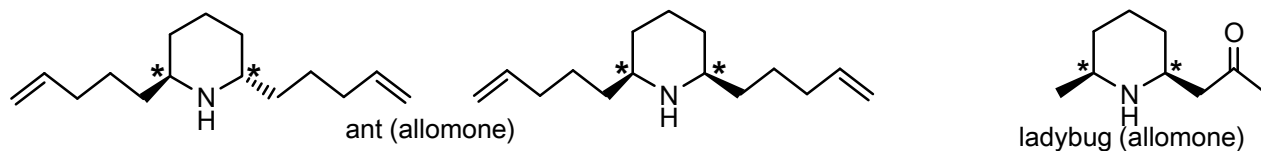
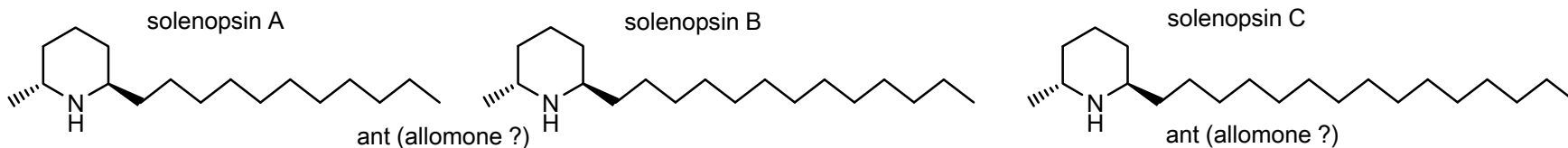
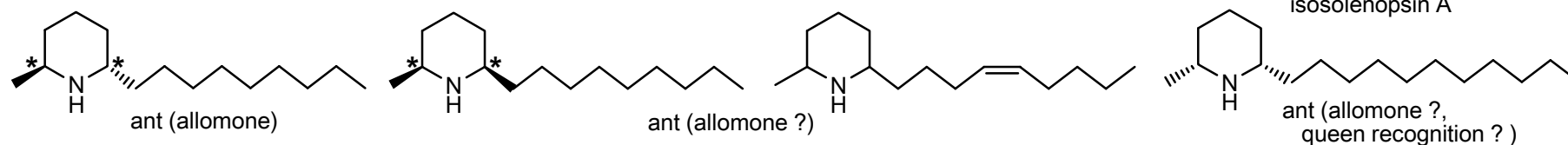


cyclo-Leu-Phe



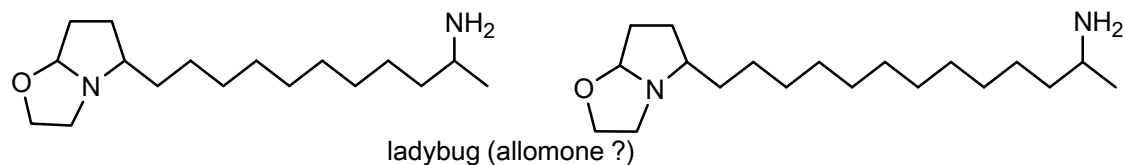
# [ C-2 ] Other: True alkaloids (vii)

C5 ring

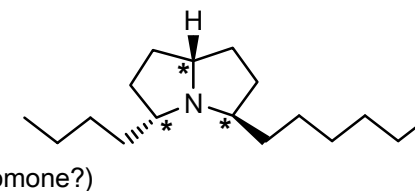
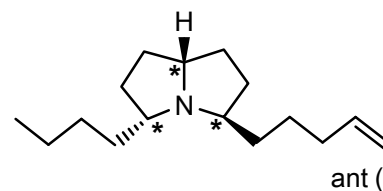
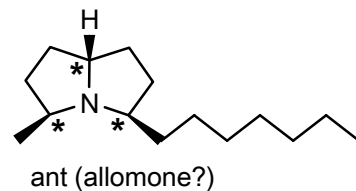
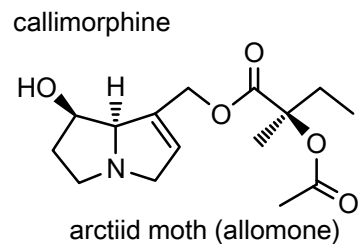
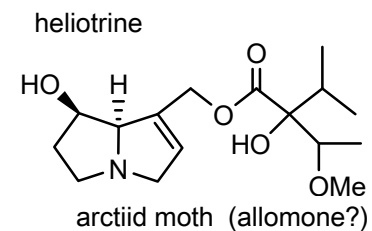
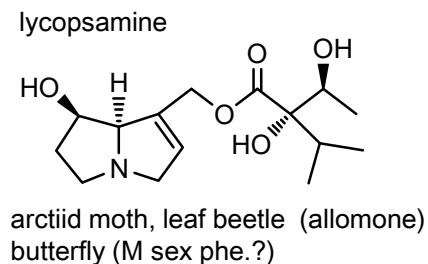
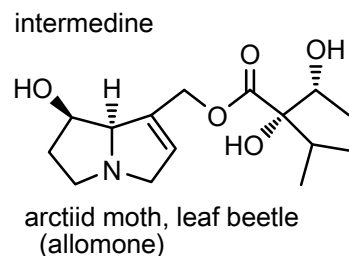
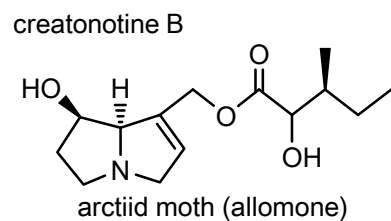
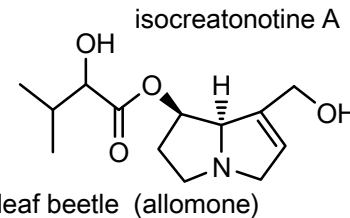
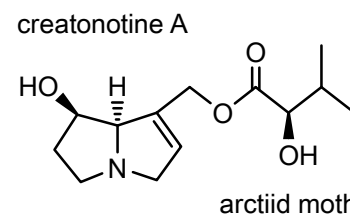
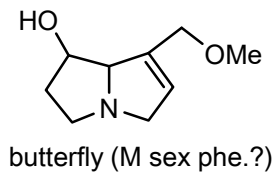
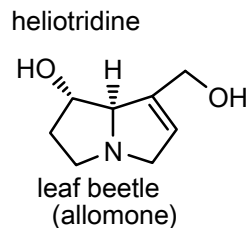
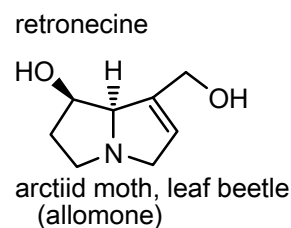
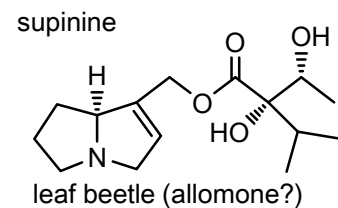
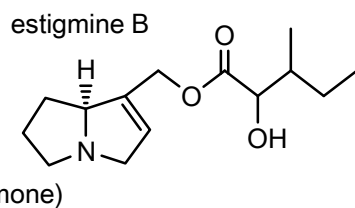
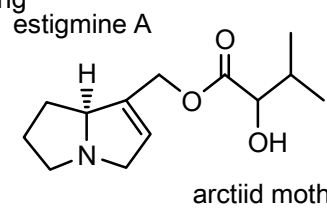


# [ C-2 ] Other: True alkaloids (viii)

C6 ring

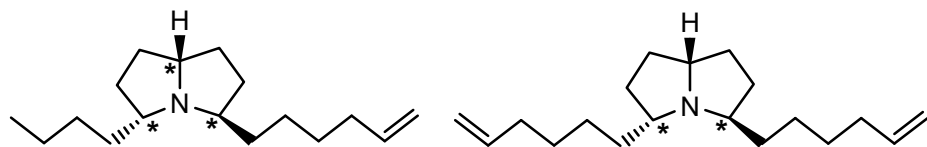


C7 ring

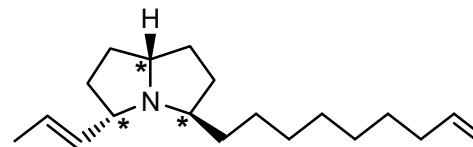


# [ C-2 ] Other: True alkaloids (ix)

C7 ring

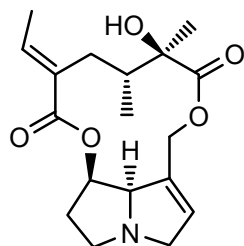


ant (allomone?)



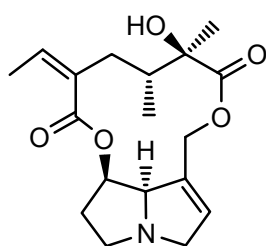
ant (allomone?)  
arctiid moth (allomone)

integerrimine



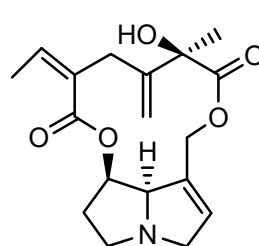
Arctiinae moth (allomone ?)

senecionine

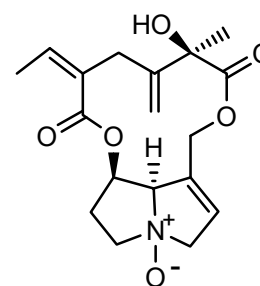


Arctiinae moth, butterfly (allomone ?)

seneciophylline

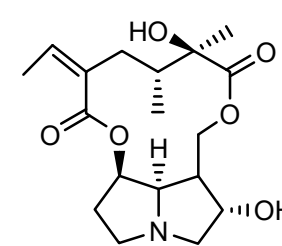


seneciophylline *N*-oxide



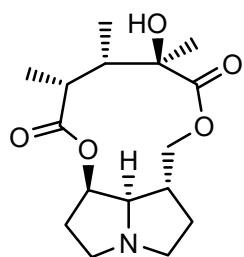
leaf beetle (allomone ?)

rosmarinine



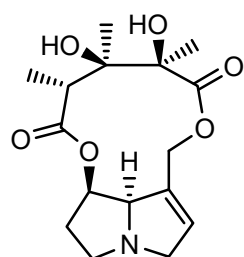
butterfly (allomone ?)

retusine



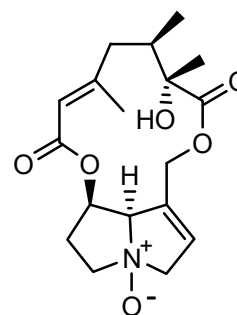
grasshopper  
(allomone ?)

monocrotaline



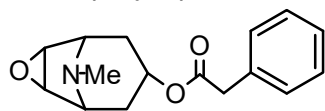
grasshopper, butterfly  
(allomone ?)

doronine *N*-oxide



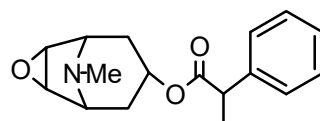
leaf beetle (allomone ?)

3-phenylacetoxy-  
6,7-epoxytropine



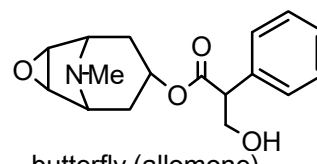
treehopper (allomone ?)

dihydroaposcopamine



butterfly (allomone)

scopolamine



butterfly (allomone)  
treehopper (allomone ?)



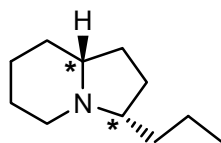
# [ C-2 ] Other: True alkaloids (x)

C8 ring

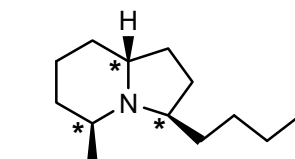
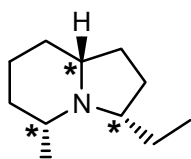
polyzonimine



millipede (allomone)

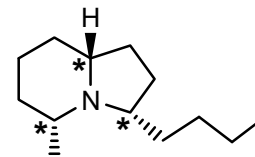


ant (allomone ?)

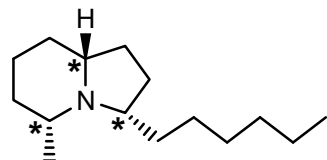


ant (allomone ?)

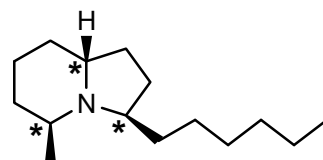
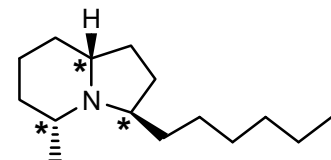
monomorine I



ant (trail phe.)

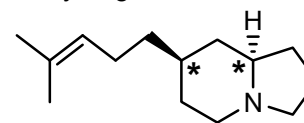


ant (allomone ?)



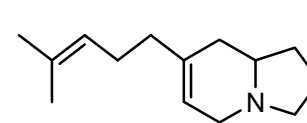
ant (allomone ?)

hydrogosodesmine

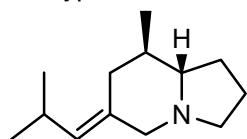


millipede (allomone)

gosodesmine

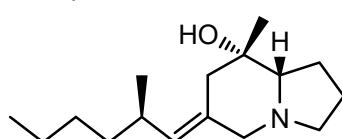


8-deoxypumiliotoxin 193H

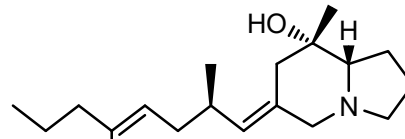


oribatid mite (allomone ?)

pumiliotoxin 251D

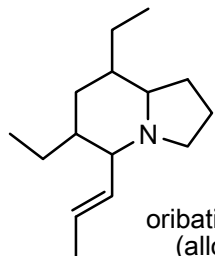


pumiliotoxin 291G



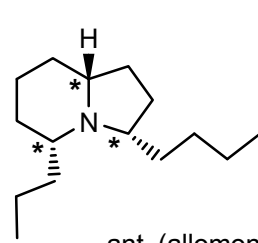
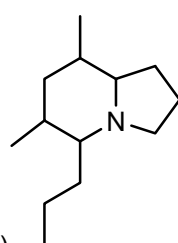
oribatid mite (allomone ?)

indolizidine 223A

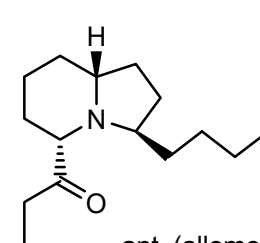
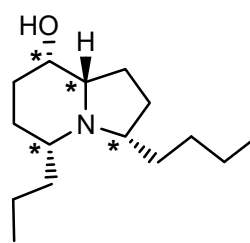


oribatid mite (allomone ?)

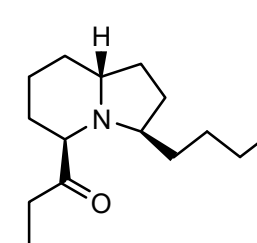
indolizidine 195G



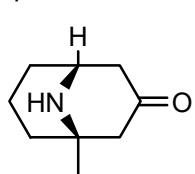
ant (allomone ?)



ant (allomone ?)

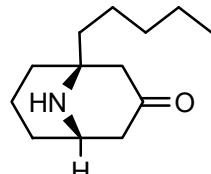


euphococcinine

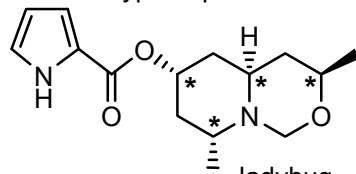


ladybug (allomone)

adaline



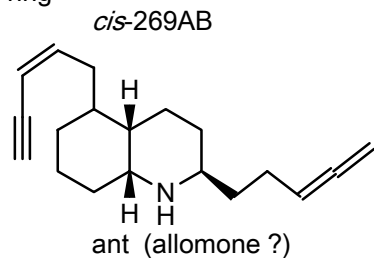
hyperaspine



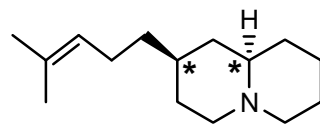
ladybug (allomone ?)

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

C9 ring

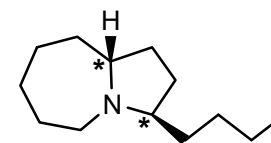
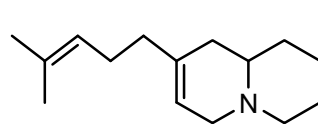


homo-hydrogosodesmine



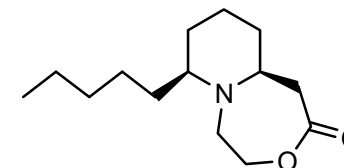
millipede (allomone)

homo-gosodesmine



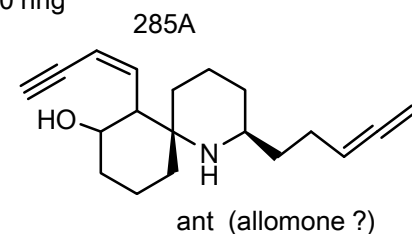
ant (allomone ?)

calvine

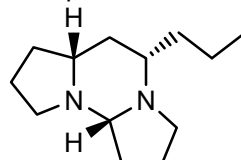


ladybug (allomone ?)

C10 ring

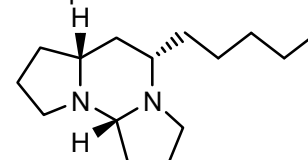


tetraponerine-2

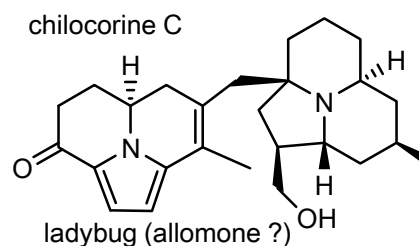
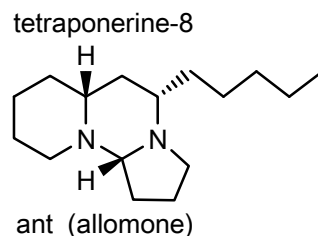
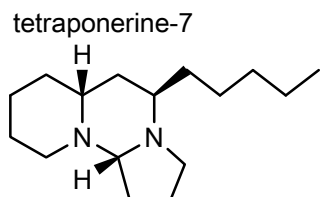
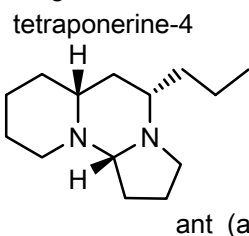


ant (allomone)

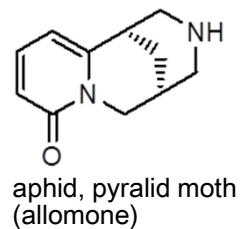
tetraponerine-6



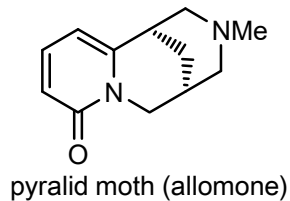
C11 ring



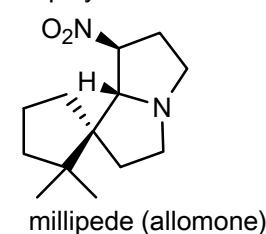
cytisine



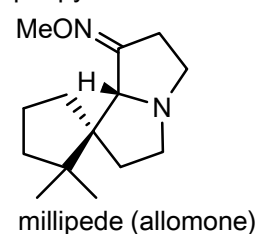
N-methylcytisine



nitropolyzonamine



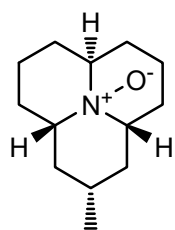
spiropyrrolizidine 236



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

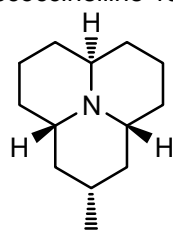
C12 ring

coccinelline



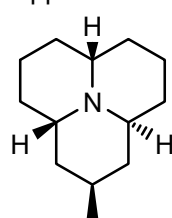
ladybug  
(allomone)

precoccinelline 193C



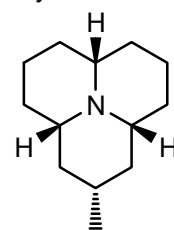
ladybug, soldier  
beetle, oribotriiid  
mite (allomone)

hippodamine



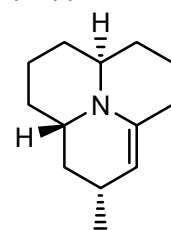
ladybug, soldier  
beetle, (allomone ?)

myrrhine



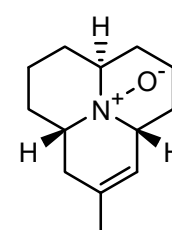
ladybug  
(allomone)

propyleine



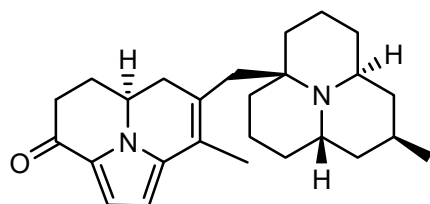
ladybug, soldier  
beetle, (allomone)

2-dehydrococcinelline



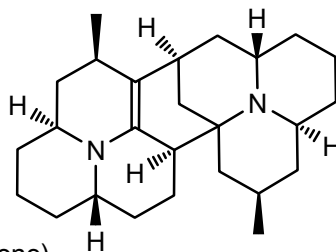
ladybug  
(allomone)

exochoimine

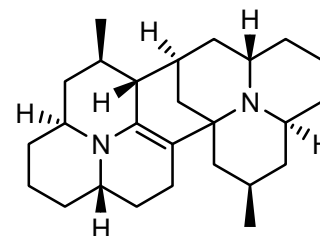


ladybug (allomone)

psylloborine A

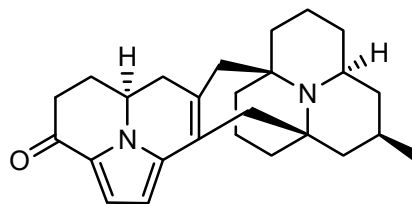


isopsylloborine A



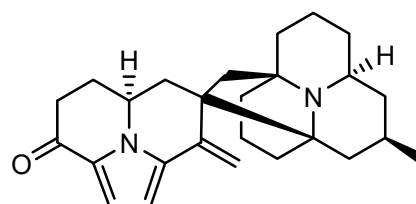
ladybug (allomone ?)

chilocorine A



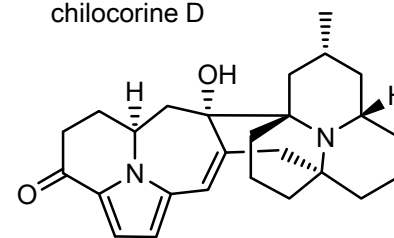
ladybug (allomone ?)

chilocorine B



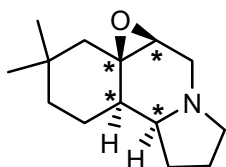
ladybug (allomone)

chilocorine D



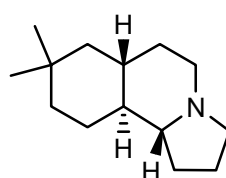
ladybug (allomone ?)

buzonamine

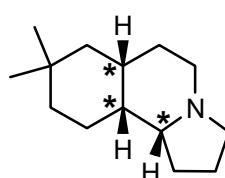


millipede (allomone)

deoxybuzonamine

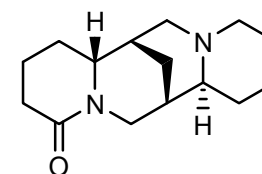


millipede (allomone)



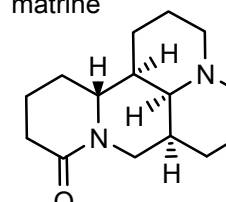
C15 ring

lupanine

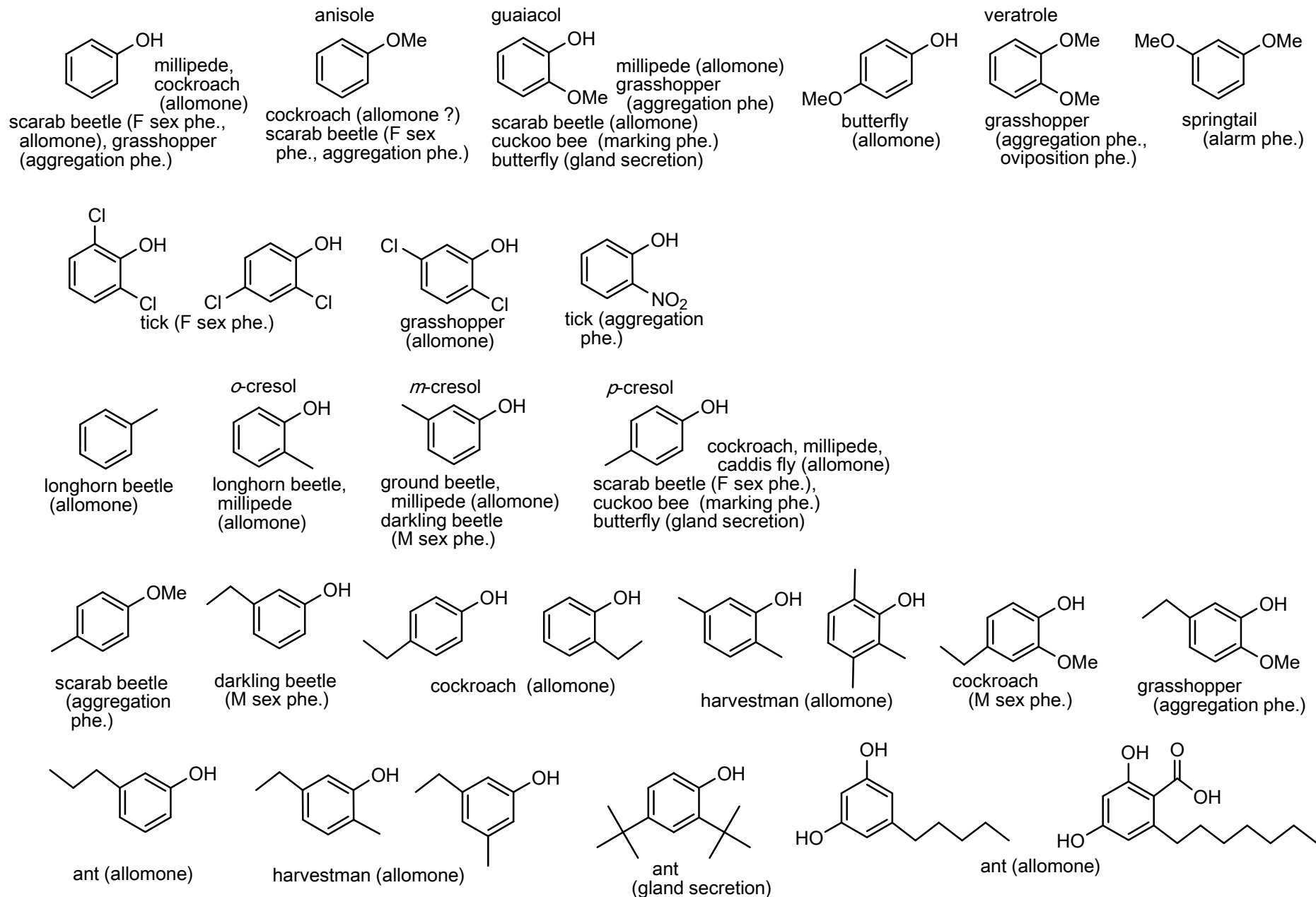


aphid (allomone ?)

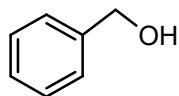
matrine



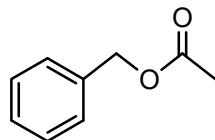
# [ C-3 ] Other: Aromatic comp. (i)



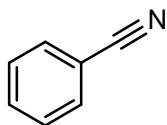
# [ C-3 ] Other: Aromatic comp. (ii)



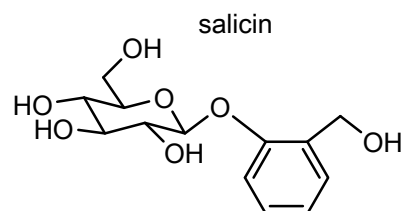
true bug (aggregation phe.), stink bug (M sex phe.)



honey bee (alarm phe.)

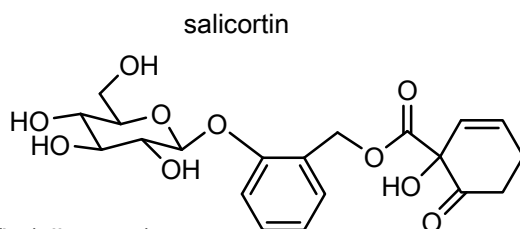


saturniid moth (larva allomone)

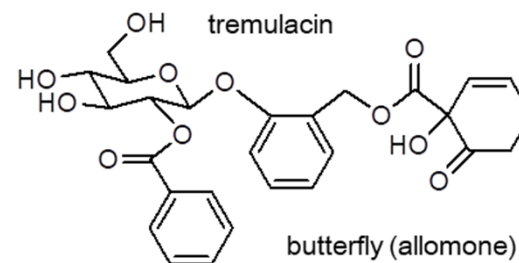


salicin

butterfly (allomone)

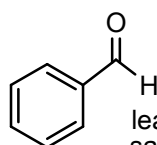


salicortin

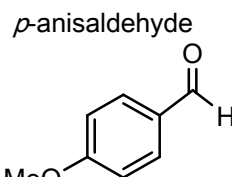


tremulacin

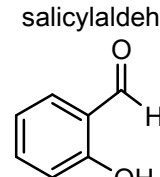
butterfly (allomone)



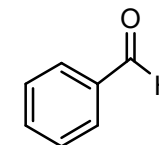
leaf beetle, tiger beetle, saturniid moth, millipede, sawfly, centipede (allomone), bee (alarm phe.), assassin bug (M sex phe.) grasshopper (M aggregation phe.)



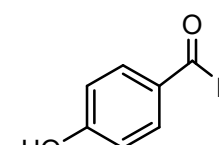
*p*-anisaldehyde  
cockroach (allomone ?)  
green lacewing (M aggregation phe.?)



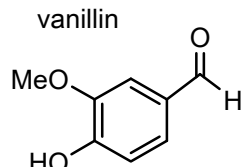
salicylaldehyde  
ground beetle, leaf beetle, creeping water bug, cuckoo bee, butterfly (allomone)



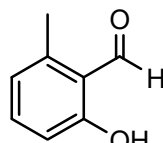
4-hydroxybenzaldehyde  
creeping water bug (allomone)  
ant (gland secretion)



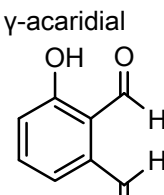
3-hydroxybenzaldehyde  
water bug (gland secretion)  
water beetle, creeping water bug (allomone)



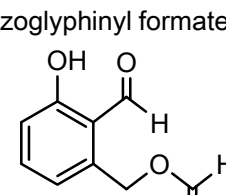
vanillin  
shield bug, pyralid moth, butterfly (M sex phe.)  
cuckoo bee (marking phe.)



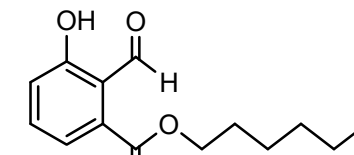
2-hydroxy-3-methylbenzaldehyde  
longhorn beetle (allomone ?)  
mite (alarm phe., F sex phe.)  
oribatid mite (alarm phe., allomone)



$\gamma$ -acaridial  
acarid mite, oribatid mite (F sex phe.)

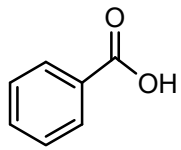


rhizoglyphinyl formate  
non-parasitic mite, oribatid mite (gland secretion)



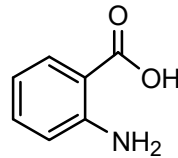
2-hydroxy-3-pentylbenzaldehyde  
acarid mite (allomone ?)

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

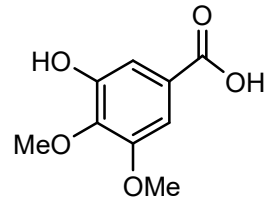


water beetle  
(allomone ?)  
ant (allomone ?,  
gland secretion)

anthranilic acid

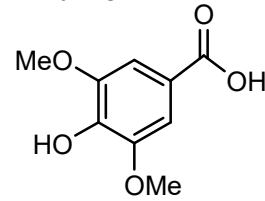


scarab beetle  
(F sex phe.)



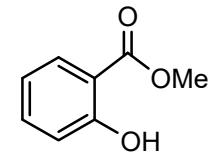
springtail (allomone)

syringic acid

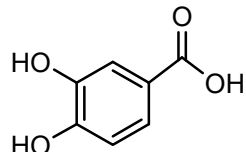


water bug (gland secretion)  
creeping water bug, water  
beetle (allomone)  
bee (queen phe.)

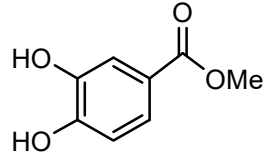
methyl salicylate



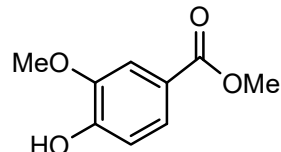
tick (aggregation phe.)  
butterfly (allomone,  
M anti-aphrodisiac phe.)  
dung beetle (allomone)  
ant (M aggregation phe. ?)



darkling beetle  
(cuticle)

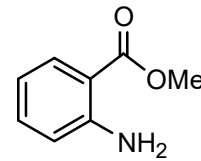


water beetle  
(allomone ?)

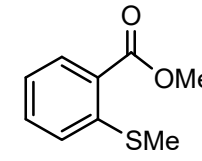


butterfly (M sex  
phe. ?)

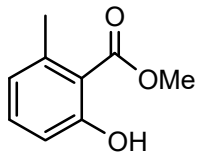
methyl anthranilate



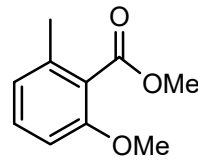
ant (alarm phe. trail phe.,  
M aggregation phe. ?)



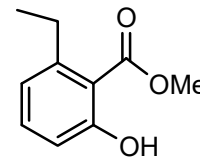
scarab beetle  
(F sex phe.)



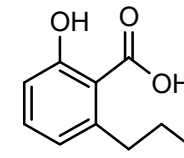
ant (primer phe., alarm phe.,  
trail phe., queen sex phe.,  
allomone, M aggregation phe.)  
parasitoid wasp (F sex phe.)  
ground beetle, darkling beetle  
(allomone)



ant (trail phe.)

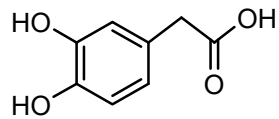


darkling beetle  
(allomone)

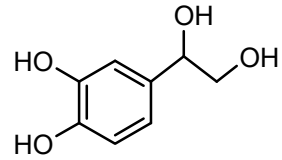


ant (allomone)

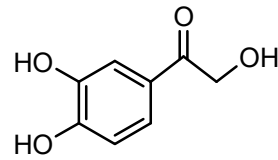
# [ C-3 ] Other: Aromatic comp. (iv)



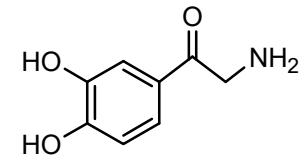
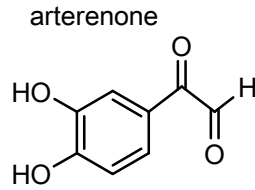
grasshopper, auger beetle, bark beetle (cuticle)



grasshopper (cuticle)

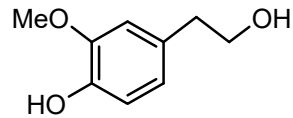


grasshopper, cicada (cuticle)



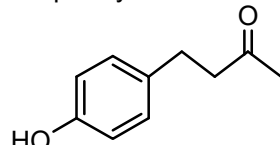
grasshopper, crane fly, blowfly, saturniid, butterfly, cockroach (cuticle)

homovanillyl alcohol



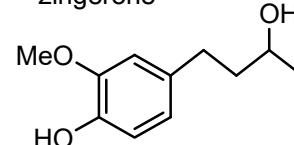
bee (queen phe.)  
butterfly (M sex phe. ?)

raspberry ketone



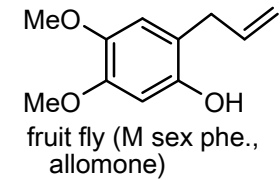
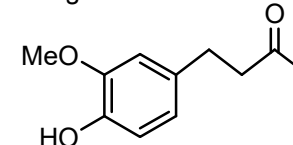
fruit fly (M sex phe.)

zingerone



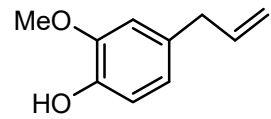
fruit fly (M sex phe.)

zingerone



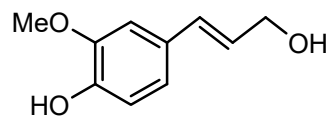
fruit fly (M sex phe., allomone)

eugenol

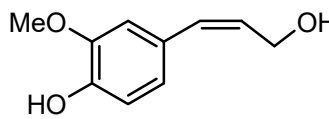


fairy wasp (F sex phe.)

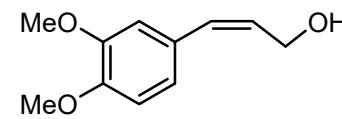
coniferyl alcohol



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

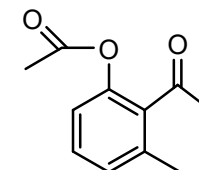
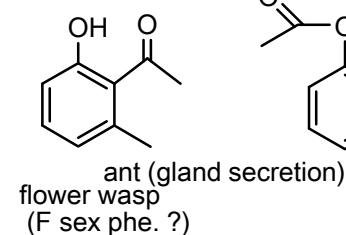
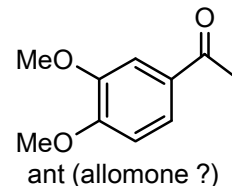
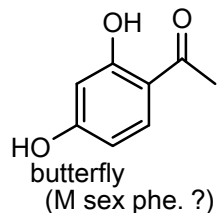
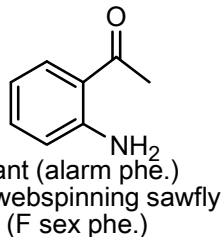
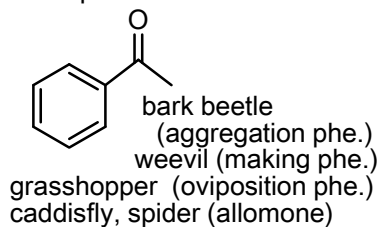


fruit fly (M sex phe.)

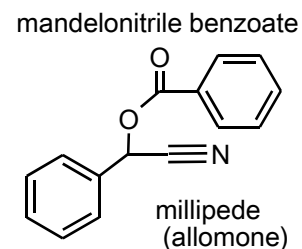
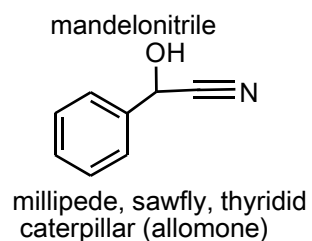
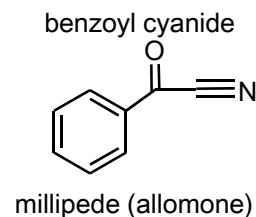
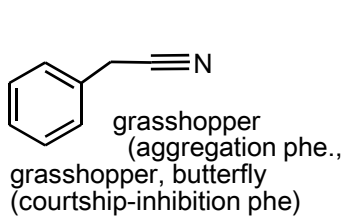
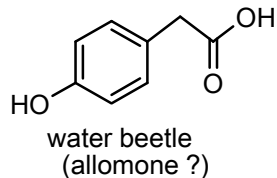
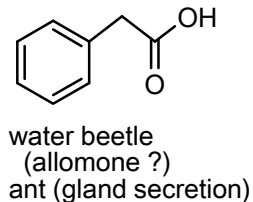
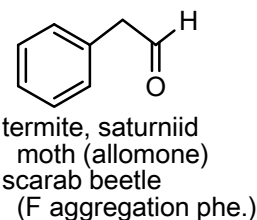
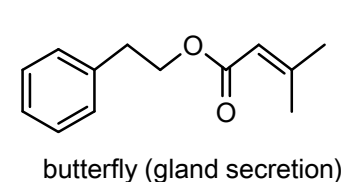
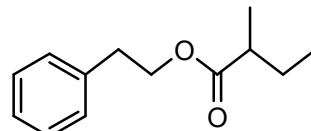
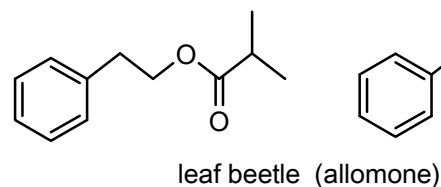
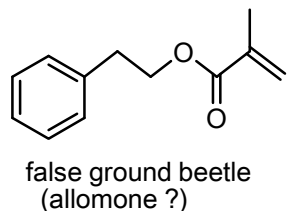
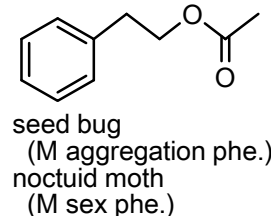
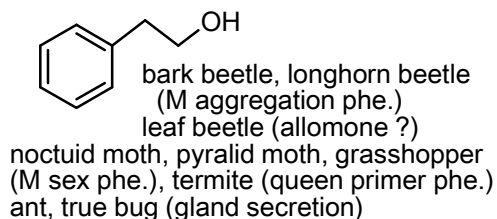
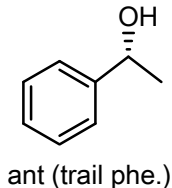
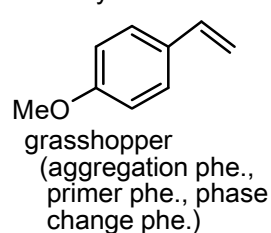


# [ C-3 ] Other: Aromatic comp. (v)

acetophenone

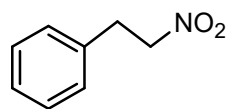


4-vinylanisole

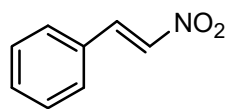




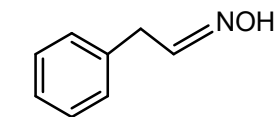
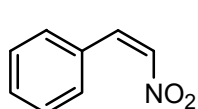
# [ C-3 ] Other: Aromatic comp. (vi)



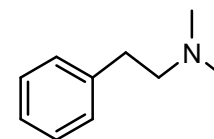
butterfly  
(gland secretion)



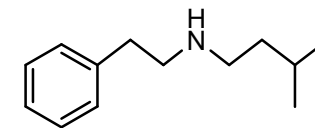
millipede (allomone)



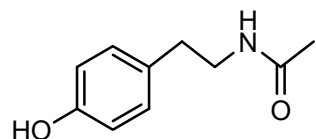
ant (gland secretion)



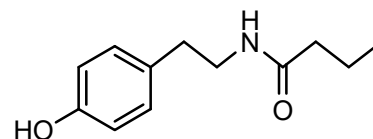
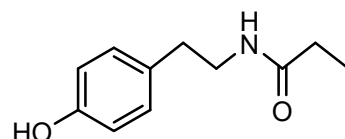
harvestman  
(allomone ?)



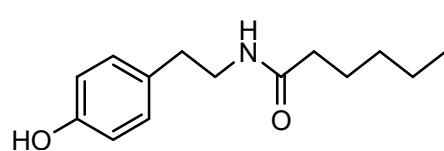
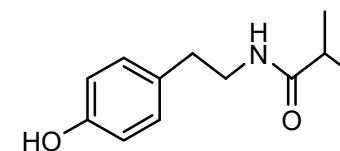
ant (trail phe.)



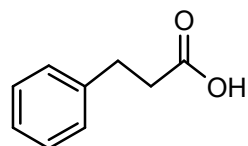
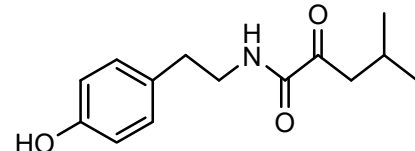
ant (M sex phe. ?)



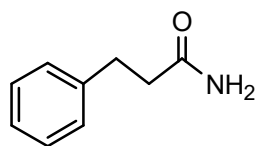
ant (M sex phe. ?)



ant (M sex phe. ?)

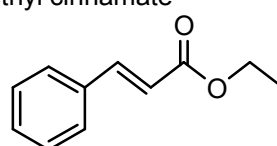


wasp (trail phe. ?)  
stingless bee  
(gland secretion)

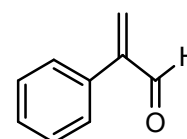


net-winged beetle  
(allomone ?)

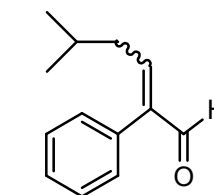
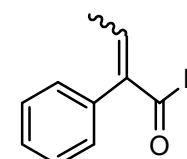
ethyl cinnamate



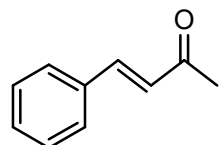
tortricid moth (M sex phe.)



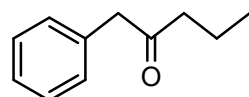
ant (gland secretion)



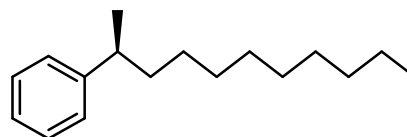
cave cricket  
(M gland secretion)



ant (alarm phe. ?)

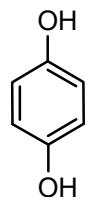


millipede (allomone)

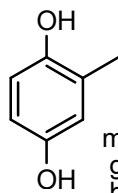


termite (aggregation phe.)

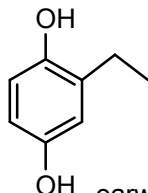
# [ C-3 ] Other: Aromatic comp. (vii)



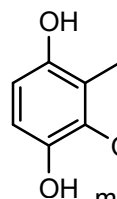
grasshopper,  
ground beetle  
(allomone)  
scarab beetle  
(F sex phe.)  
termite (phago-  
stimulating phe.)  
water beetle (gland secretion)



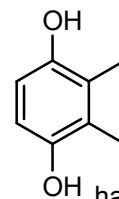
millipede,  
ground  
beetle, rove  
beetle (allomone)



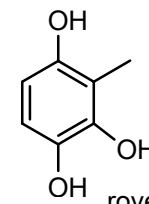
earwig  
(allomone)



millipede  
(allomone)

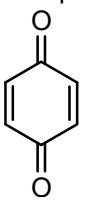


harvestman  
(allomone)

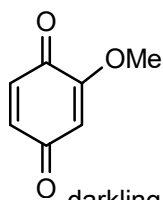


rove beetle  
(allomone)

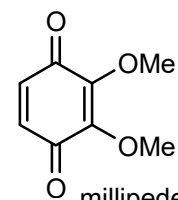
benzoquinone



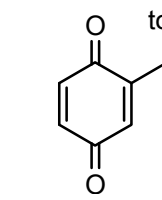
ground beetle,  
darkling beetle,  
cockroach, termite,  
harvestman,  
millipede (allomone)  
cockroach (alarm phe.)  
scarab beetle (F sex phe.)



darkling beetle  
(allomone)

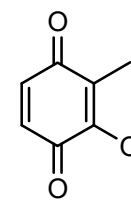


millipede  
(allomone)

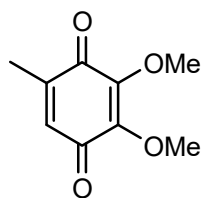


ground beetle,  
darkling beetle,  
rove beetle,  
termite, earwig,  
cockroach, millipede (allomone)

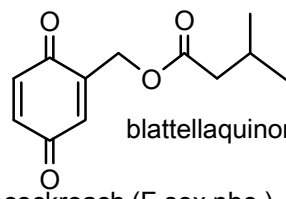
toluquinone



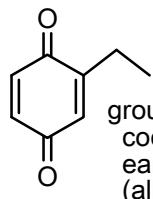
millipede,  
darkling  
beetle,  
rove beetle (allomone)



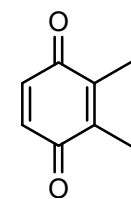
millipede (allomone)



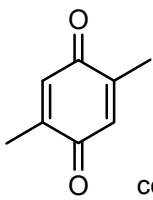
blattellaquinone  
cockroach (F sex phe.)



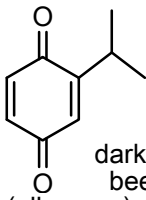
ground beetle,  
cockroach,  
earwig, millipede  
(allomone)  
darkling beetle (M sex phe.)



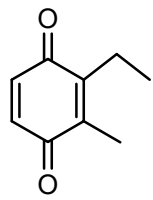
ground beetle,  
darkling beetle,  
cockroach,  
harvestman, earwig (allomone)



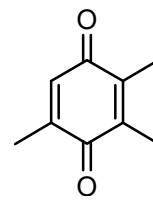
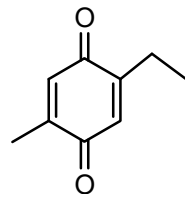
cockroach  
(allomone, alarm phe.)



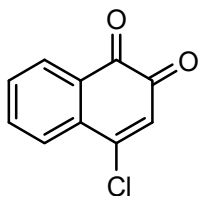
darkling  
beetle  
(allomone)



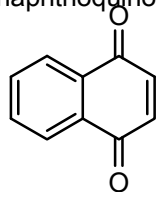
harvestman (allomone)



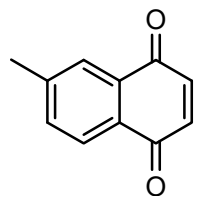
naphthoquinone



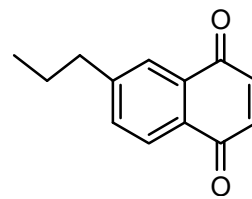
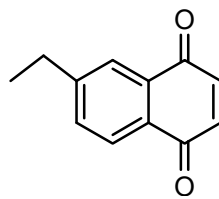
harvestman  
(allomone ?)



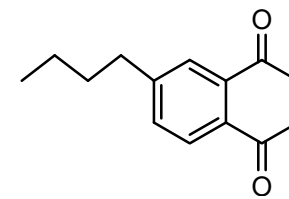
firefly, harvestman  
(allomone)



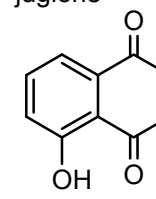
harvestman, darkling  
beetle, (allomone)



darkling beetle (allomone)



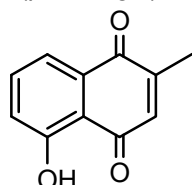
juglone



leaf beetle, thrips  
(allomone)

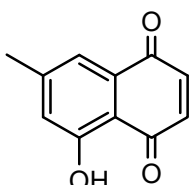
# [ C-3 ] Other: Aromatic comp. (viii)

2-methyljuglone  
(plumbagin)

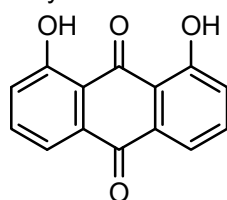


thrips (allomone), mite (gland secretion)

7-methyljuglone

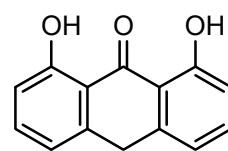


chryszazin

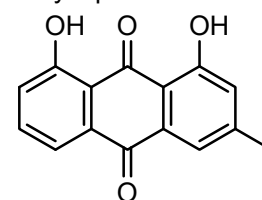


leaf beetle (allomone)

dithranol

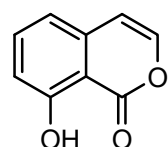
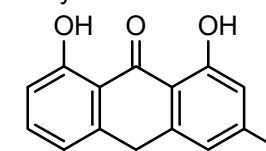


chrysophanol

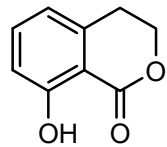


leaf beetle, aphid (allomone)

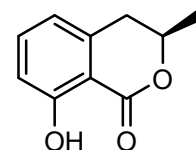
chrysarobin



darkling beetle (allomone)

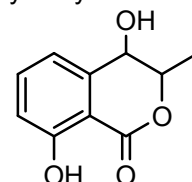


mellein

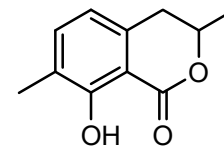


ant (M sex phe. ?, trail phe.  
allomone, gland secretion)  
termite, thrips (allomone)  
moth (M sex phe.)

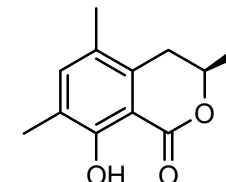
hydroxymellein



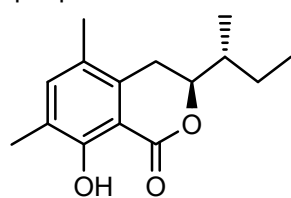
ant (gland secretion)



ant (trail phe.)

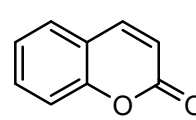


periplanotide E



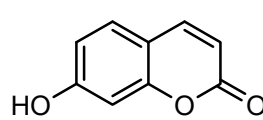
cockroach  
(aggregation phe.)

coumarin

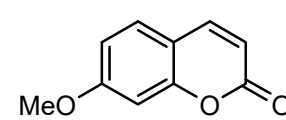


ermine moth (allomone ?)

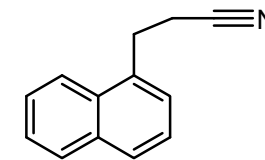
umbelliferone



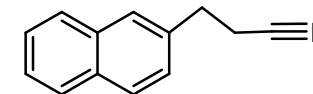
herniarin



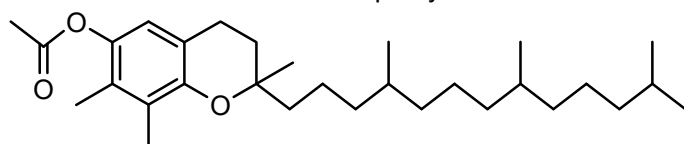
ermine moth (allomone ?)



grasshopper (M sex phe. ?)

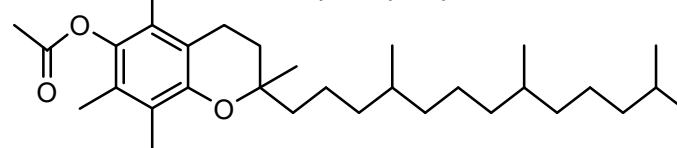


$\alpha$ -tocopheryl acetate

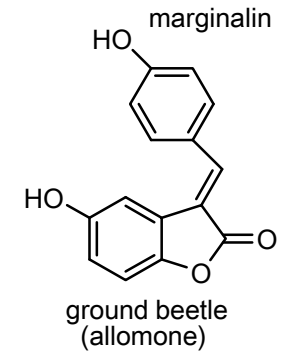
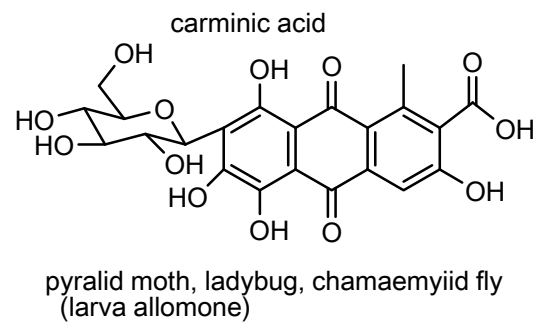
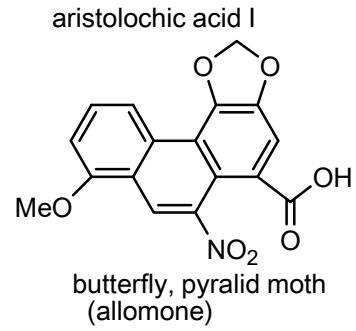
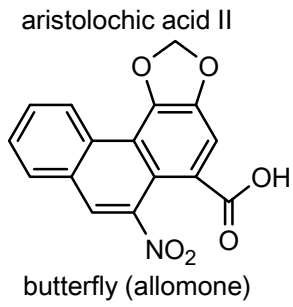


ladybug (allomone ?)

$\gamma$ -tocopheryl acetate

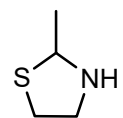


# [ C-3 ] Other: Aromatic comp. (ix)

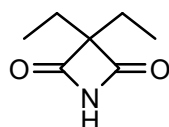


# [ C-4 ] Other: Ring comp. (i)

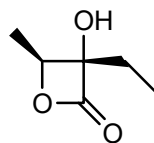
C3 ring



cockroach  
(M sex phe.)

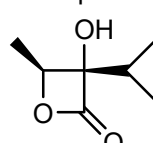


scarab beetle  
(F sex phe.?)

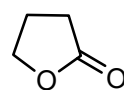


butterfly (M sex phe.)

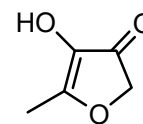
viridifloric  $\beta$ -lactone



C4 ring

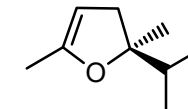
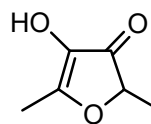


burrowing bug  
(gland secretion)



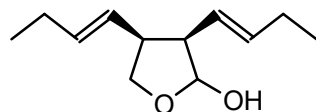
cockroach (M sex phe.)

furaneol

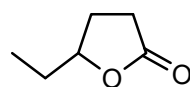


ship-timber beetle  
(F sex phe.?)

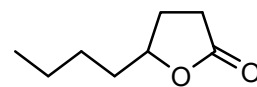
biprorulure



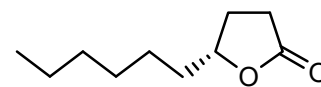
stink bug (M sex phe.)



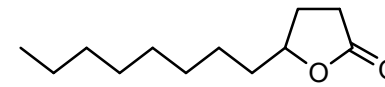
hide beetle  
(F sex phe.)



parasitoid wasp, honey  
bee (gland secretion)

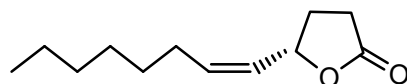


scarab beetle (M sex phe.,  
M aggregation phe.)  
rove beetle, thrips (allomone)  
butterfly (M scent secretion)



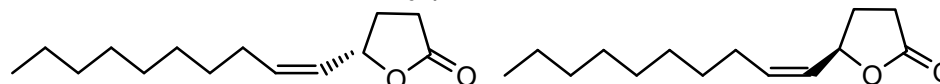
rove beetle (allomone?)  
parasitoid wasp (gland secretion)

buibuilactone

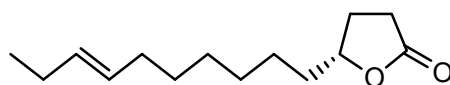


scarab beetle (F sex phe.)

japonilure

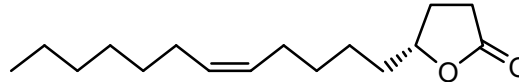


scarab beetle (F sex phe.)

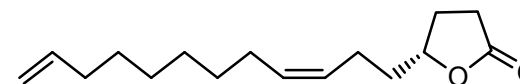


parasitoid wasp (M aggregation phe.)

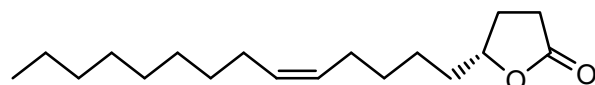
desmolactone



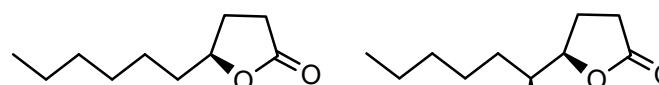
longhorn beetle (F sex phe.)



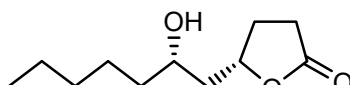
scarab beetle (F sex phe.)



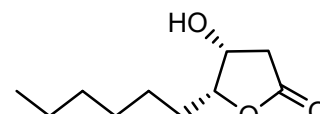
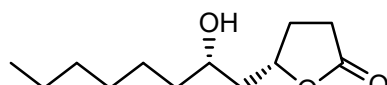
ant (secretion), stem sawfly (F sex phe.)



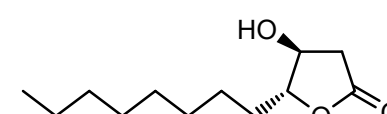
parasitoid wasp (M sex phe.)



butterfly (M sex phe.)



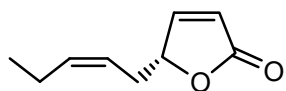
fruit fly (M sex phe.?)



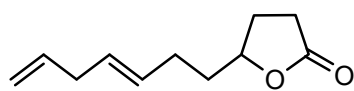
harvestman (allomone)

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

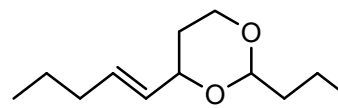
C4 ring



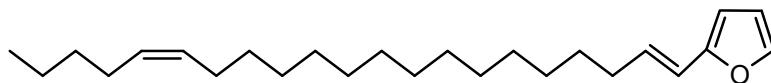
pyralid moth (M sex phe.)



fruit fly (gland secretion)



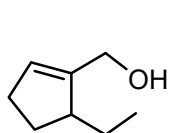
cockroach (allomone ?)



ant (allomone ?)

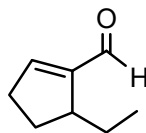
C5 ring

phoracanthol

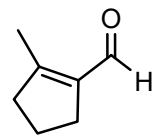


longhorn beetle (allomone?)

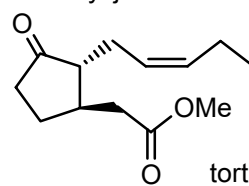
phoracanthal



ant (gland secretion)

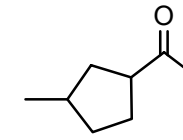
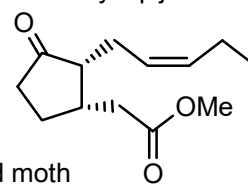


methyl jasmonate



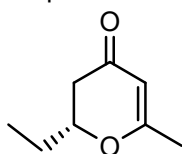
torricid moth (M sex phe.)

methyl epijasmonate

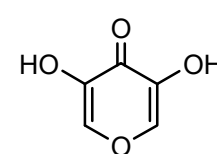
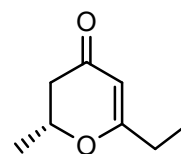


stick insect (allomone ?)

hepialone

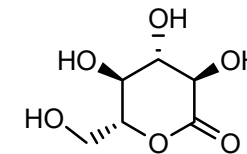


swift moth (M sex phe.)

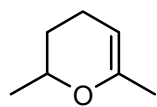


shield bug (M sex phe.)

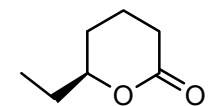
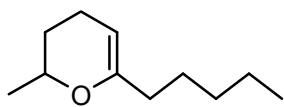
gluconolactone



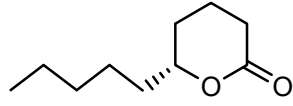
cockroach (allomone ?)



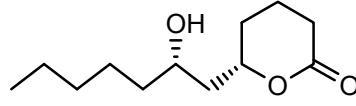
bee (cephalic secretion)



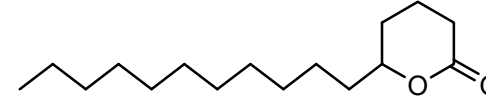
fruit fly (M sex phe.)



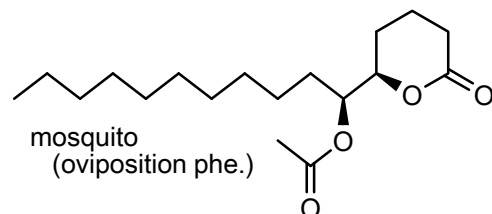
butterfly (M sex phe. ?)



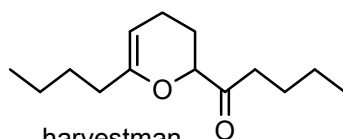
butterfly (M sex phe.)



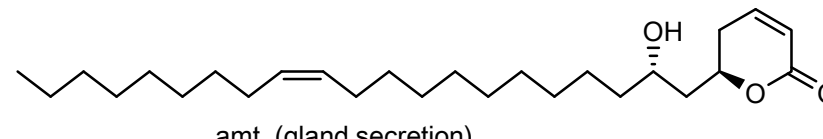
wasp (queen primer phe.)



mosquito (oviposition phe.)



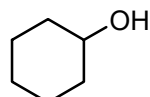
harvestman (allomone ?)



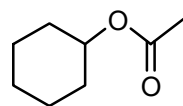
ant (gland secretion)

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

C6 ring

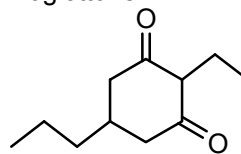


grasshopper  
(aggregation phe.)

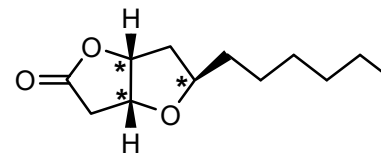


butterfly (F sex phe. ?)

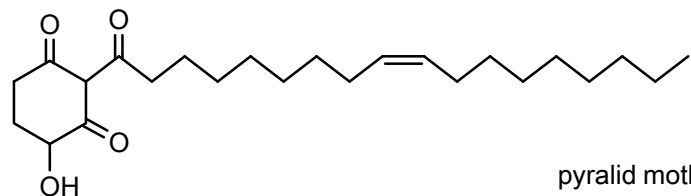
chiloglottone



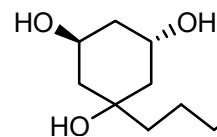
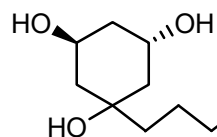
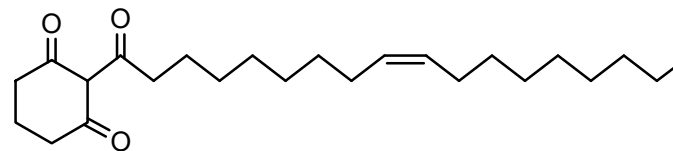
solitary wasp (F sex phe.)



parasitoid wasp (gland secretion)



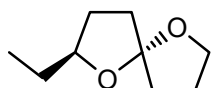
pyralid moth (larva trail phe.)



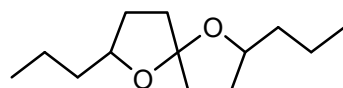
ant (gland secretion)

C7 ring

chalcogran



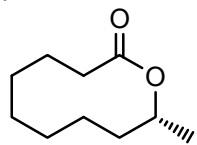
bark beetle  
(aggregation phe.)



mining bee  
(gland secretion)

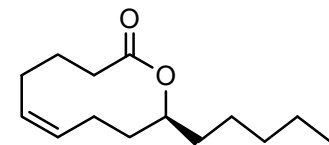
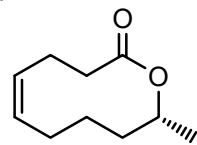
C9 ring

phoracantholide I



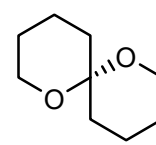
longhorn beetle (allomone ?)

phoracantholide J

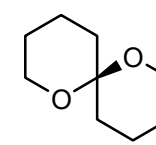
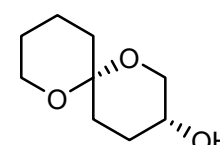


termite (queen recognition ?)

olean



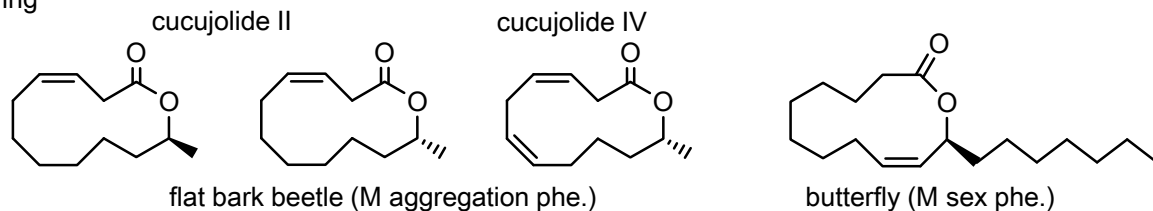
fruit fly (F sex phe.)



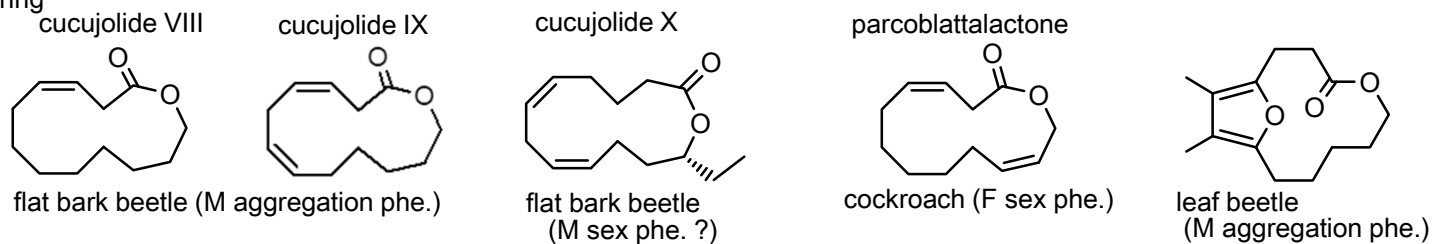
fruit fly  
(F sex phe.)

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

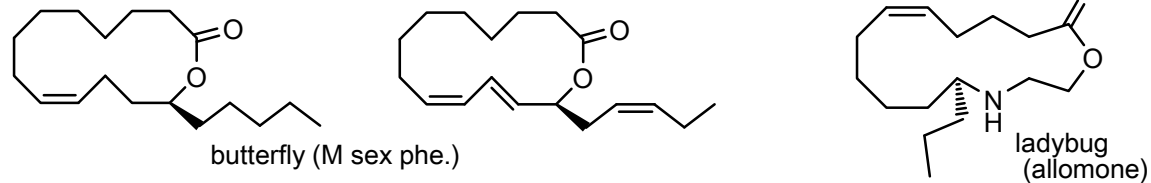
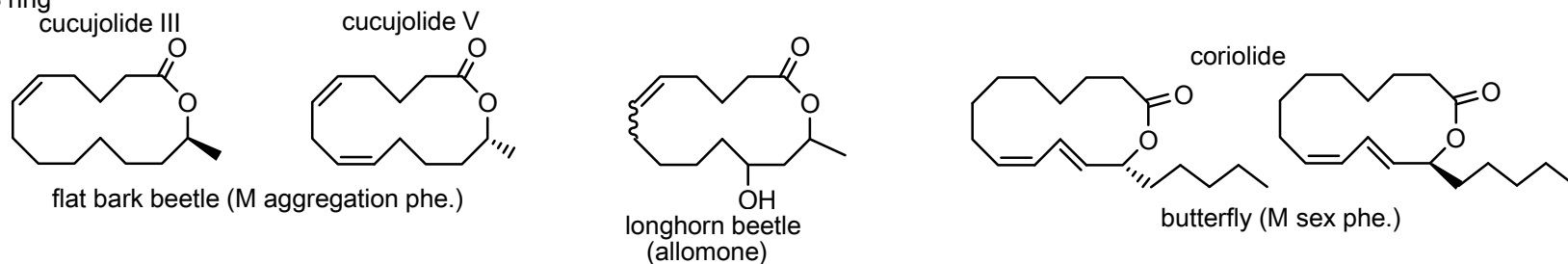
C11 ring



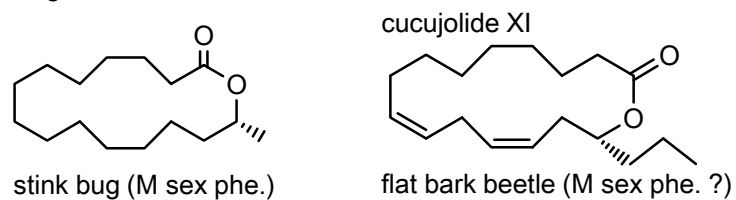
C12 ring



C13 ring



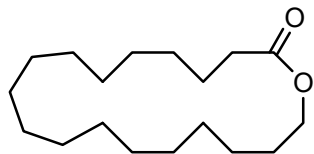
C15 ring



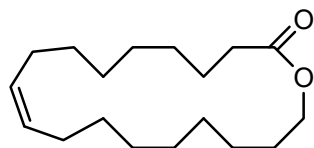


# [ C-4 ] Other: Ring comp. (v)

C18 ring

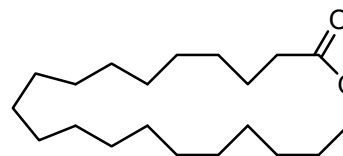


sweat bee (gland secretion,  
F sex phe., queen phe.)



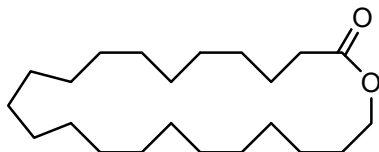
wasp (trail phe. ?)

C20 ring

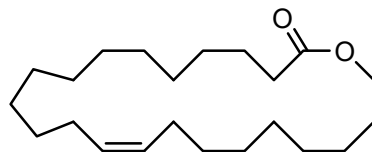


sweat bee (gland secretion,  
F sex phe., queen phe.)  
mining bee, plasterer bee  
(gland secretion)

C22 ring

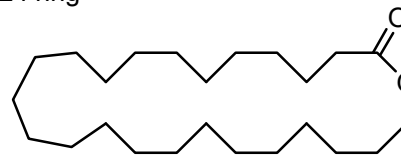


sweat bee (gland secretion,  
F sex phe., queen phe.)  
plasterer bee (gland secretion)

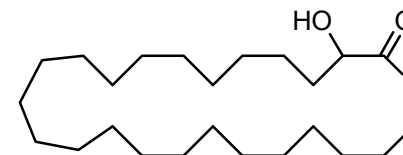


sweat bee (gland secretion)

C24 ring

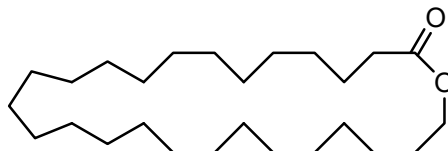


sweat bee (gland secretion,  
F sex phe.)  
plasterer bee (gland secretion)  
termite (allomone ?)

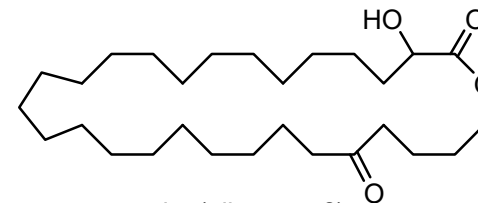
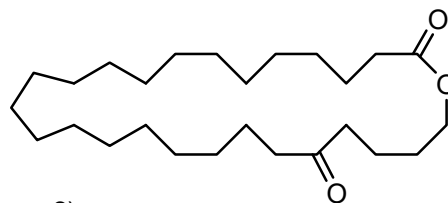


termite (allomone ?)

C26 ring

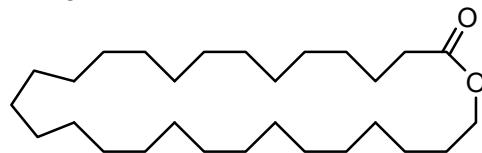


termite (allomone ?)



termite (allomone ?)

C28 ring



termite (allomone ?)

