

Part II. List of Other Arthropod Pheromones and Allomones

Update: Dec. 13, 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.

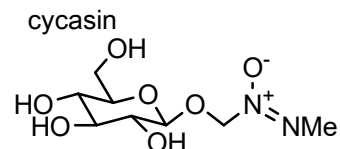
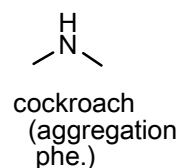
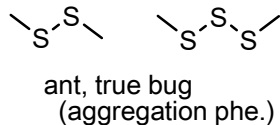
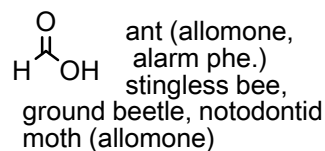
[C-1]	Other: Acyclic compounds	i – xxiv (535 compounds)
[C-2]	Other: True alkaloids	i – xiv (240 compounds)
[C-3]	Other: Aromatic compounds	i – ix (167 compounds)
[C-4]	Other: Ring compounds	i – v (101 compounds)

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

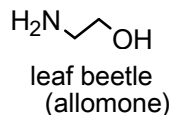
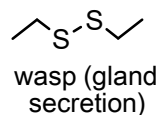
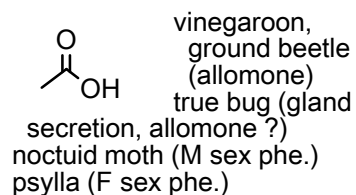
Lepidopteran female sex pheromones and male attractants are listed in **Part I**.
Other arthropod pheromones and allomones are listed in **Part II**,
which is composed of **(A)** terpenoid compounds without alkaloids,
(B) non-terpene methyl-branched compounds, and **(C)** other compounds
including terpene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

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

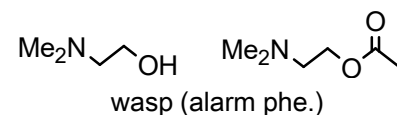
C1 chain



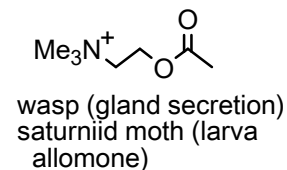
C2 chain



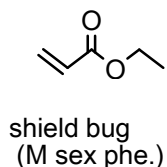
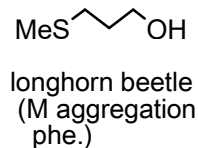
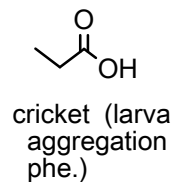
deanol



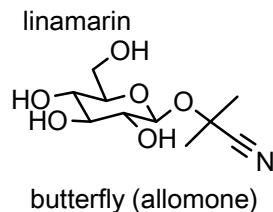
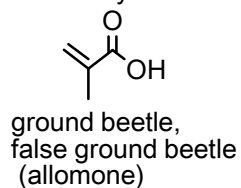
acetylcholine



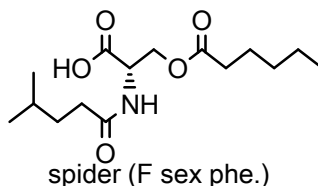
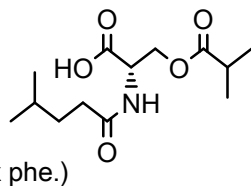
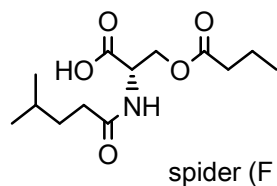
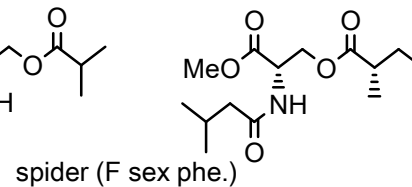
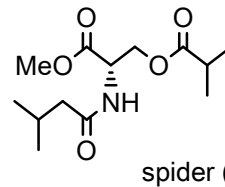
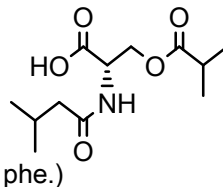
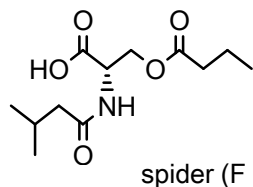
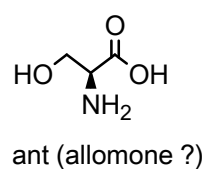
C3 chain



methacrylic acid

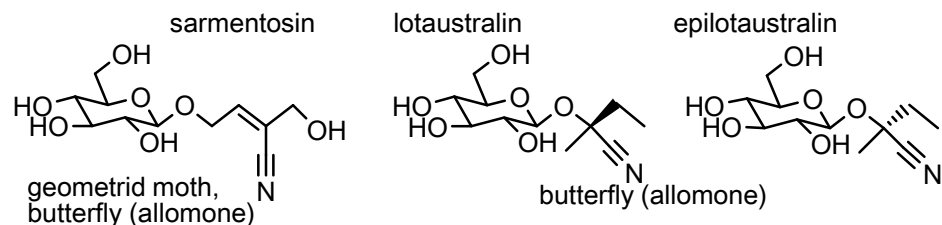
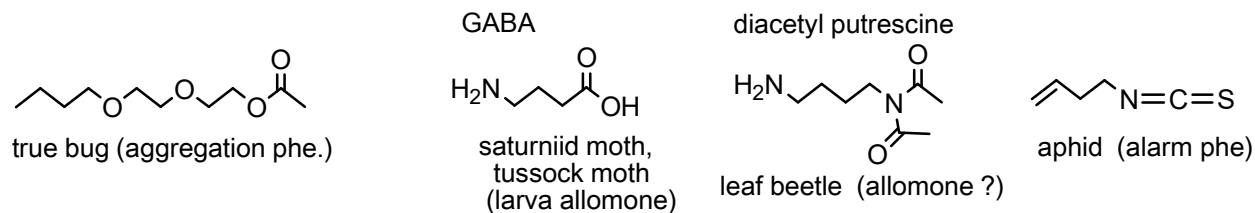
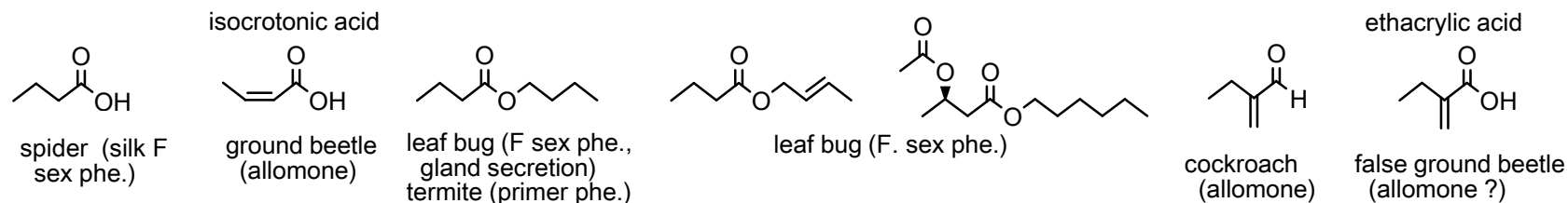
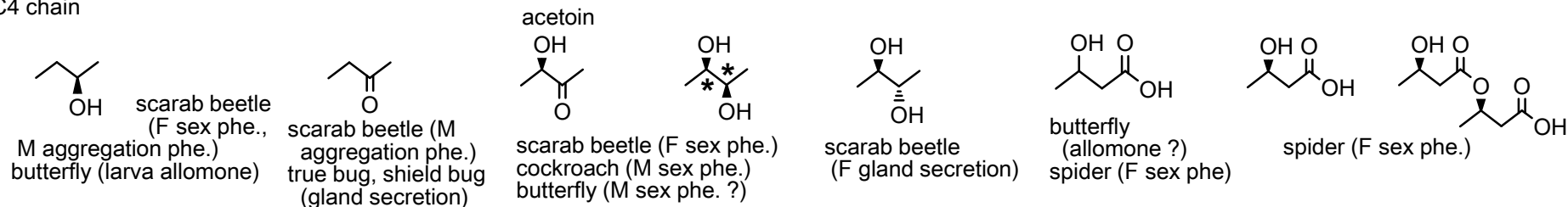


serine



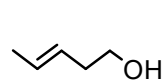
[C-1] Other: Acyclic comp. (ii)

C4 chain

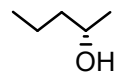


[C-1] Other: Acyclic comp. (iii)

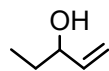
C5 chain



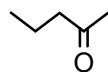
bark beetle
(F aggregation
phe. ?)



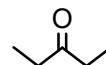
wasp
(alarm phe.)
assassin bug
(sex phe. ?)



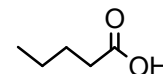
butterfly (larva
allomone)



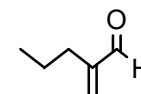
ground beetle,
darkling beetle
(allomone ?)



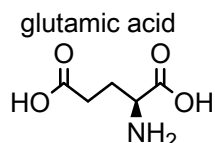
scarab beetle (M
aggregation phe.)
assassin bug (alarm phe.)
butterfly (larva allomone)



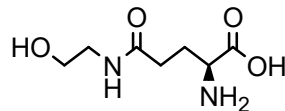
grasshopper
(F. sex phe.)



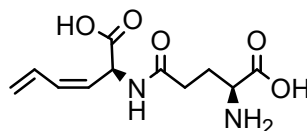
cockroach
(allomone)



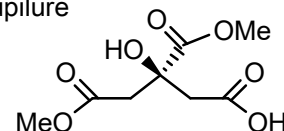
fruit fly (marking phe.)



leaf beetle (allomone)

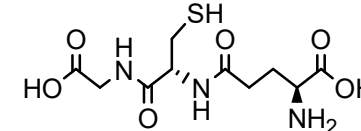


cupilure



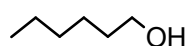
spider (F sex phe.)

glutathione

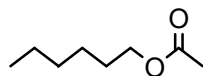


fruit fly (marking phe.)

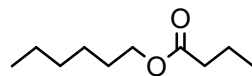
C6 chain



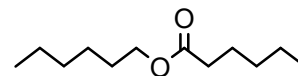
ambrosia beetle
(aggregation phe.)



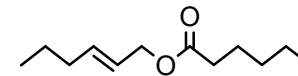
true bug (allomone ?,
gland secretion)
leaf bug (F sex phe.)



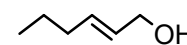
true bug (gland secretion)
leaf bug (F sex phe.,
M anti-sex phe., alarm
phe., allomone)



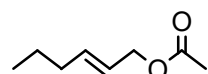
true bug (gland secretion)
leaf bug (gland secretion,
F sex phe.)



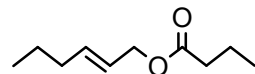
leaf bug (gland secretion,
alarm phe., F sex phe.)



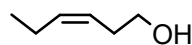
shield bug (allomone)
leaf bug (F sex phe.)
stink bug (M
aggregation phe.)



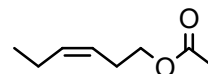
giant water bug, eed
bug (gland secretion)
stink bug, true bug
(allomone)
leaf bug (F sex phe.)



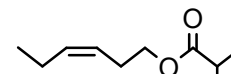
leaf bug (F sex phe.,
M anti-sex phe.,
alarm phe., allomone)



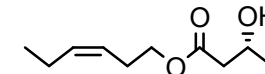
leaf beetle
(gland secretion)



leaf bug
(F sex phe.)



leaf beetle (allomone)
butterfly (M sex phe. ?)

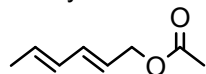


wasp
(M marking phe.)

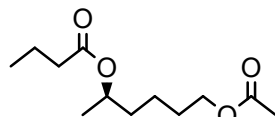
[C-1] Other: Acyclic comp. (iv)

C6 chain

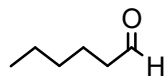
sorbyl acetate



seed bug
(aggregation phe.)

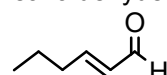


leaf bug (F sex phe.)

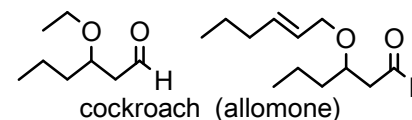


darkling beetle (gland secretion), true bug, shield bug (alarm phe. gland secretion) flesh fly (M sex phe.)

leaf aldehyde

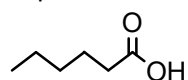


stink bug (alarm phe., aggregation phe., allomone) lace bug, ant (alarm phe.), true bug (aggregation phe. alarm phe.), giant shield bug, rove beetle (allomone)

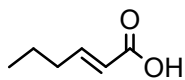


cockroach (allomone)

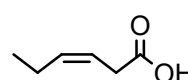
caproic acid



termite (trail phe., allomone), click beetle (F sex phe.) ant (trail phe.), wasp (sex phe.) assassin bug (aggregation phe.) spider (F silk sex phe.)

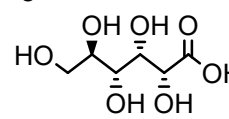


stink bug (gland secretion)

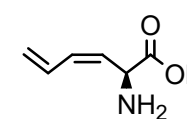


butterfly (M sex phe. ?)

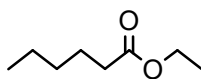
gluconic acid



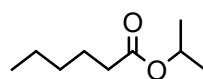
cockroach (allomone ?)



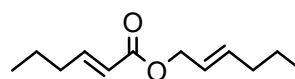
leaf beetle (allomone)



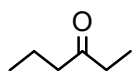
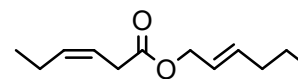
fruit fly (M sex phe.)



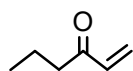
assassin bug (queen phe.)



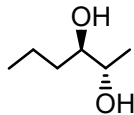
broad-headed bug (M aggregation phe.)



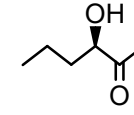
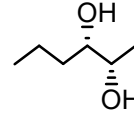
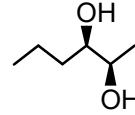
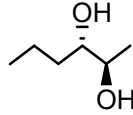
parasitoid wasp (aggregation phe.)



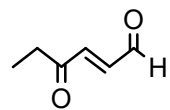
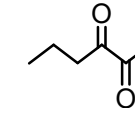
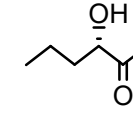
butterfly (gland secretion)



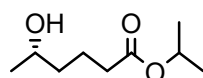
longhorn beetle (M sex or aggregation phe.)



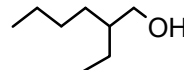
longhorn beetle (M sex or aggregation phe.)



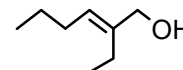
lace bug, stink bug (alarm phe.) leaf bug (F sex phe.) water boatman, giant shield bug, true bug, broad-headed bug, stink bug, rove beetle (allomone)



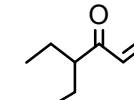
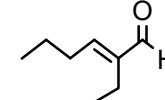
fruit fly (M sex phe.)



butterfly (M sex phe. ?)



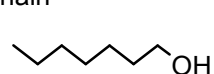
ant (gland secretion)



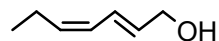
millipede (allomone)

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

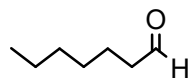
C7 chain



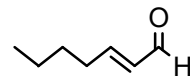
bark beetle (F
aggregation phe.)
fruit fly (M sex phe.)



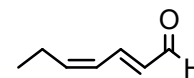
leaf beetle
(aggregation phe.)



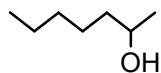
assassin bug
(M sex phe.)



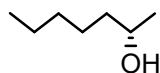
stink bug
(gland secretion)



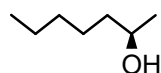
leaf beetle
(aggregation phe.)



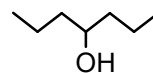
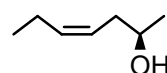
bee, wasp
(alarm phe.)



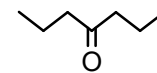
caddis fly
(F sex phe.)



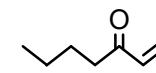
eriocraniid moth (F sex phe.)



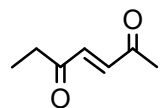
ant (gland secretion)



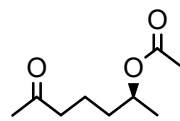
honey bee, ant, ground
beetle, bumblebee
(alarm phe.)
caddis fly (F sex phe.)



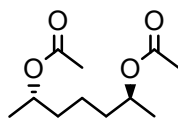
harvestman
(allomone ?)



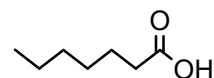
stingless bee
(allomone)



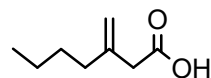
gall midge (F sex phe.)



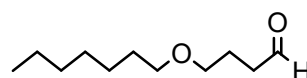
enanthic acid



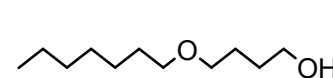
ant (trail phe. ?)



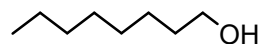
seed beetle
(F sex phe.)



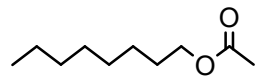
longhorn beetle (M aggregation phe.)



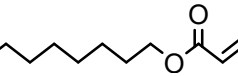
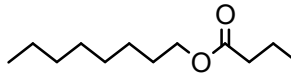
C8 chain



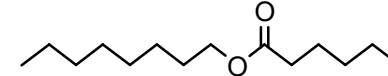
true bug (gland secretion)
leaf bug (F sex phe.)



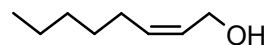
leaf bug (F sex phe.)



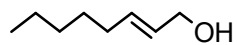
parasitoid wasp
(F sex phe.)



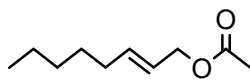
leaf bug (F sex phe.)



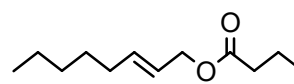
grasshopper
(M sex phe. ?)



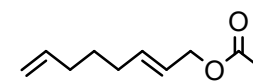
broad-headed bug
(gland secretion)



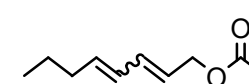
seed bug (F sex phe,
aggregation phe.)
leaf bug (F sex phe.)
stink bug (allomone)



leaf bug (F sex phe.)



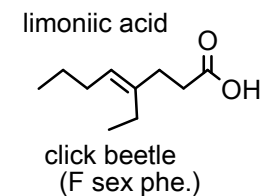
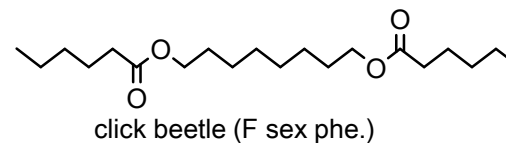
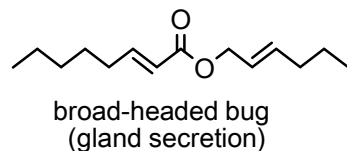
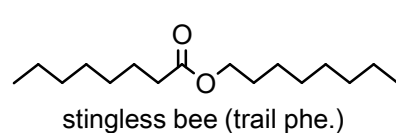
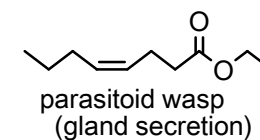
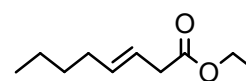
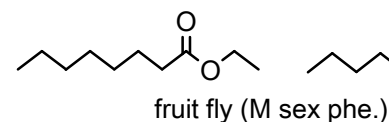
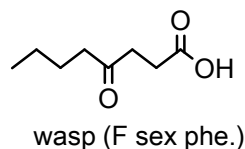
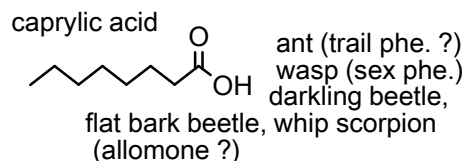
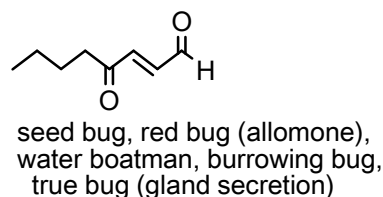
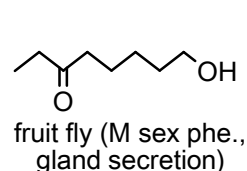
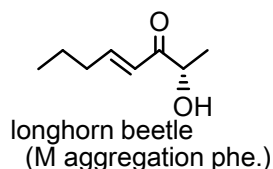
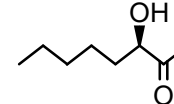
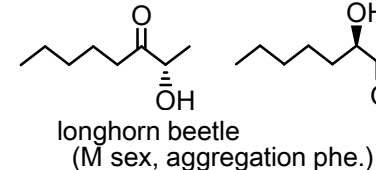
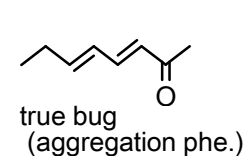
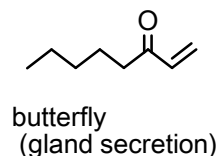
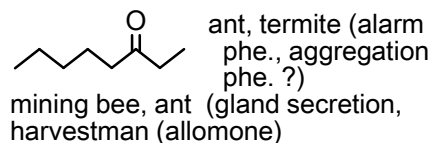
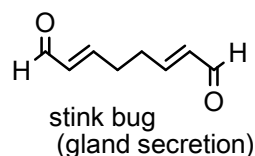
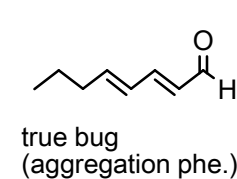
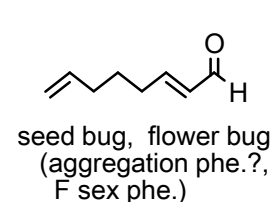
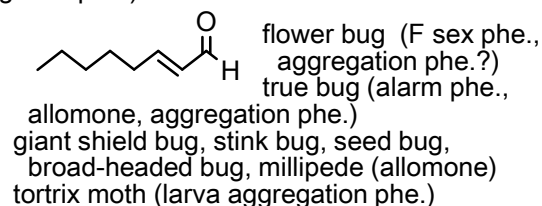
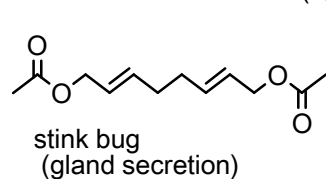
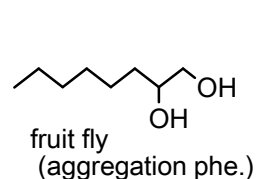
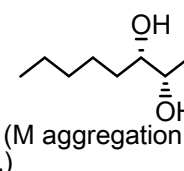
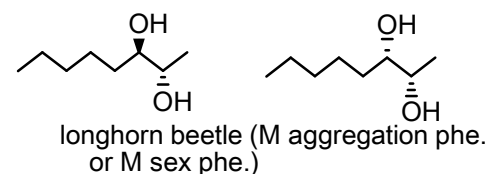
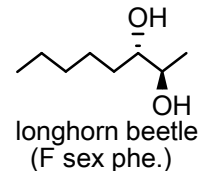
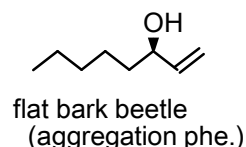
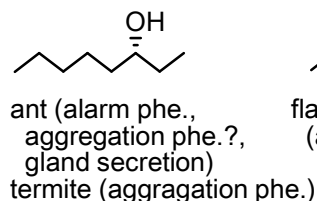
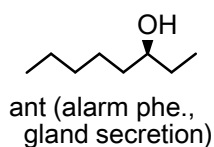
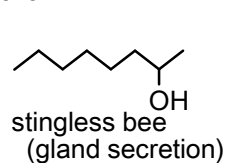
seed bug
(aggregation phe.?)



seed bug
(sex phe.?)

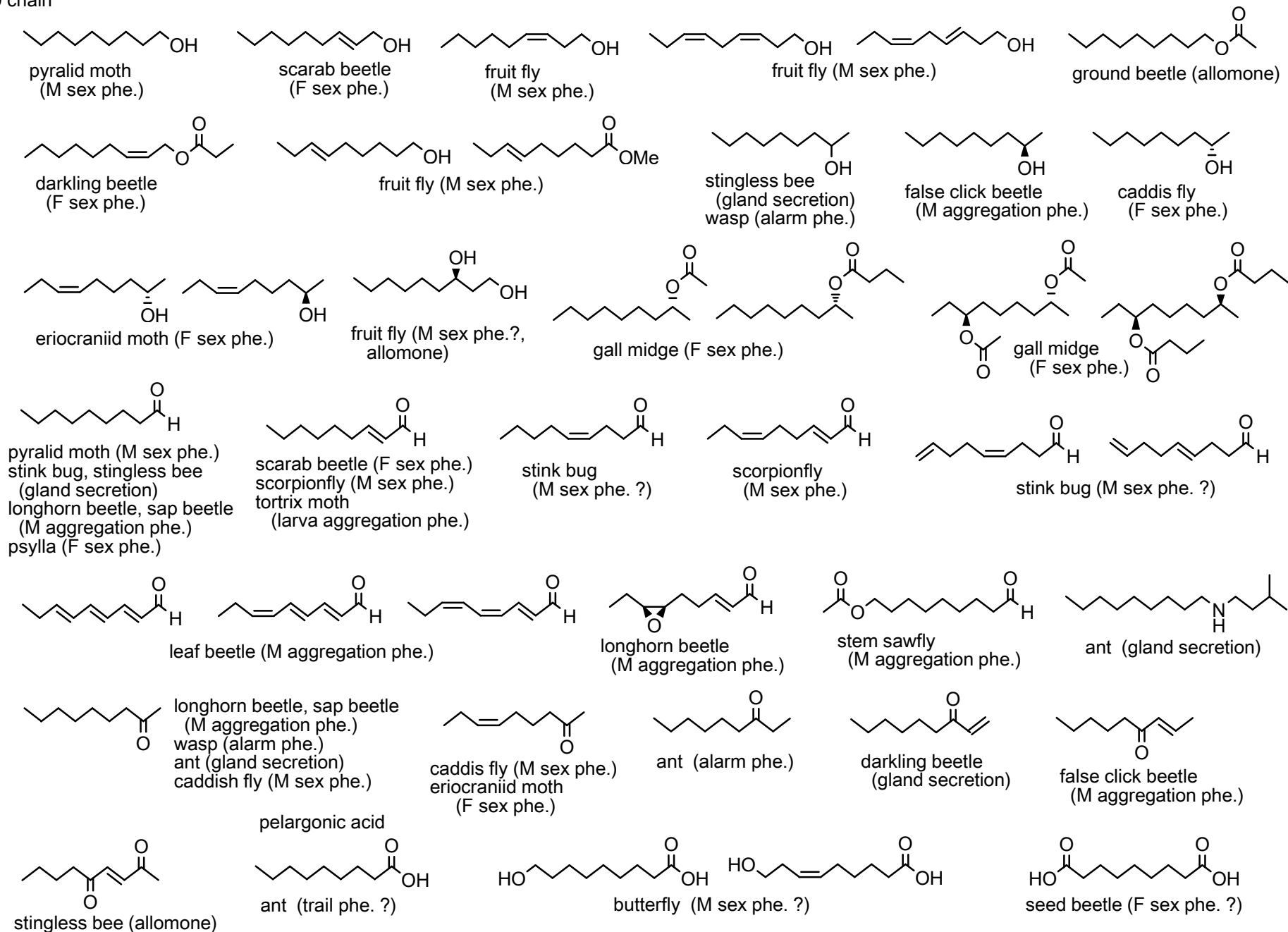
[C-1] Other: Acyclic comp. (vi)

C8 chain



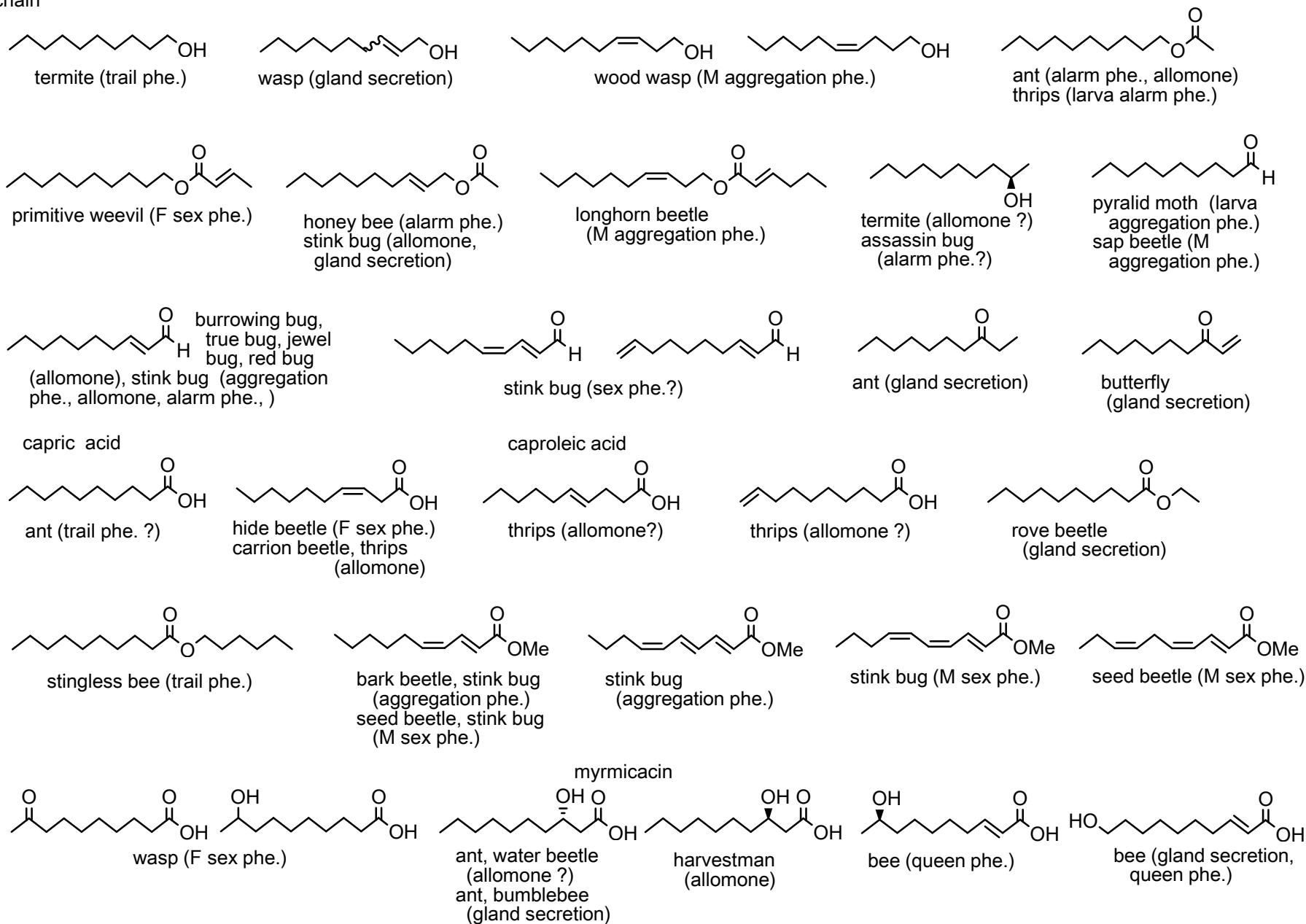
[C-1] Other: Acyclic comp. (vii)

C9 chain



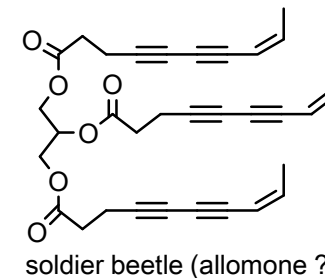
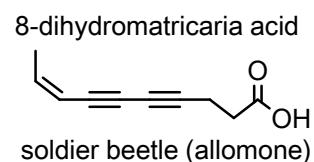
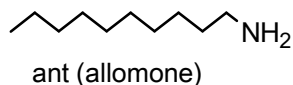
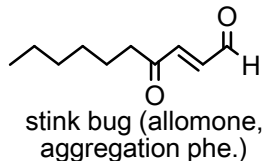
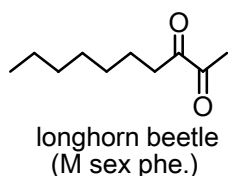
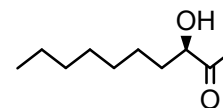
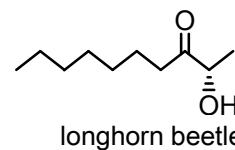
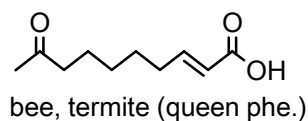
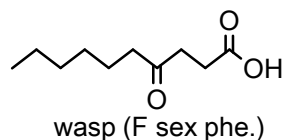
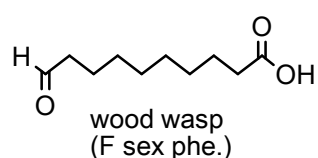
[C-1] Other: Acyclic comp. (viii)

C10 chain

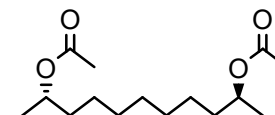
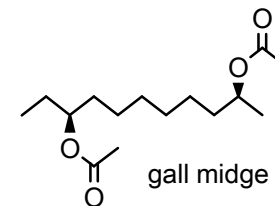
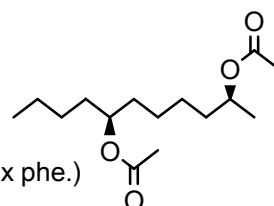
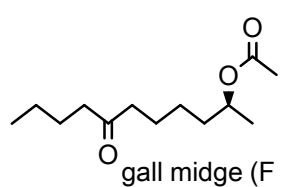
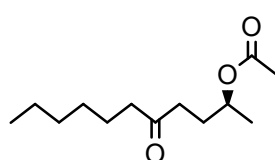
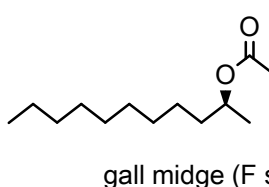
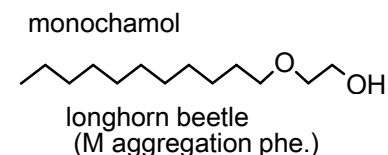
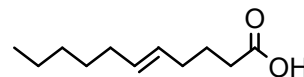
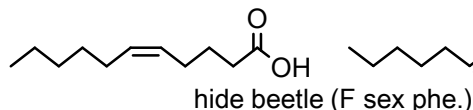
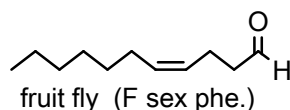
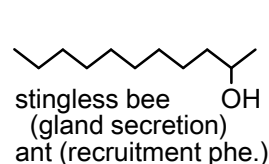
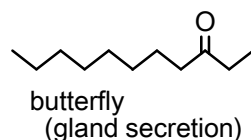
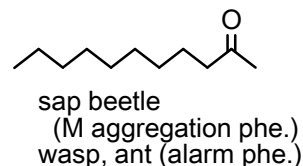
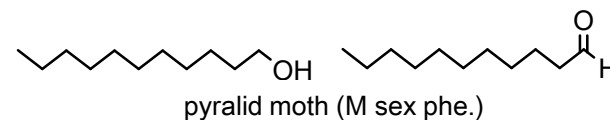
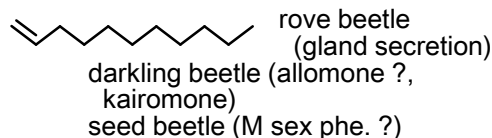
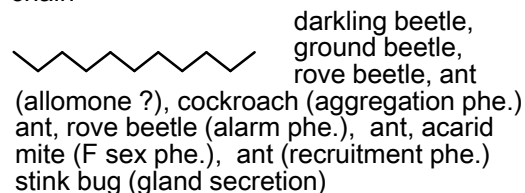


[C-1] Other: Acyclic comp. (ix)

C10 chain



C11 chain

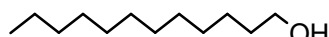


[C-1] Other: Acyclic comp. (x)

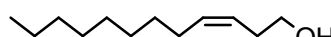
C12 chain



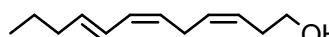
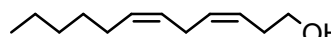
ant (gland secretion)



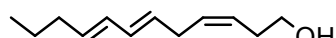
termite (trail phe.)



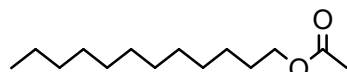
termite (trail phe.)



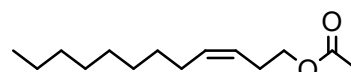
termite (trail phe., F sex phe.)



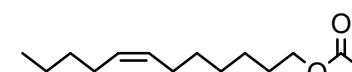
termite (trail phe.)



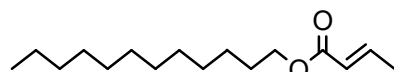
ant (secretion, alarm phe., allomone)
click beetle (F sex phe.), thrips (larva
alarm phe., larva aggregation phe.)



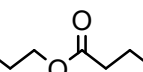
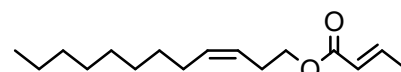
darkling beetle (M sex phe.)



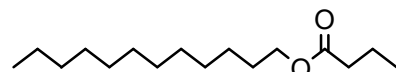
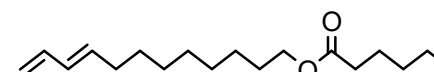
noctuid moth (M sex phe. ?)



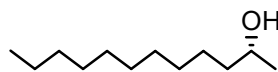
primitive weevil (F sex phe.)



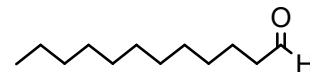
click beetle (F sex phe.)



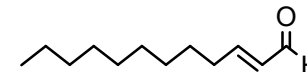
longhorned bee
(M gland secretion)



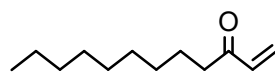
ant (trail phe.)



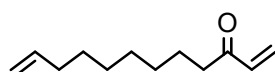
rove beetle (aphrodisiac phe..
allomone), parasitoid wasp
(M aggregation phe.)



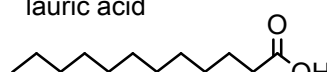
millipede (allomone ?)



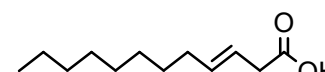
sweat bee (gland secretion)



lauric acid



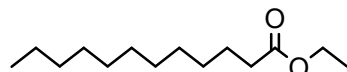
ant (trail phe. ?)
sand fly (oviposition phe.)



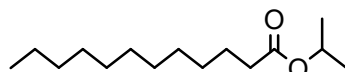
thrips (gland secretion)



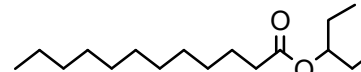
ant (gland secretion)



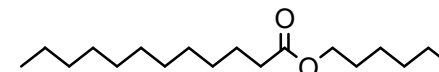
cuckoo bee (allomone ?)
fruit fly (M sex phe.)
bark beetle (aggregation phe.)



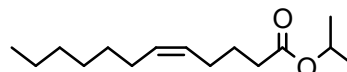
rove beetle (gland secretion)
hide beetle, auger beetle
(M aggregation phe. ?)



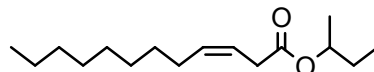
auger beetle
(M aggregation phe.)



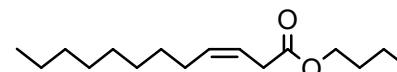
millipede (allomone ?)



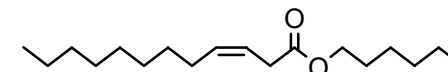
hide beetle (M gland secretion)



rove beetle (gland secretion)

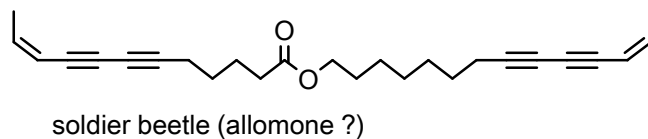
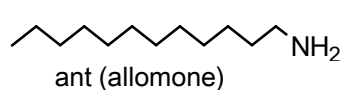


butterfly (gland secretion)

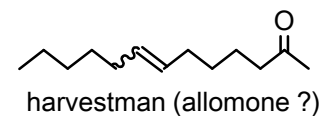
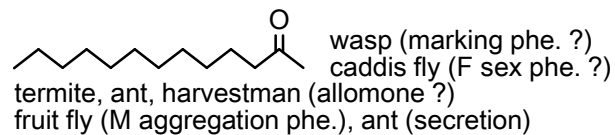
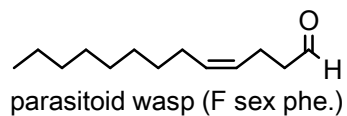
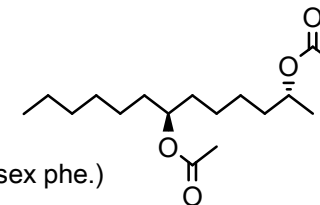
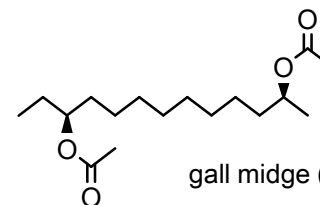
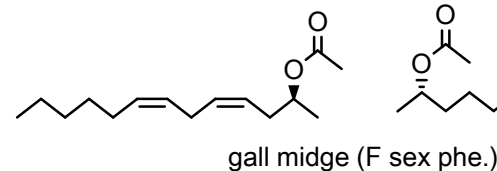
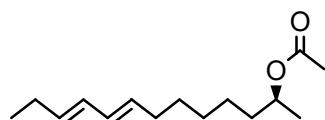
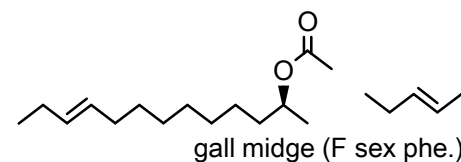
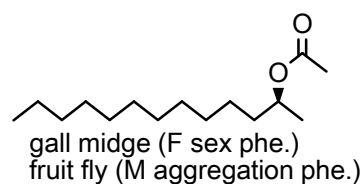
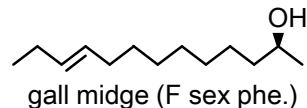
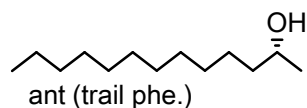
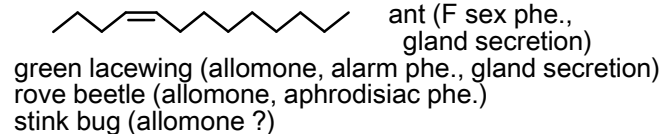
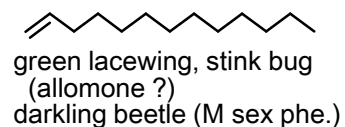
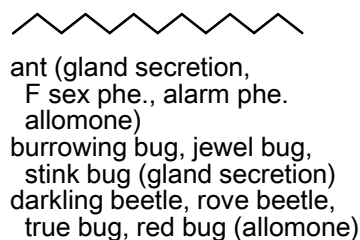


[C-1] Other: Acyclic comp. (xi)

C12 chain

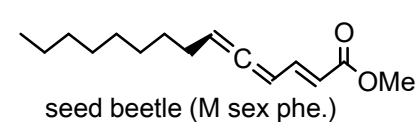
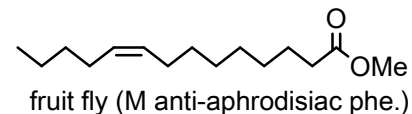
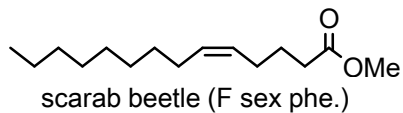
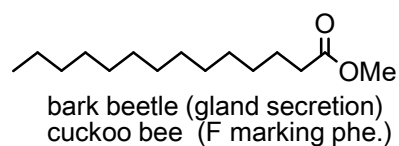
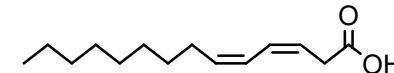
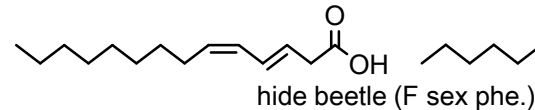
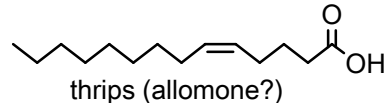
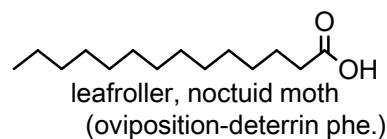
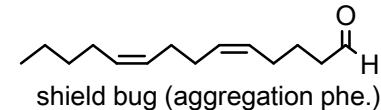
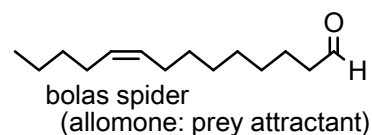
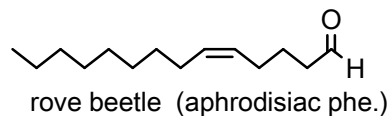
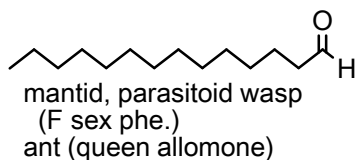
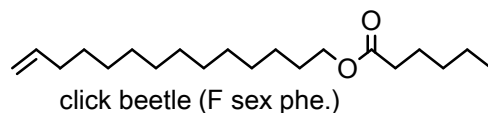
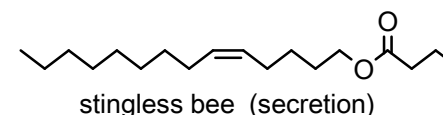
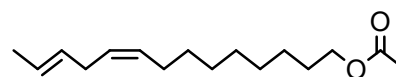
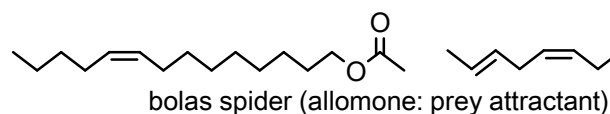
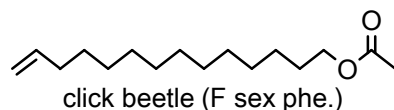
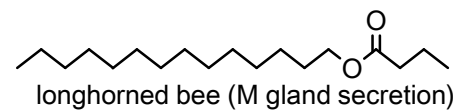
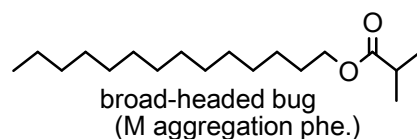
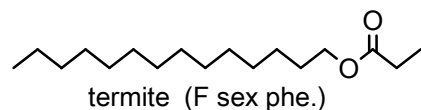
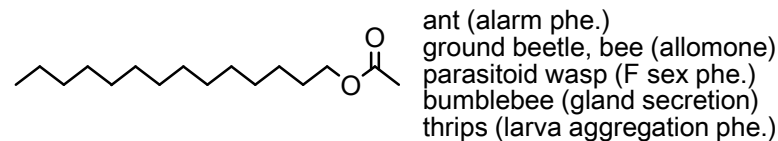
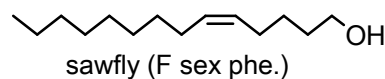
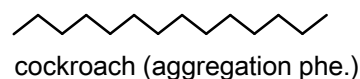


C13 chain



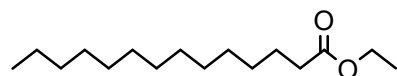
[C-1] Other: Acyclic comp. (xii)

C14 chain

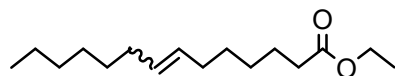


[C-1] Other: Acyclic comp. (xiii)

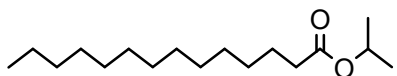
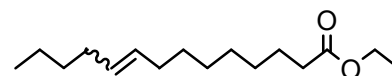
C14 chain



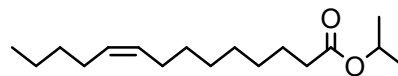
cuckoo bee (allomone ?)
wasp (marking phe. ?)
fruit fly (M sex phe.)



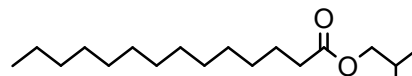
bumblebee (M marking phe. ?)



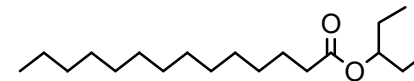
wasp (marking phe. ?)
hide beetle (M aggregation phe. ?)



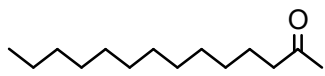
hide beetle (M aggregation phe. ?)



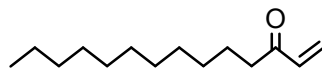
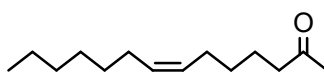
fruit fly (F gland secretion)



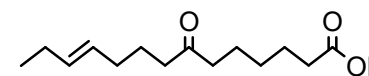
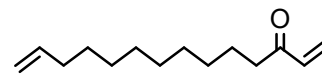
auger beetle
(M aggregation phe.)



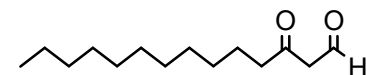
scarab beetle (F sex phe.)



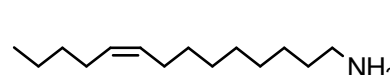
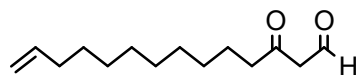
termite (allomone)



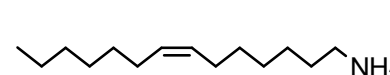
butterfly (M sex phe. ?)



termite (allomone)

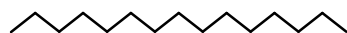


ant (allomone ?)

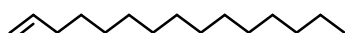


[C-1] Other: Acyclic comp. (xiv)

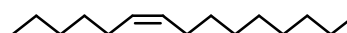
C15 chain



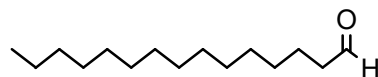
true bug, small carpenter bee
(allomone ?), wasp (F sex phe.)
ant (gland secretion)



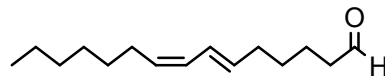
darkling beetle (allomone)



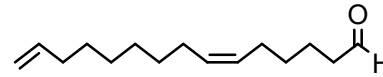
acarid mite (alarm phe.)



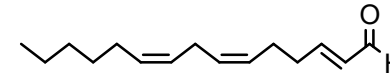
mantid (F sex phe.)



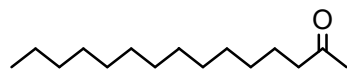
longhorn beetle (M aggregation phe.)



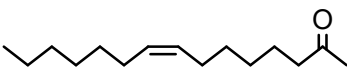
webspinning sawfly (F sex phe.)



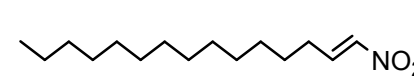
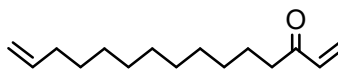
longhorn beetle (aggregation phe.)



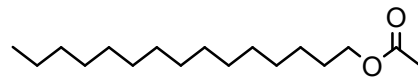
wasp (marking phe.?, trail phe.?)
fruit fly (M aggregation phe.)
darkling beetle (allomone ?)
ant, cuckoo bee (gland secretion)



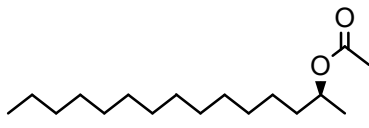
termite (allomone)



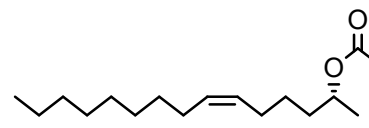
termite (allomone)



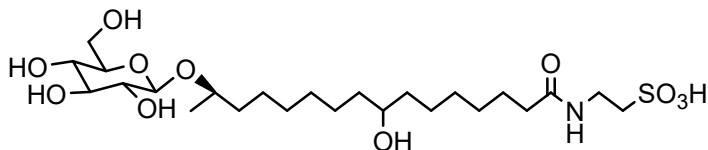
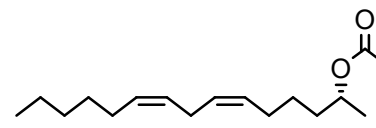
scarab beetle (aggregation phe.)



fruit fly (M aggregation phe.)



gall midge (F sex phe.)



fruit fly (marking phe.)

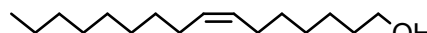
C16 chain



acrolepiid moth (M sex phe.)



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



scarab beetle (F sex phe.)

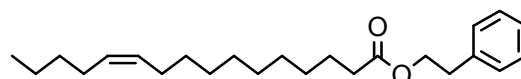
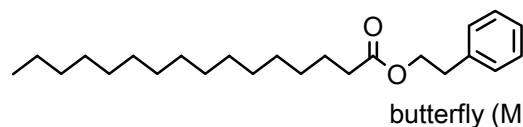
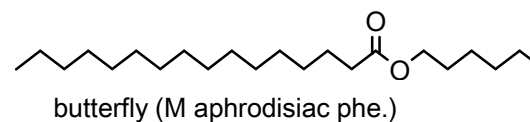
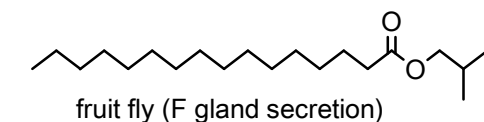
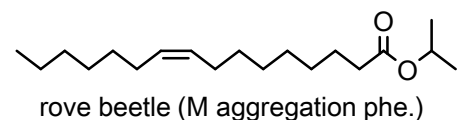
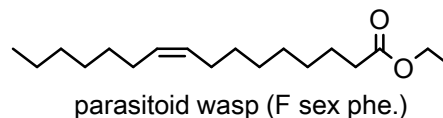
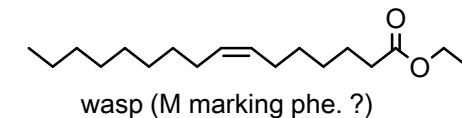
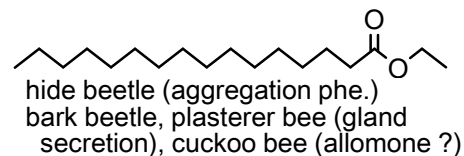
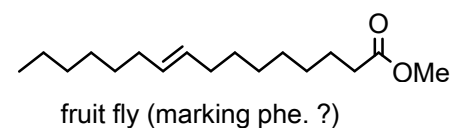
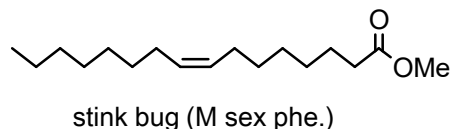
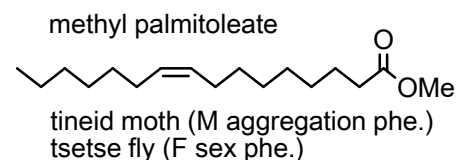
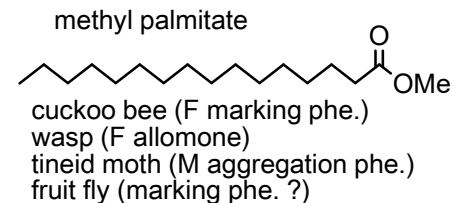
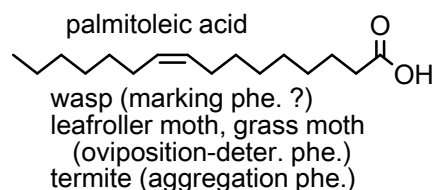
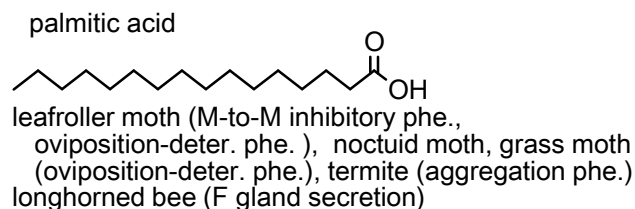
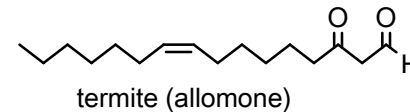
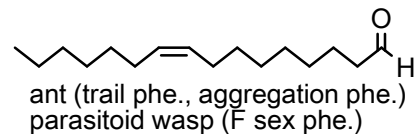
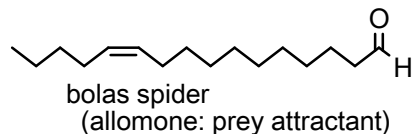
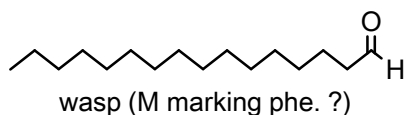
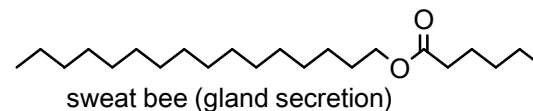
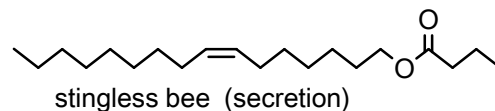
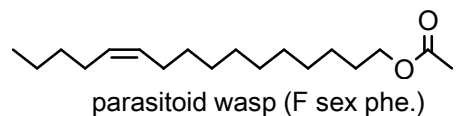
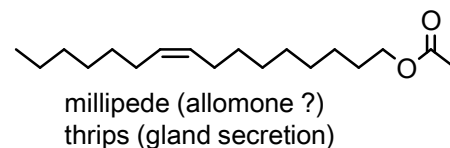
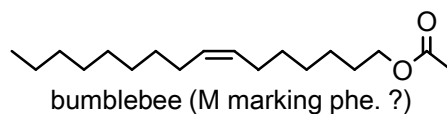
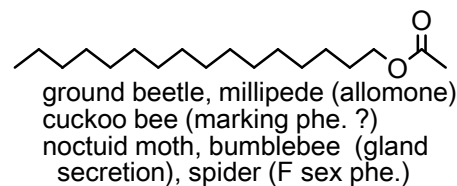
palmitoleyl alcohol



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

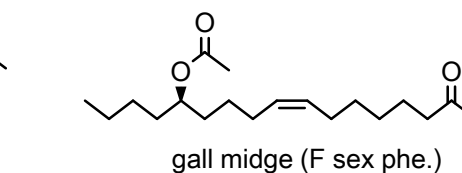
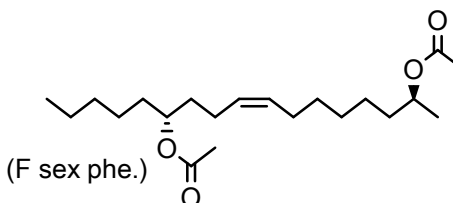
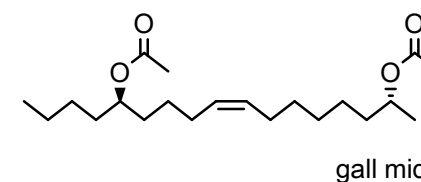
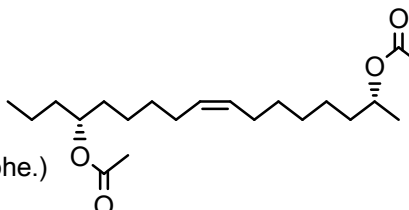
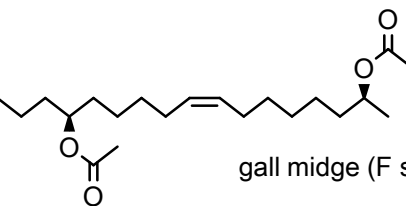
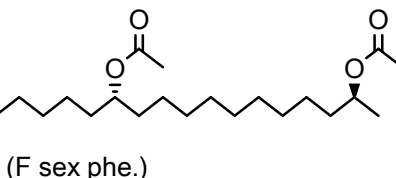
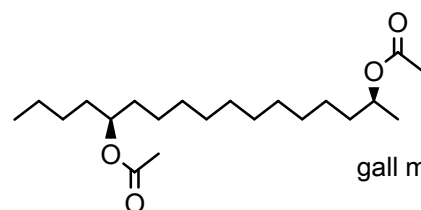
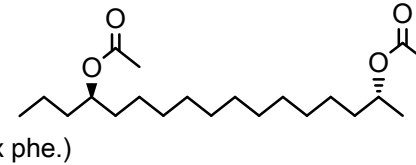
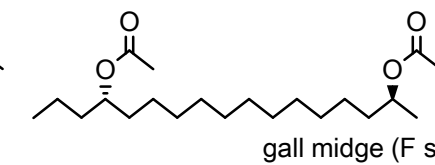
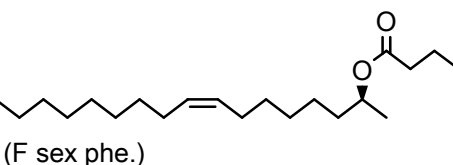
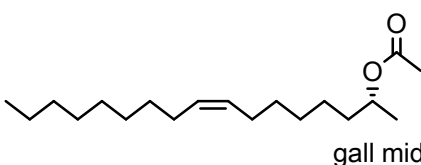
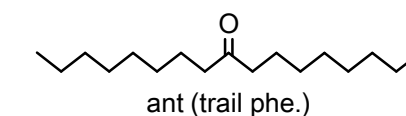
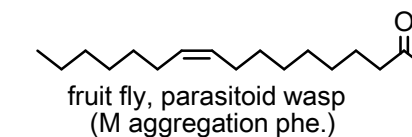
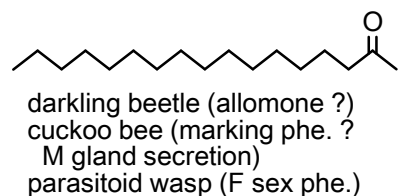
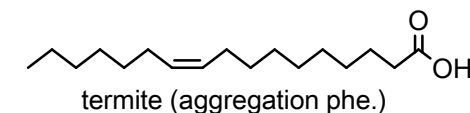
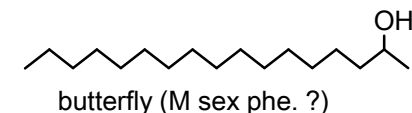
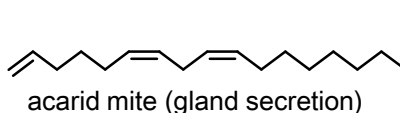
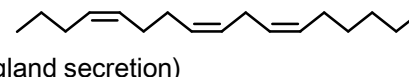
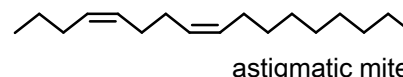
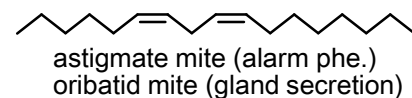
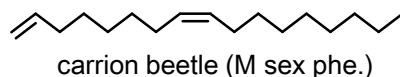
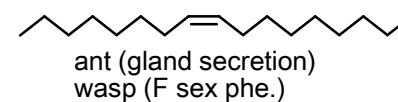
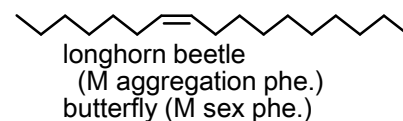
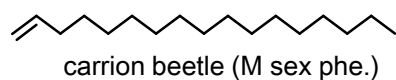
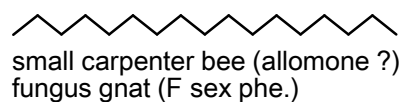
[C-1] Other: Acyclic comp. (xv)

C16 chain



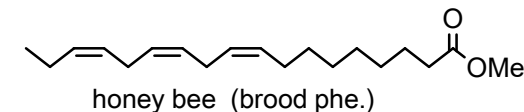
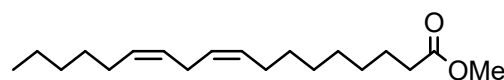
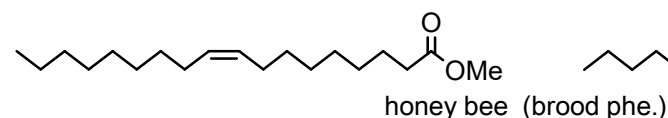
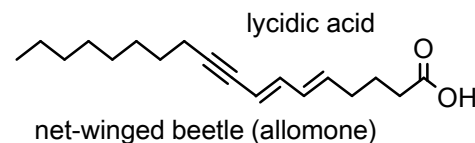
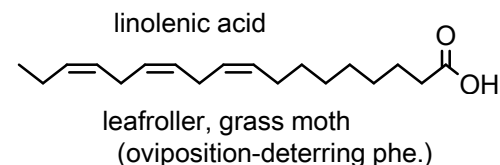
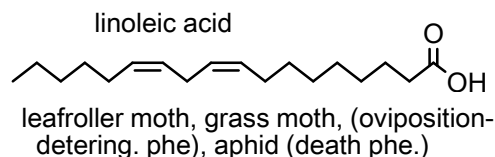
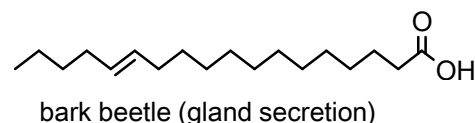
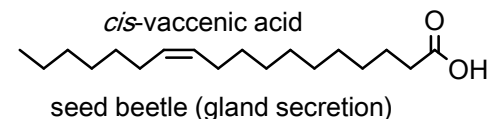
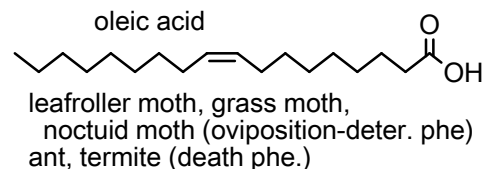
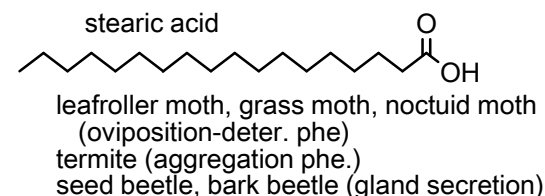
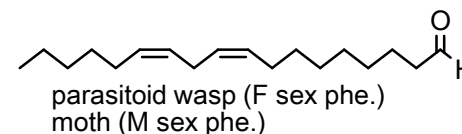
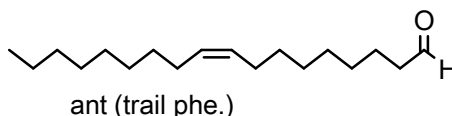
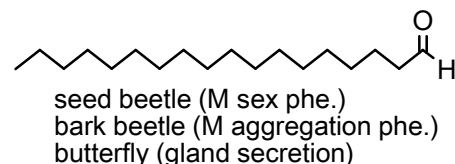
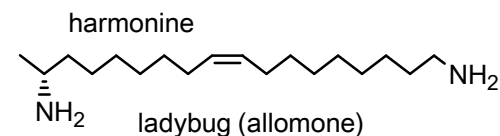
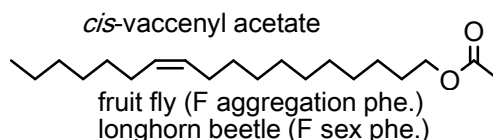
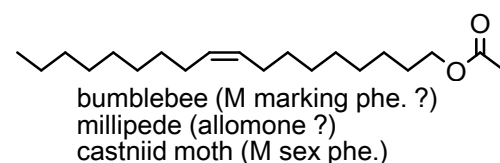
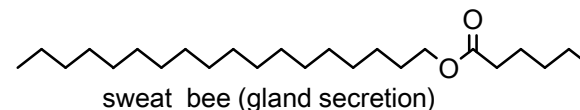
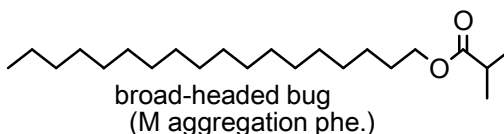
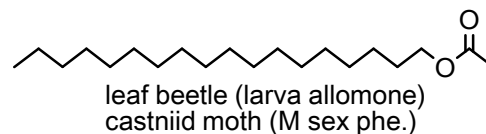
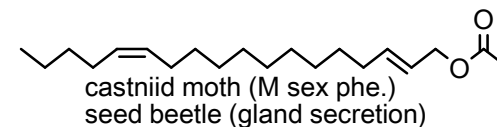
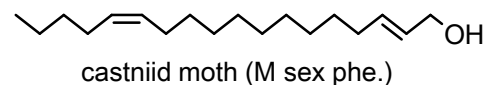
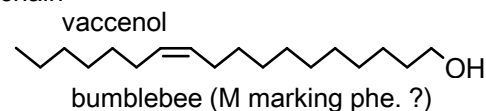
[C-1] Other: Acyclic comp. (xvi)

C17 chain



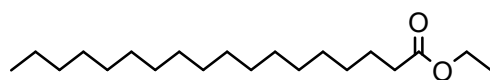
[C-1] Other: Acyclic comp. (xvii)

C18 chain



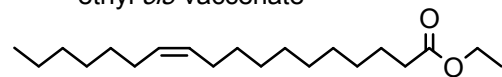
[C-1] Other: Acyclic comp. (xviii)

C18 chain

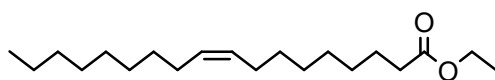


plasterer bee (gland secretion)

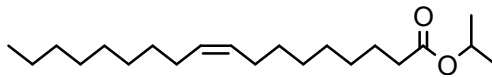
ethyl *cis*-vaccenate



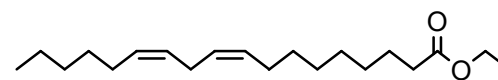
fruit fly (F gland secretion)



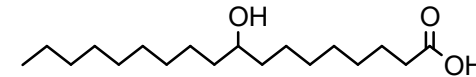
hide beetle (aggregation phe.)
cuckoo bee (M sex phe. ?)



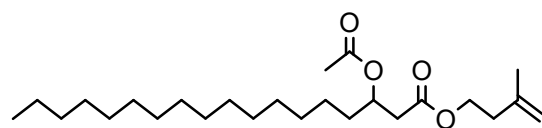
carpenter bee (M gland secretion)



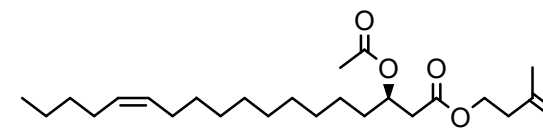
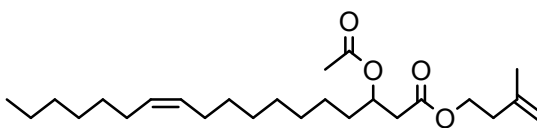
hide beetle (aggregation phe.)



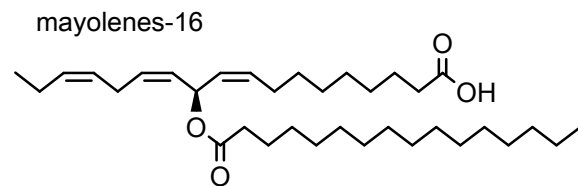
butterfly (M sex phe. ?)



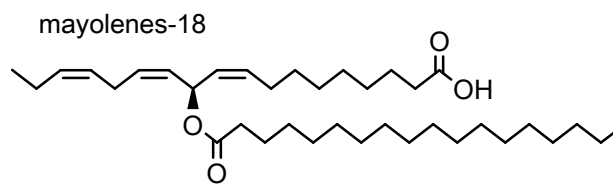
butterfly (M gland secretion)



butterfly (M gland secretion)

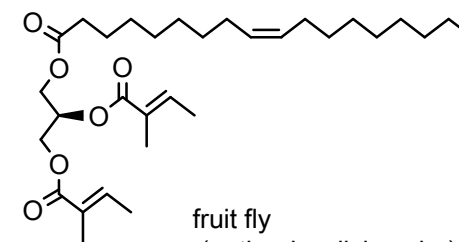


mayolene-16

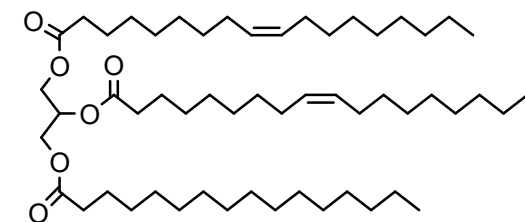


mayolene-18

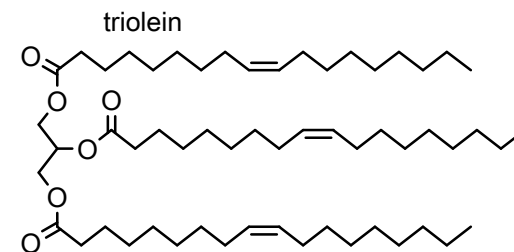
butterfly (larva allomone)



fruit fly
(anti-aphrodisiac phe)

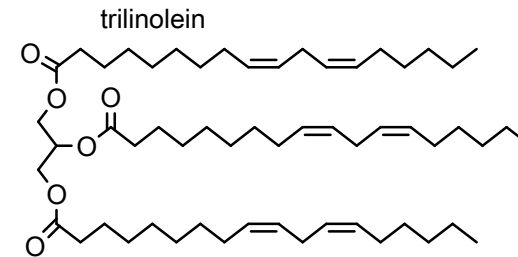


honey bee (brood phe.)



triolein

ant (brood phe.)

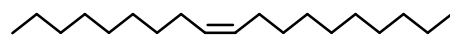


trilinolein

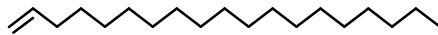
termite (F sex phe. ?)

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

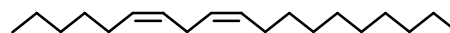
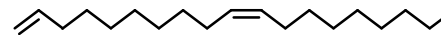
C19 chain



ant (marking phe.)
thrips (gland secretion)



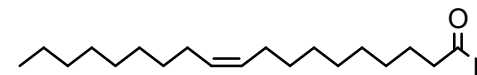
carrion beetle (M sex phe. ?)



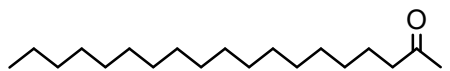
mite (alarm phe.?)



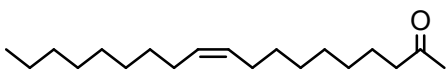
ant (gland secretion)



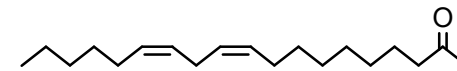
sawfly (F sex phe.)



seed beetle (F sex phe.)



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



termite (trail phe.)

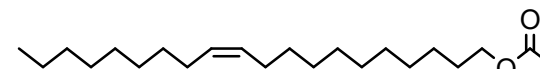
C20 chain



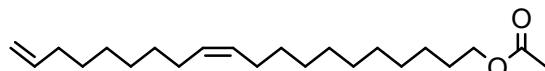
longhorned bee
(F gland secretion)



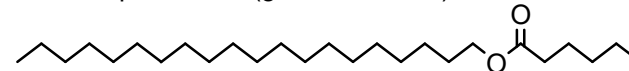
honey bee (worker alarm phe.)
wasp (M marking phe.)
carpenter bee (gland secretion)



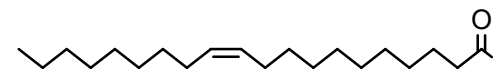
leaf beetle (larva allomone)
fruit fly (M aggregation phe.)



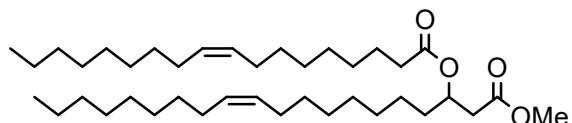
thrips (allomone)



sweat bee (gland secretion)

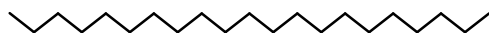


ant (trail phe.)

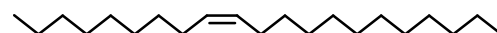


pyralid moth (larva trail phe.)

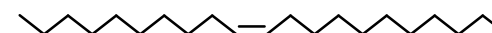
C21 chain



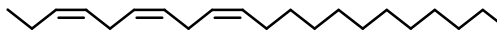
termite (primer phe.)



fruit fly (M aggregation phe.)



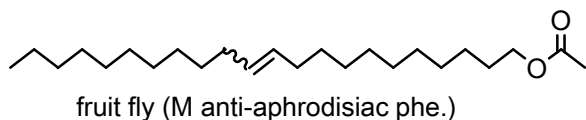
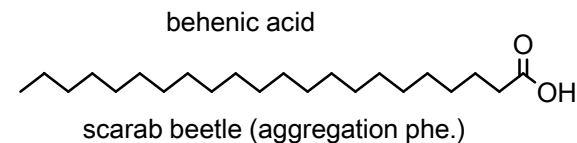
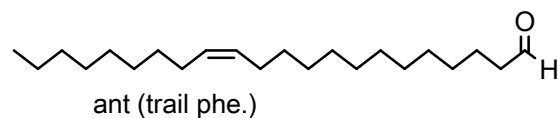
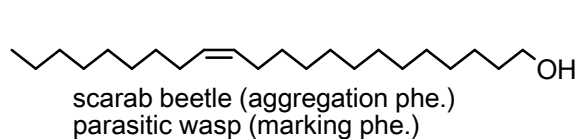
rove beetle, plasterer bee (F sex phe.)



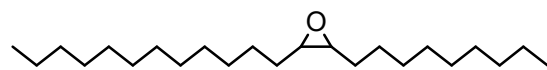
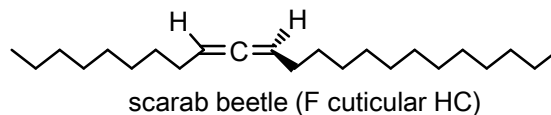
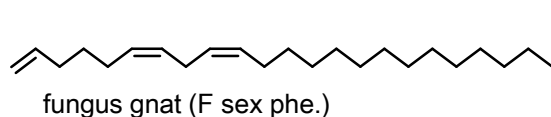
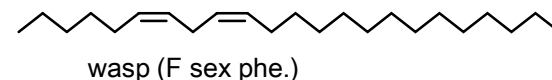
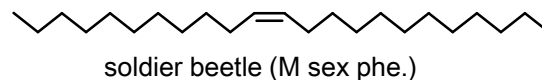
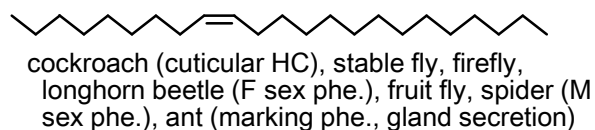
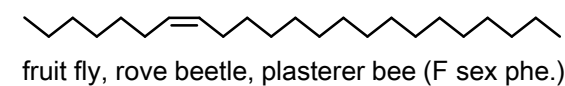
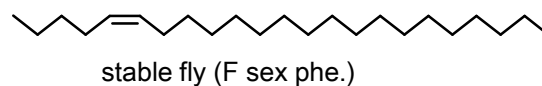
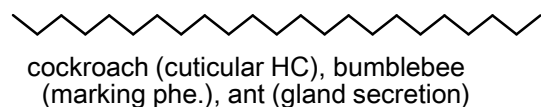
erebid moth (M sex phe.)

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

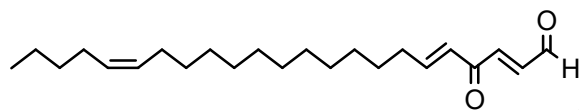
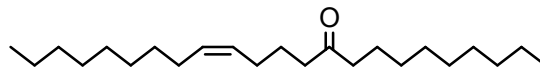
C22 chain



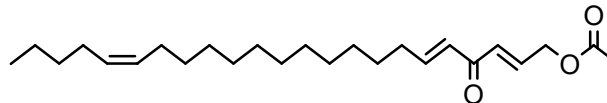
C23 chain



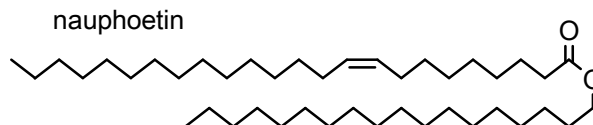
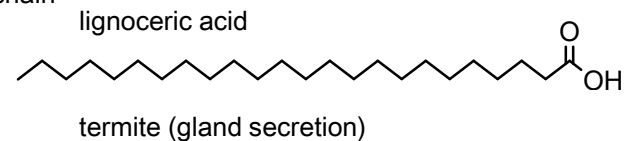
stable fly (F sex phe.)



ant (allomone)



C24 chain

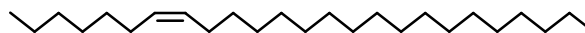


[C-1] Other: Acyclic comp. (xxi)

C25 chain



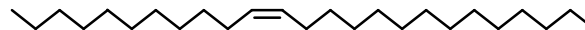
cuckoo bee (gland secretion)



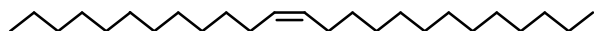
longhorn beetle, plasterer bee (F sex phe.)



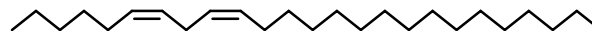
fly, longhorn beetle, mining bee, leaf bug
(F sex phe.), wasp (brood phe.)



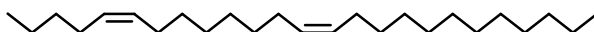
fruit fly (F sex phe.)



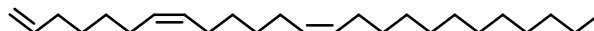
ladybug (oviposition-deterring phe.)



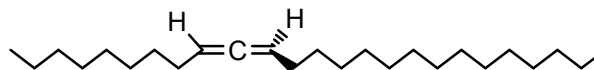
wasp (F sex phe.)



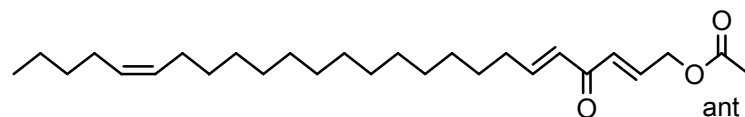
fruit fly (F sex phe.)



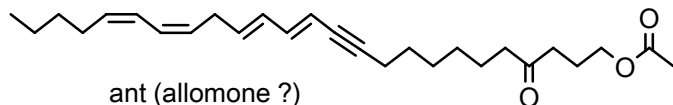
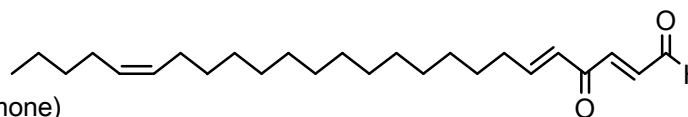
stable fly (M sex phe. ?)



scarab beetle (F cuticular HC)



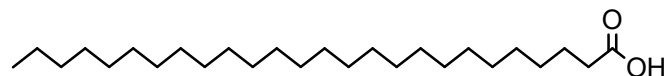
ant (allomone)



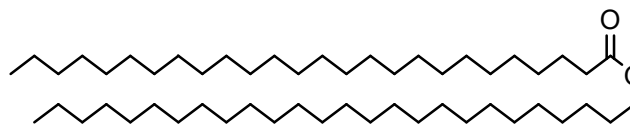
ant (allomone ?)

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

C26 chain

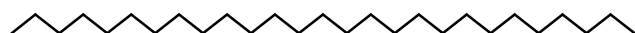


termite (gland secretion)

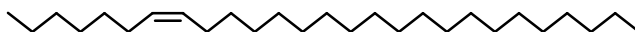


scale (wax)

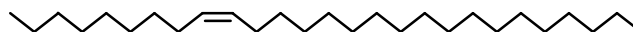
C27 chain



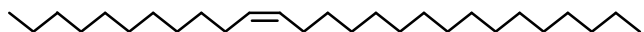
longhorn beetle (F sex phe.)



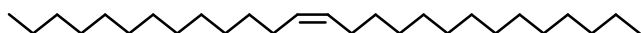
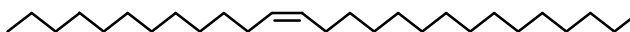
longhorn beetle, wood wasp (F sex phe.)



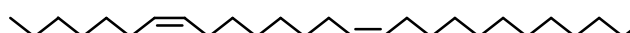
termite (allomone ?), stable fly (M sex phe. ?)
stable fly, longhorn beetle, mining bee (F sex phe.)



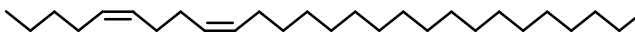
mining bee (F sex phe.)



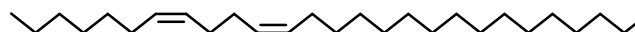
stable fly (M sex phe.)



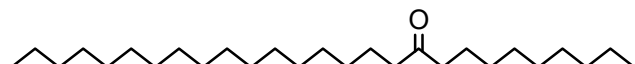
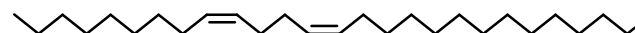
fruit fly (F sex phe.)



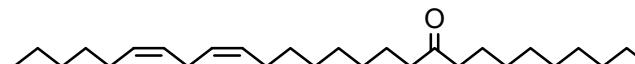
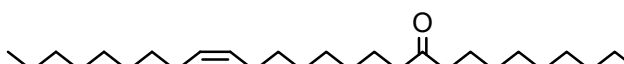
fruit fly (F sex phe.)



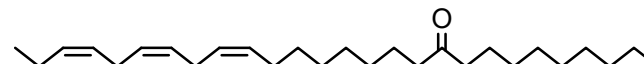
parasitoid wasp (F sex phe.)



longhorn beetle (F sex phe.)

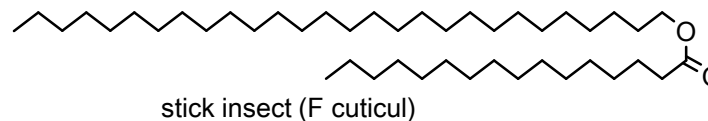
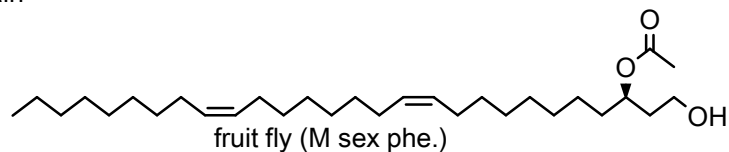


longhorn beetle (F sex phe.)

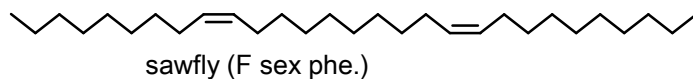
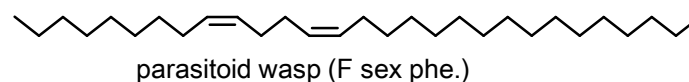
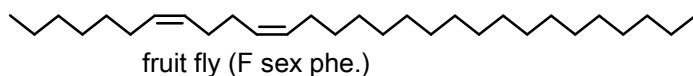
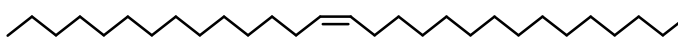
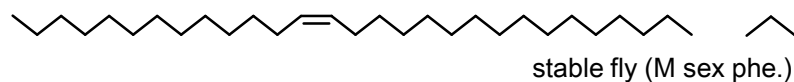
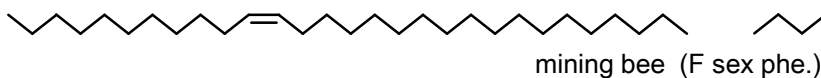
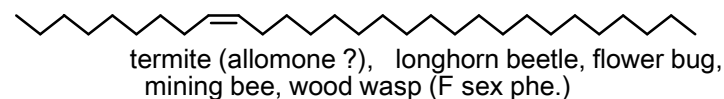
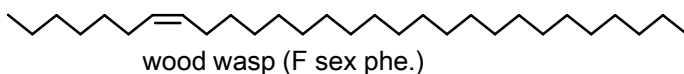
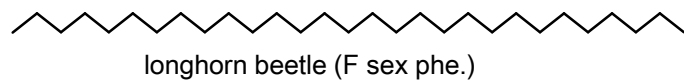


[C-1] Other: Acyclic comp. (xxiii)

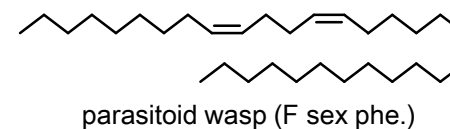
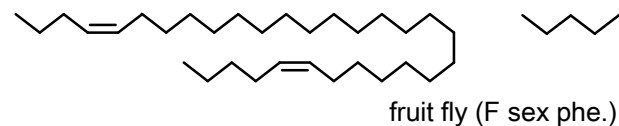
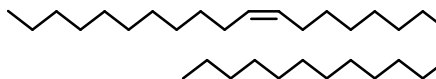
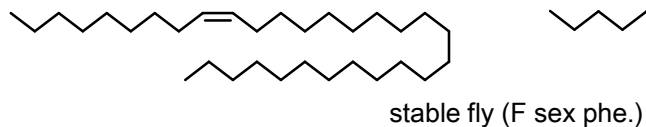
C28 chain



C29 chain

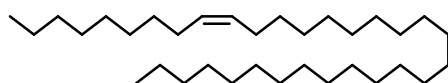


C31 chain

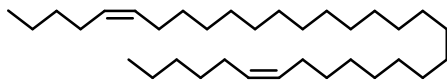


[C-1] Other: Acyclic comp. (xxiv)

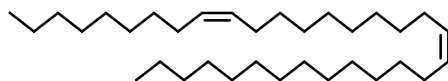
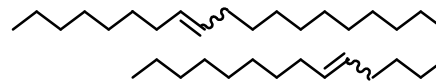
C33 chain



stable fly (F sex phe.)



fruit fly (F sex phe.)



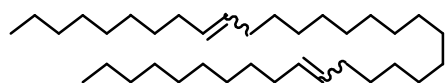
sawfly (F sex phe.)

C34 chain

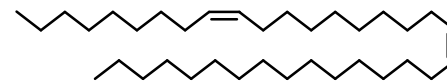


leaf beetle (sex phe. ?)

C35 chain

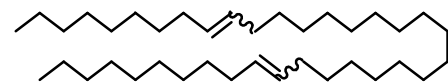


fruit fly (F sex phe.)



sawfly (F sex phe.)

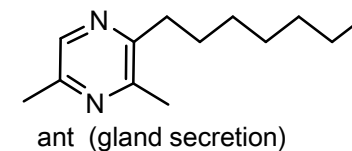
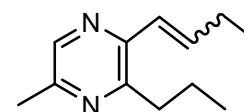
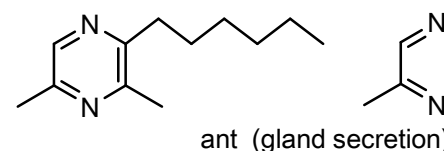
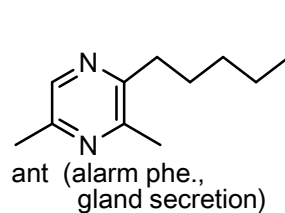
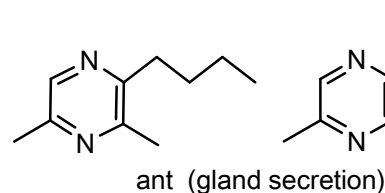
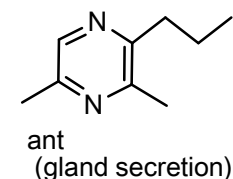
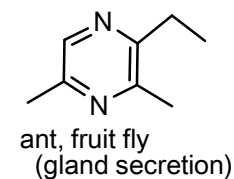
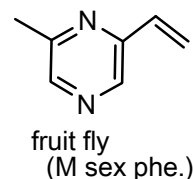
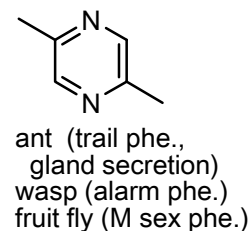
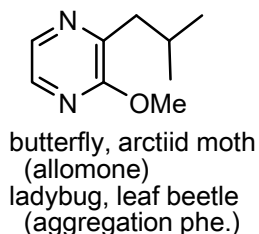
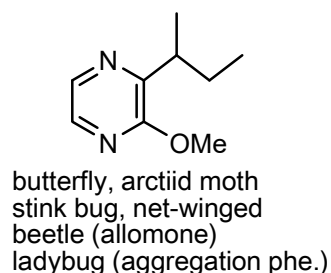
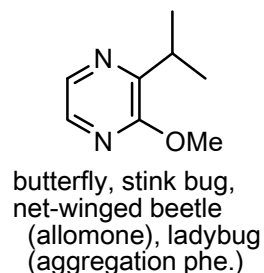
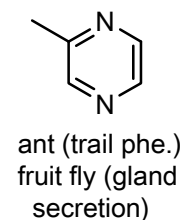
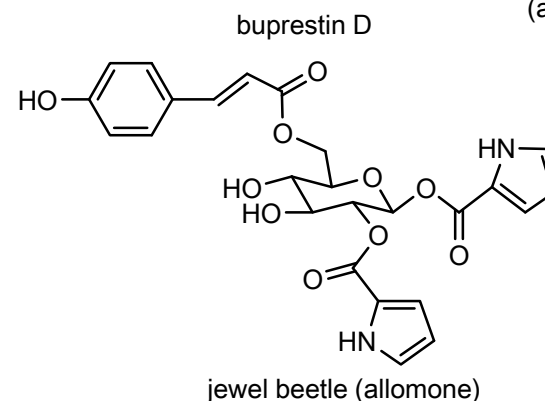
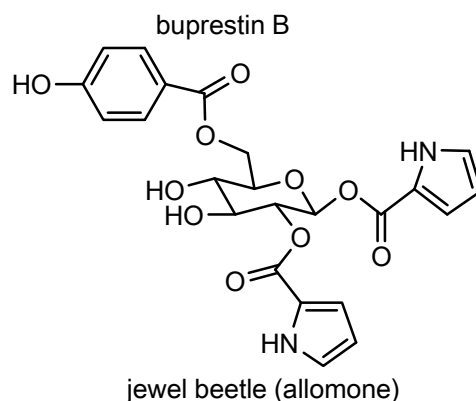
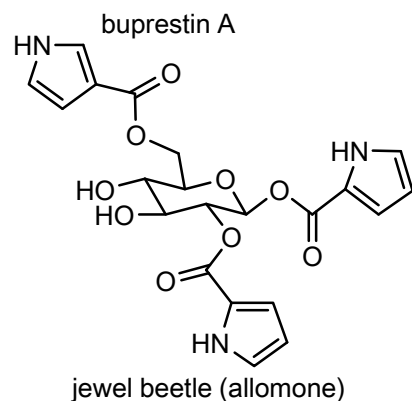
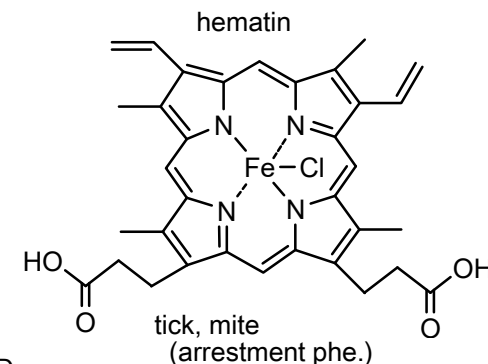
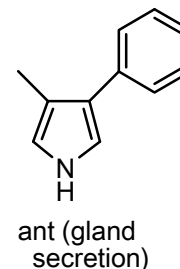
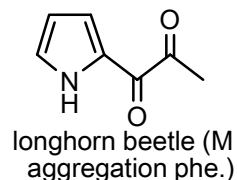
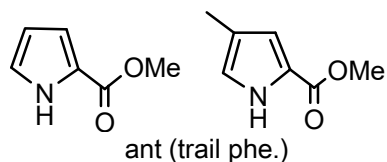
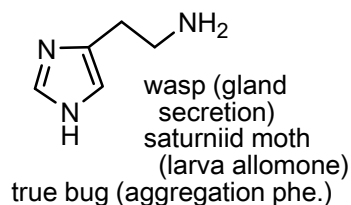
C37 chain



fruit fly (F sex phe.)

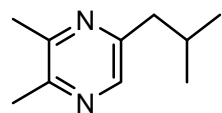
[C-2] Other: True alkaloids (i)

Aromatic comp.
histamine

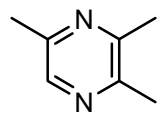


[C-2] Other: True alkaloids (ii)

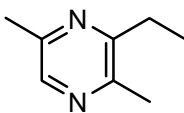
Aromatic comp.



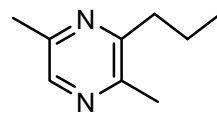
ant (trail phe.)



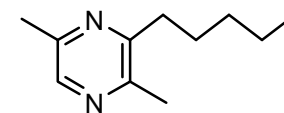
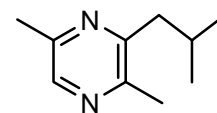
ant (trail phe.,
gland secretion)
fruit fly (M sex phe.,
gland secretion)



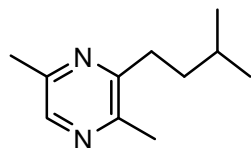
ant (trail phe.,
alarm phe.)



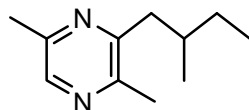
ant (gland secretion)



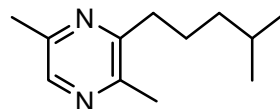
ant (gland secretion)



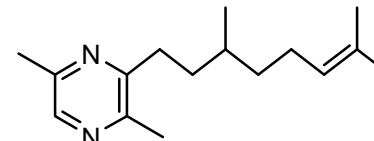
ant (alarm phe., gland
secretion, allomone)
flower wasp (F sex phe.)
wasp (marking phe.)
leaf insect (allomone)



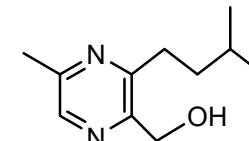
ant (alarm phe.,
gland secretion)
leaf insect (allomone)



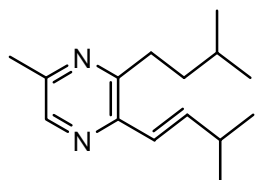
ant (gland secretion)



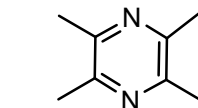
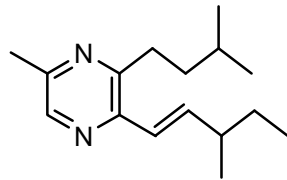
ant (alarm phe.)



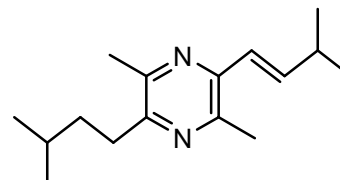
flower wasp
(F sex phe.)



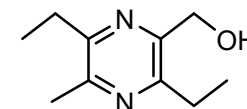
ant (gland secretion)



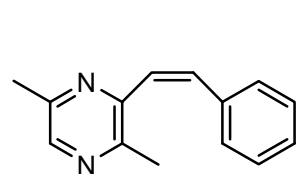
fruit fly (M sex phe.,
gland secretion)



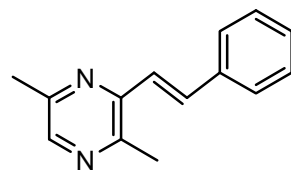
ant (gland secretion)



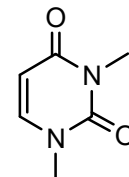
flower wasp
(F sex phe.)



ant (gland secretion)

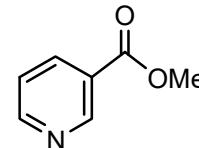


N,N-dimethyluracil

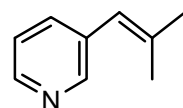


ant (trail phe.)

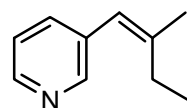
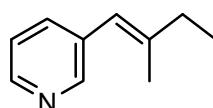
methyl nicotinate



ladybug, tsetse fly
(aggregation phe.)

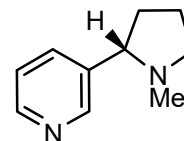


rove beetle (allomone)



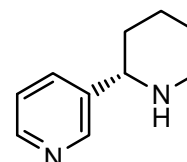
rove beetle
(allomone)

nicotine



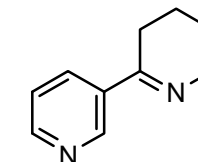
harvestman
(allomone ?)

anabasine

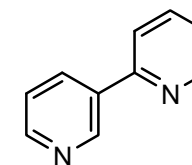


ant (gland secretion, allomone, trail phe.)

anabaseine



harvestman (allomone ?)

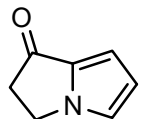


ant (gland secretion)

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

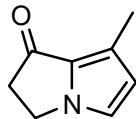
Aromatic comp.

nordanaidone

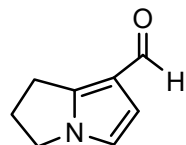


butterfly (M sex phe.)

danaidone

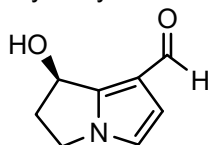


danaidal

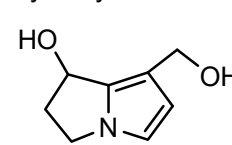


butterfly, arctiid moth (M sex phe.?)

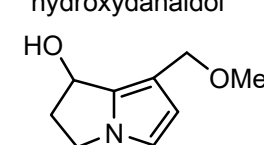
hydroxydanaidal



hydroxydanaidol

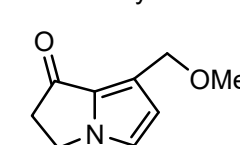


9-O-methyl-
hydroxydanaidol

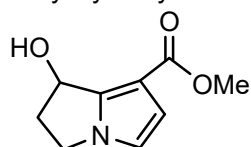


butterfly (M sex phe.?)

9-methoxydanaidol

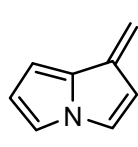


methyl hydroxydanaidoate



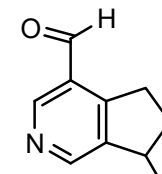
butterfly (M sex phe.?)

actinidine



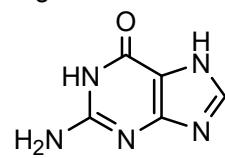
ant (alarm phe.)
parasitoid wasp,
rove beetle, tick insect
(allomone)

boschniakine

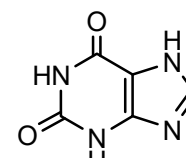


stick insect
(allomone ?)

guanine

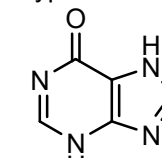


xanthine

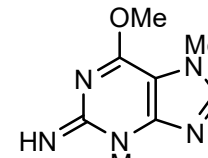


tick (arrestment phe.)

hypoxanthine

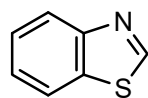


himantarine



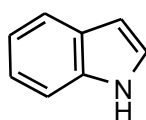
centipede
(galand secretion)

benzothiazole



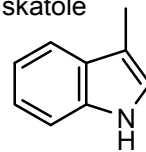
pleasing fungus
beetle (allomone)
butterfly (gland
secretion)

indol



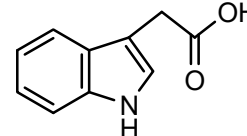
butterfly
(M sex phe. ?)
ant (trail phe.)
pleasing fungus beetle,
caddis fly (allomone)

skatole



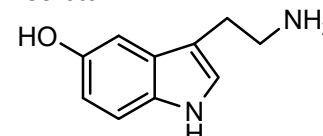
green lacewing,
stingless bee,
wasp, caddis fly,
pleasing fungus
beetle (allomone)
ant, wasp (alarm phe.)
green lacewing (gland secretion)

IAA



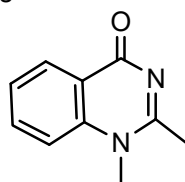
water beetle
(allomone ?)

serotonin



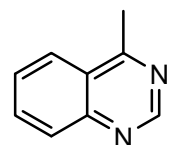
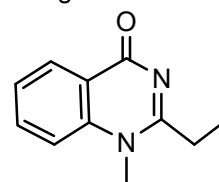
wasp, scorpion, spider
(venom secretion)

glomerin

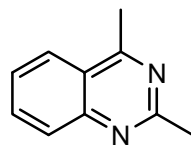


millipede (allomone)

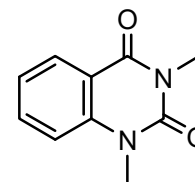
homoglomerin



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



assassin bug
(aggregation phe.)

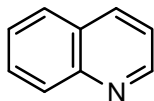


scarab beetle
(F sex phe.)

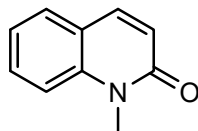
[C-2] Other: True alkaloids (iv)

Aromatic comp.

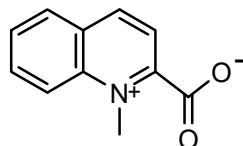
quinoline



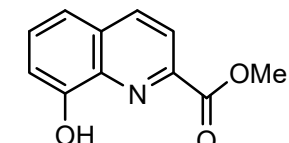
walking stick
(allomone)



net-winged beetle
(allomone ?)

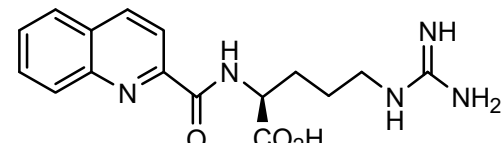


firefly (allomone)

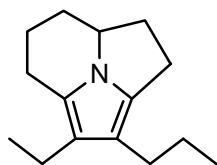


water beetle (allomone)

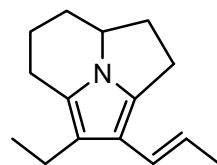
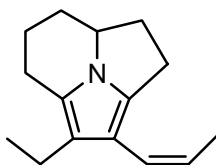
N α -quinaldyl-L-arginine



ladybug (allomone)



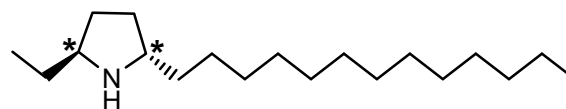
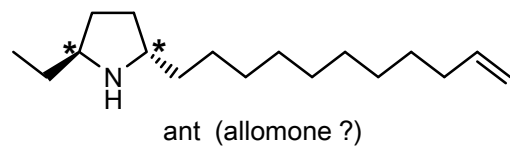
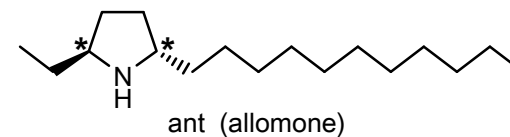
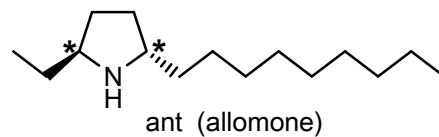
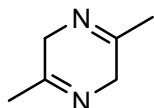
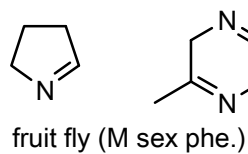
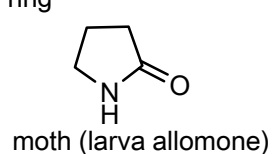
ant (allomone)



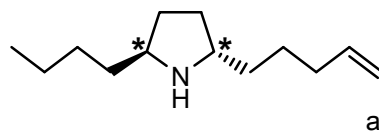
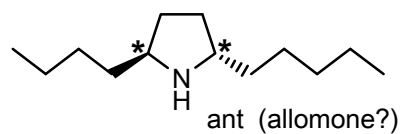
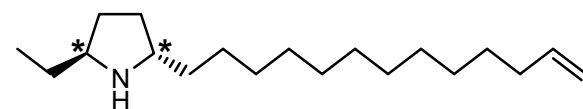
ant (allomone)

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

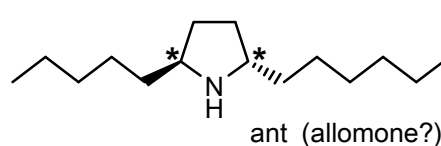
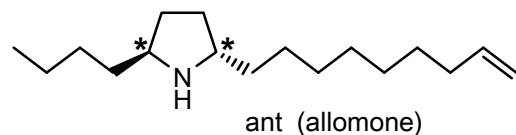
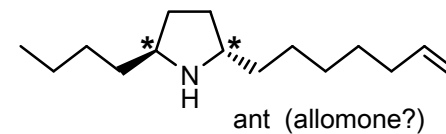
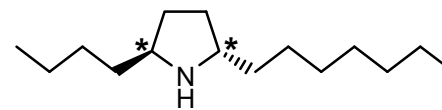
C4 ring



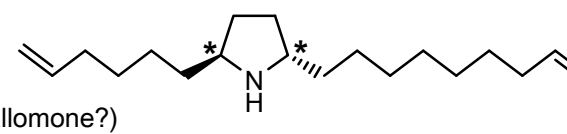
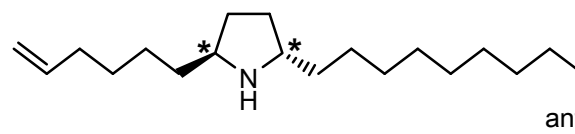
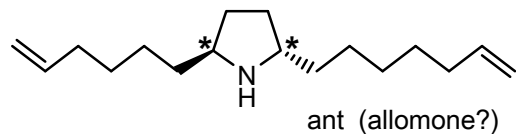
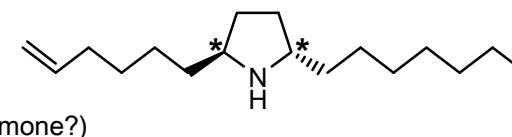
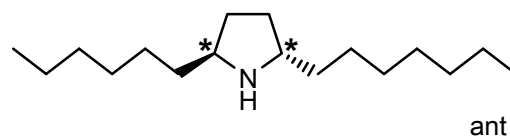
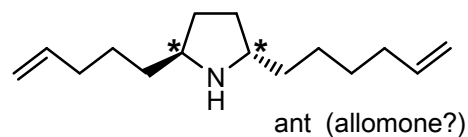
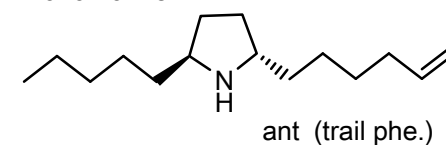
ant (allomone)



ant (allomone?)

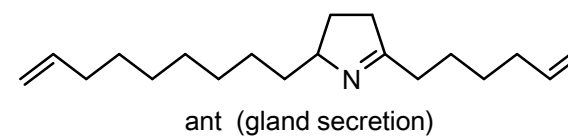
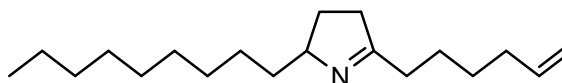
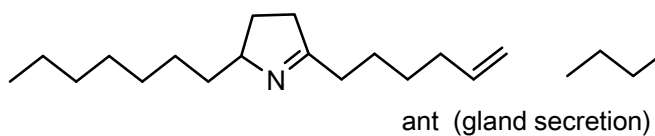
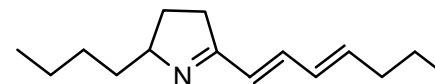
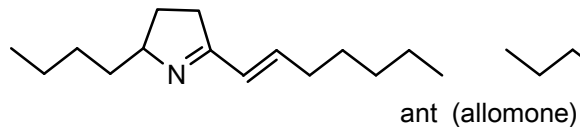
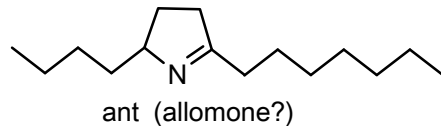
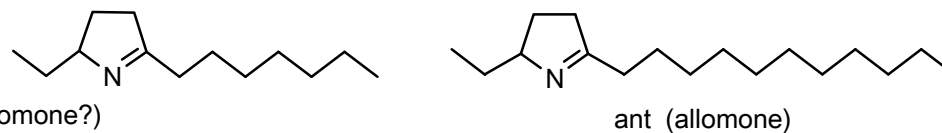
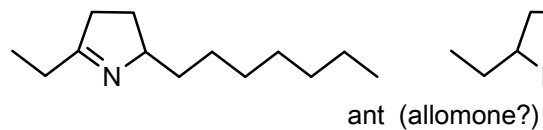
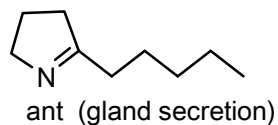
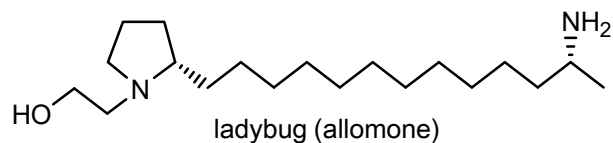
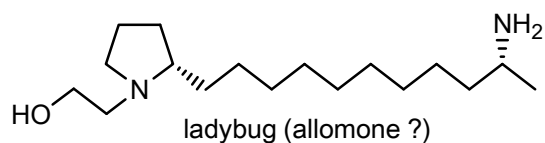
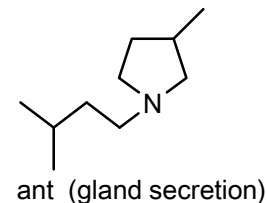
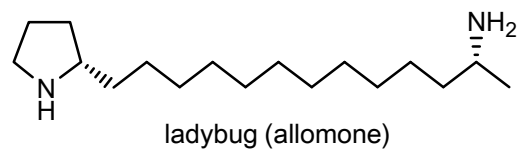
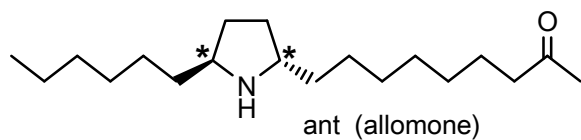


monomorine III

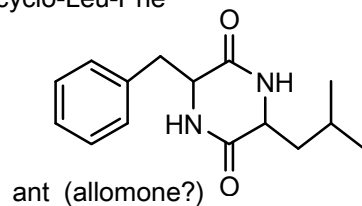


[C-2] Other: True alkaloids (vi)

C4 ring

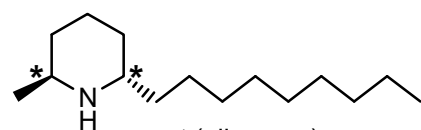


cyclo-Leu-Phe

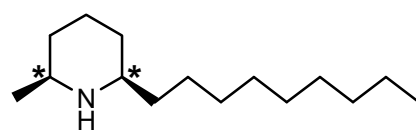


[C-2] Other: True alkaloids (vii)

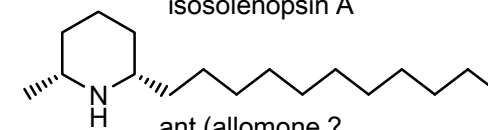
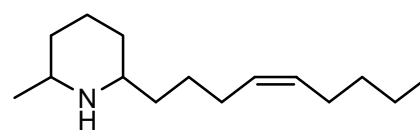
C5 ring



ant (allomone)

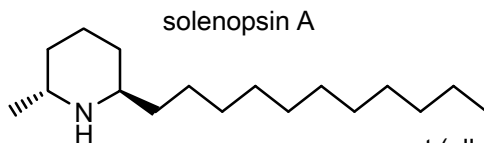


ant (allomone ?)

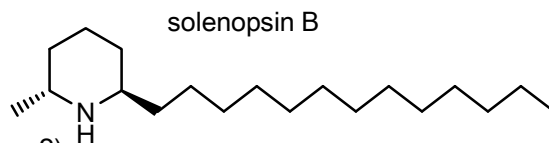


isosolenopsin A

ant (allomone ?,
queen recognition ?)

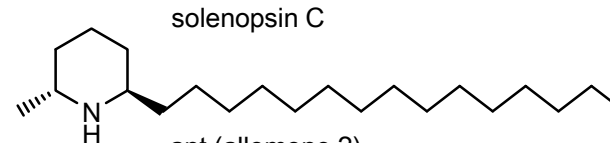


solenopsin A



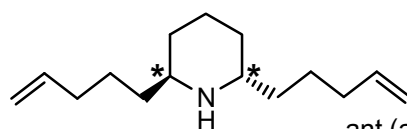
solenopsin B

ant (allomone ?)

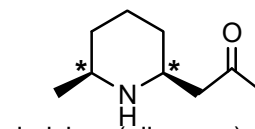
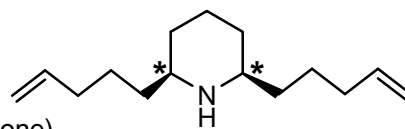


solenopsin C

ant (allomone ?)

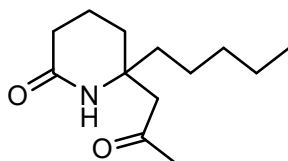


ant (allomone)



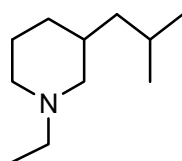
ladybug (allomone)

adalinine



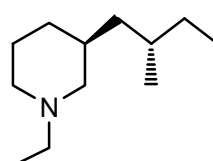
ladybug (allomone ?)

norstenusine

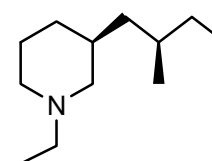


rove beetle (allomone)

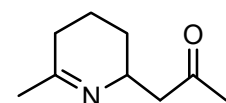
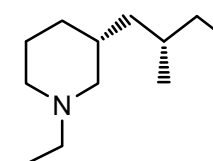
stenusine



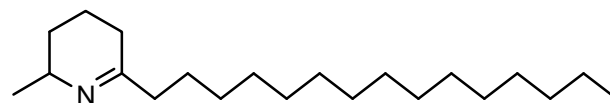
rove beetle (allomone)



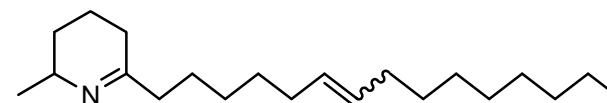
rove beetle (allomone)



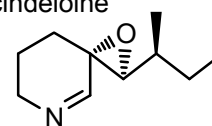
ladybug (allomone)



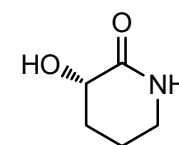
ant (allomone)



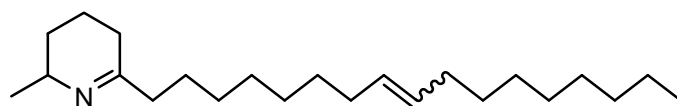
cicindeloline



rove beetle (allomone ?)



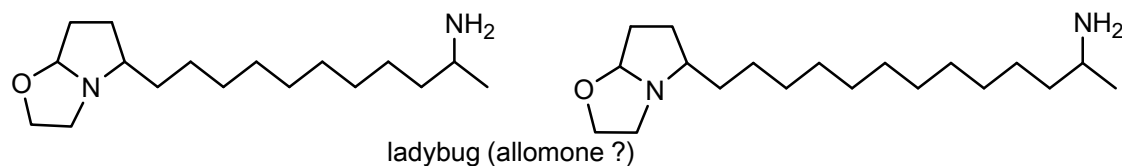
ladybug
(allomone ?)



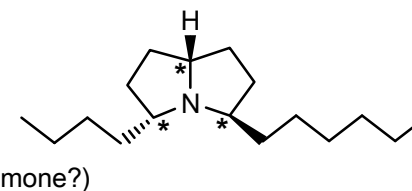
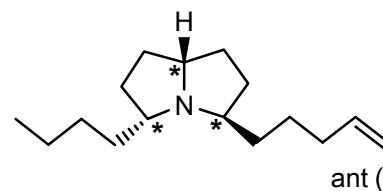
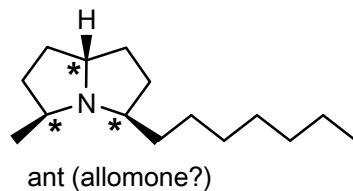
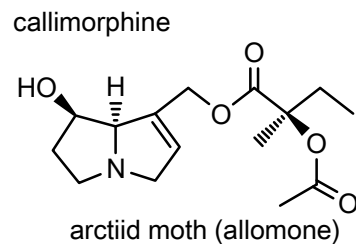
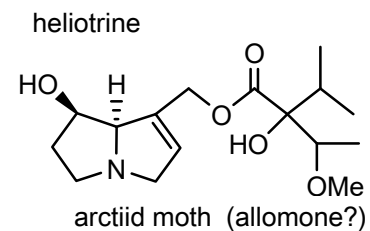
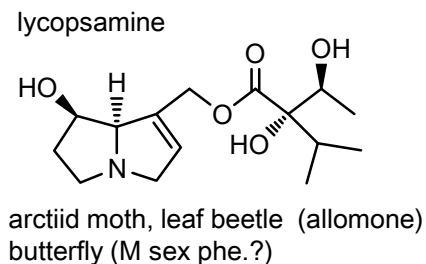
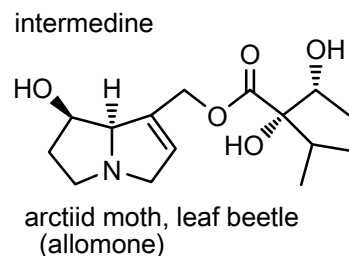
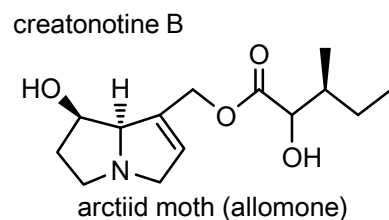
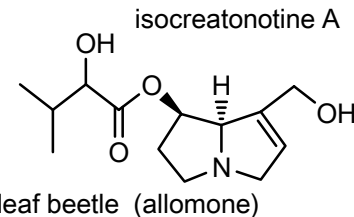
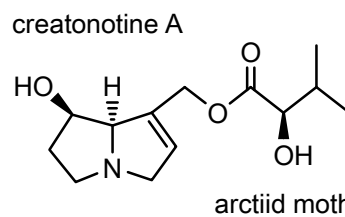
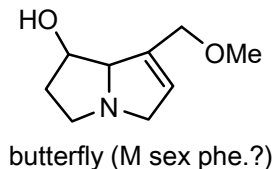
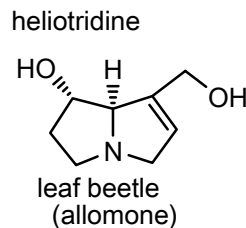
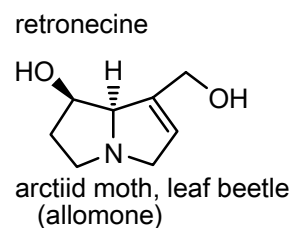
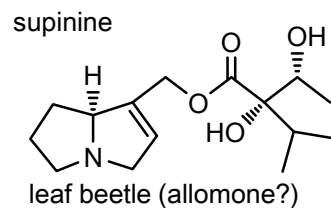
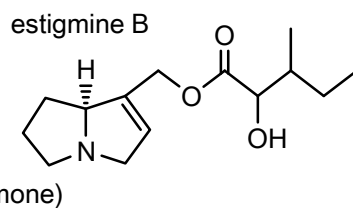
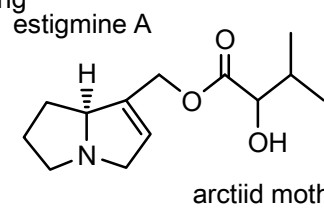
ant (allomone)

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

C6 ring

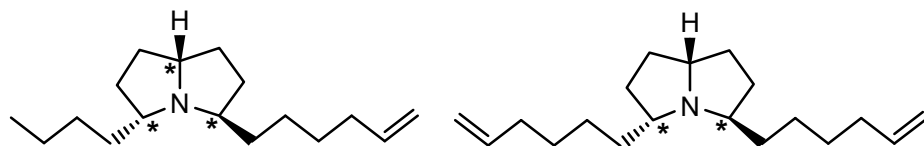


C7 ring



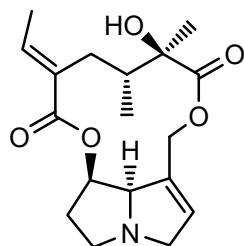
[C-2] Other: True alkaloids (ix)

C7 ring



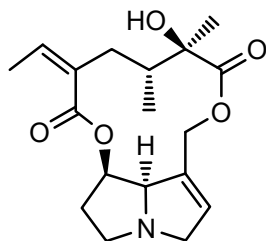
ant (allomone?)

integerrimine



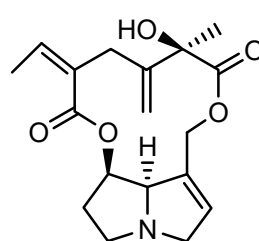
Arctiinae moth (allomone ?)

senecionine



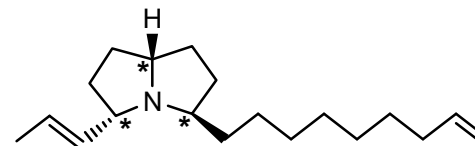
Arctiinae moth, butterfly (allomone ?)

seneciphylline

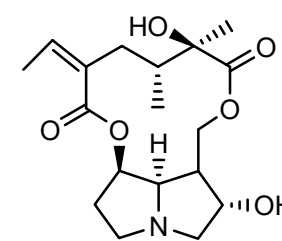


seneciphylline N-oxide

ant (allomone?)
arctiid moth (allomone)

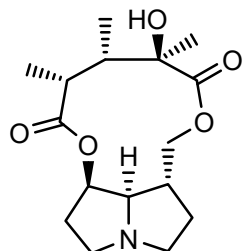


rosmarinine



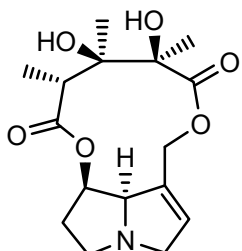
butterfly (allomone ?)

retusine

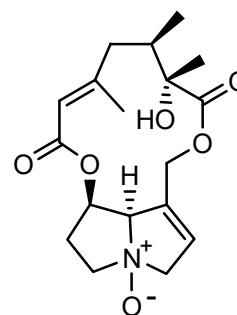


grasshopper
(allomone ?)

monocrotaline

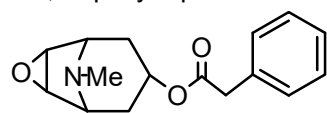


doronenine N-oxide



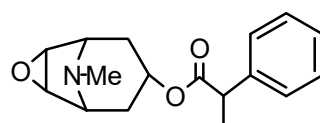
leaf beetle (allomone ?)

3-phenylacetoxy-
6,7-epoxytropine



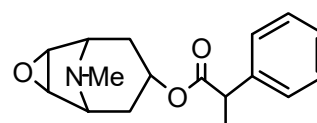
treehopper (allomone ?)

dihydroaposcopamine



butterfly (allomone)

scopolamine



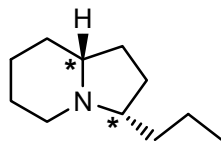
butterfly (allomone)
treehopper (allomone ?)

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

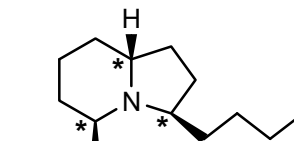
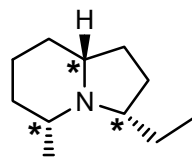
C8 ring
polyzonimine



millipede (allomone)

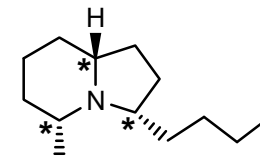


ant (allomone ?)

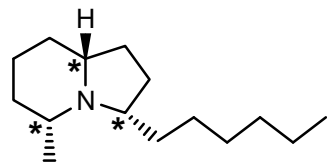


ant (allomone ?)

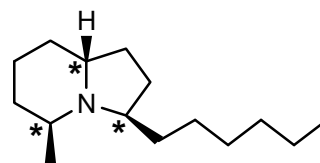
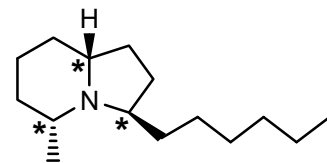
monomorine I



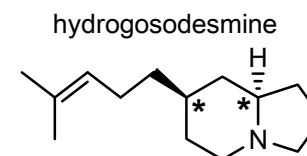
ant (trail phe.)



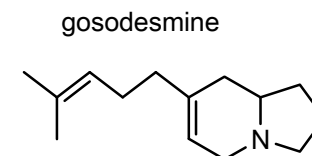
ant (allomone ?)



ant (allomone ?)

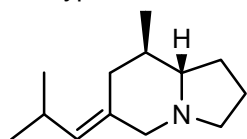


hydrogosodesmine



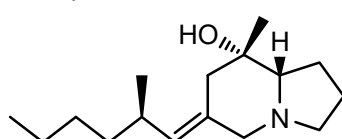
millipede (allomone)

8-deoxypumiliotoxin 193H



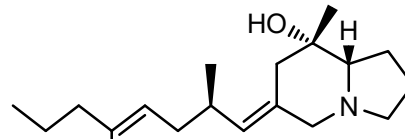
oribatid mite (allomone ?)

pumiliotoxin 251D

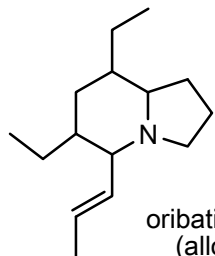


oribatid mite (allomone ?)

pumiliotoxin 291G

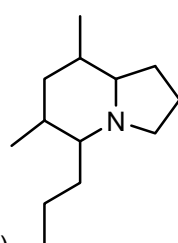


indolizidine 223A

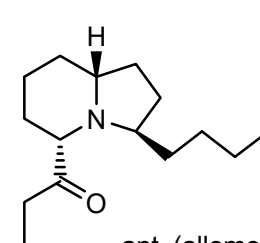
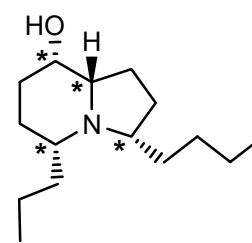
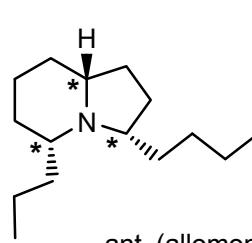


oribatid mite (allomone ?)

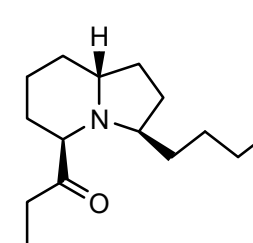
indolizidine 195G



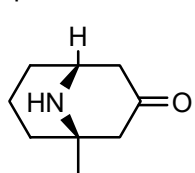
ant (allomone ?)



ant (allomone ?)

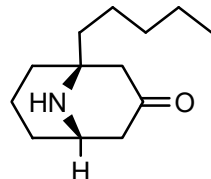


euphococcinine

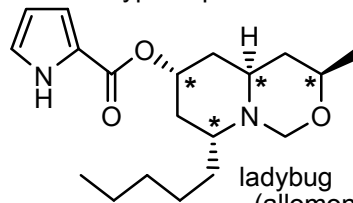


ladybug (allomone)

adaline



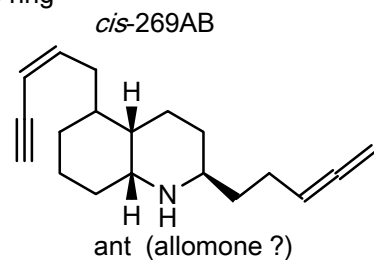
hyperaspine



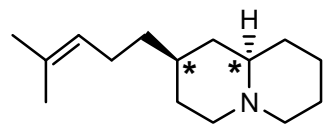
ladybug (allomone ?)

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

C9 ring

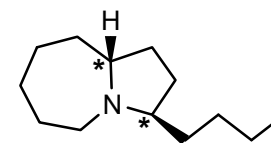
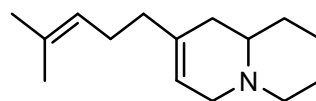


homo-hydrogosodesmine



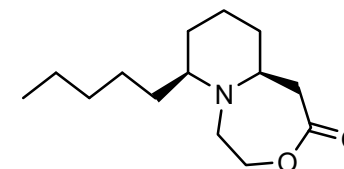
millipede (allomone)

homo-gosodesmine



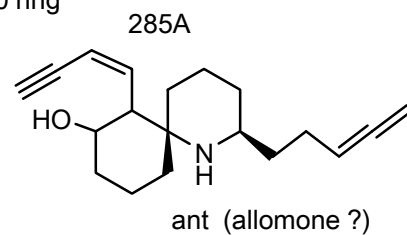
ant (allomone ?)

calvine

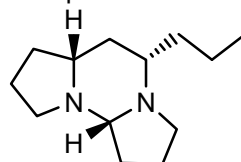


ladybug (allomone ?)

C10 ring

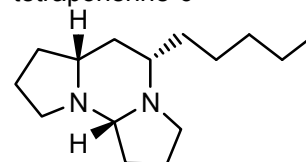


tetraponerine-2

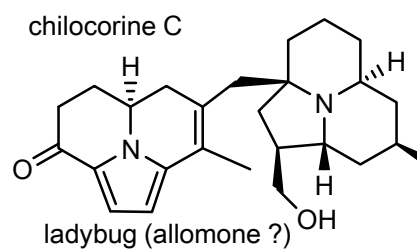
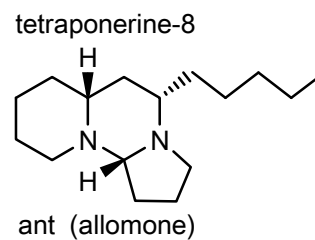
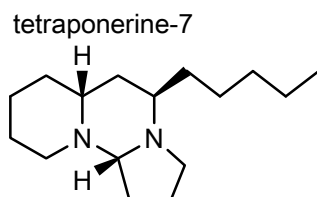
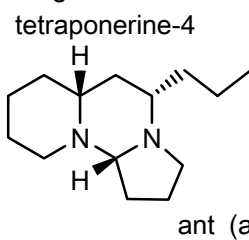


ant (allomone)

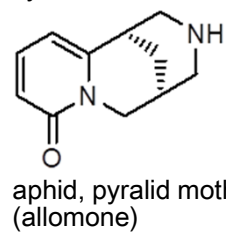
tetraponerine-6



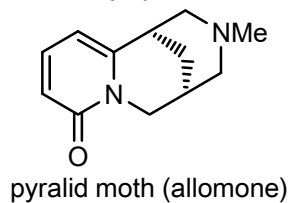
C11 ring



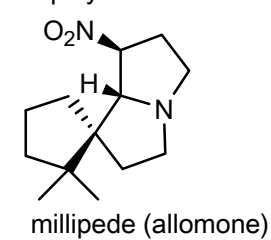
cytisine



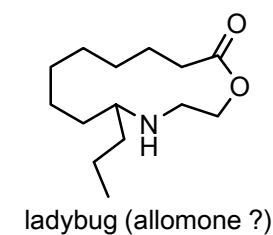
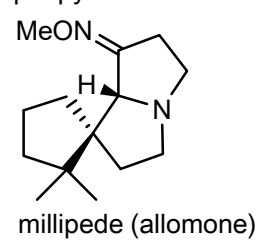
N-methylcytisine



nitropolyzonamine



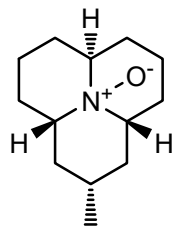
spiropyrrolizidine 236



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

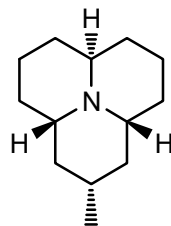
C12 ring

coccinelline



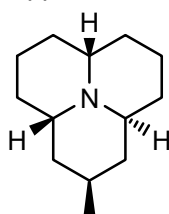
ladybug
(allomone)

precoccinelline 193C



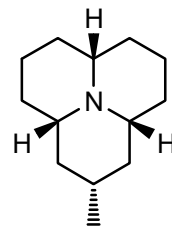
ladybug, soldier
beetle, oribotriid
mite (allomone)

hippodamine



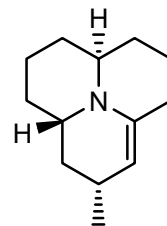
ladybug, soldier
beetle, (allomone ?)

myrrhine



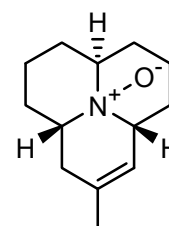
ladybug
(allomone)

propyleine



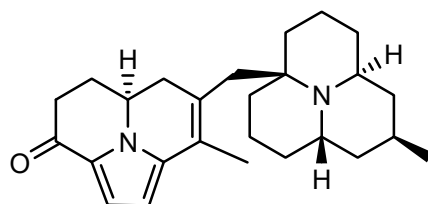
ladybug, soldier
beetle, (allomone)

2-dehydrococcinelline



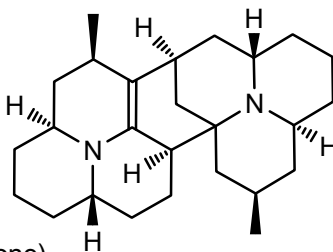
ladybug
(allomone)

exochoimine

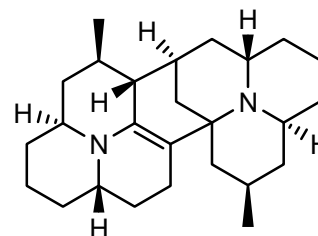


ladybug (allomone)

psylloborine A

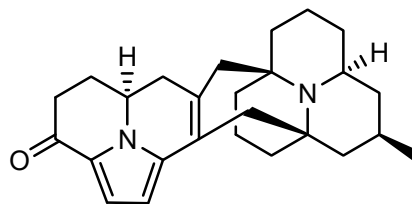


isopsylloborine A



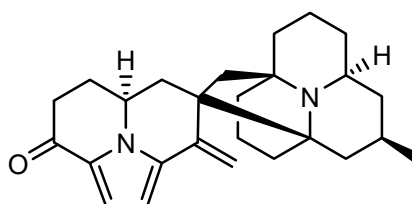
ladybug (allomone ?)

chilocorine A



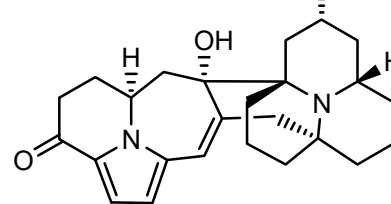
ladybug (allomone ?)

chilocorine B



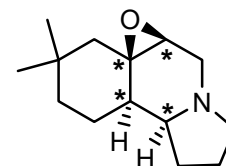
ladybug (allomone)

chilocorine D



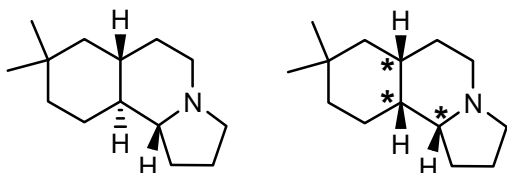
ladybug (allomone ?)

buzonamine



millipede (allomone)

deoxybuzonamine

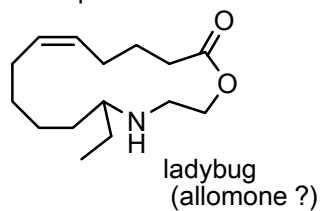


millipede (allomone)

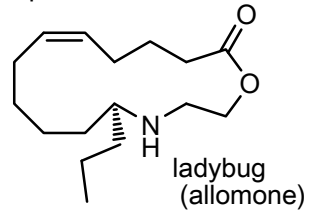
[C-2] Other: True alkaloids (xiii)

C13 ring

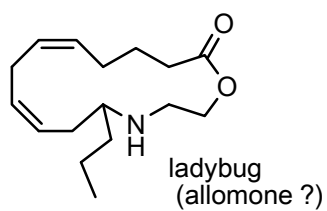
norepilachnene



epilachnene

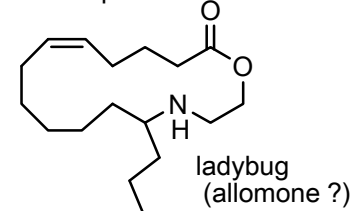


epilachnadiene



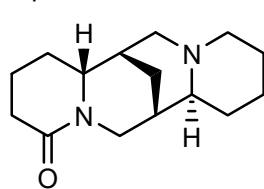
C14 ring

homoepilachnene

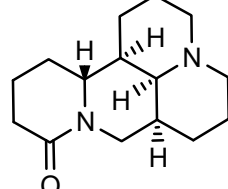


C15 ring

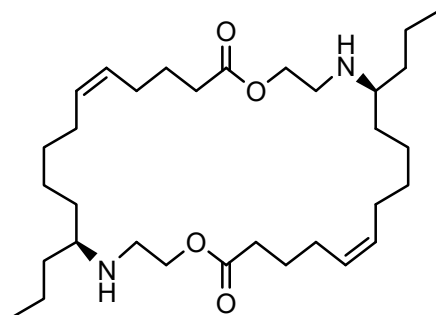
lupanine



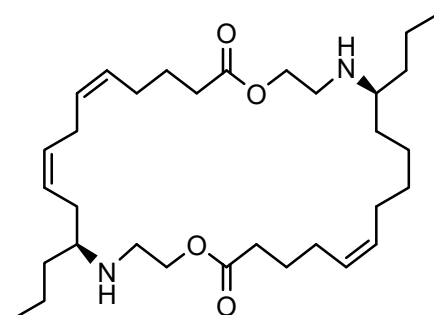
matrine



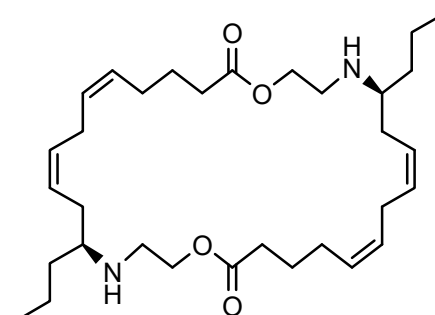
C26 ring



ladybug (allomone)



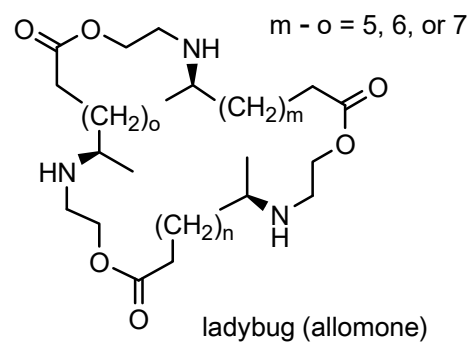
ladybug (allomone)



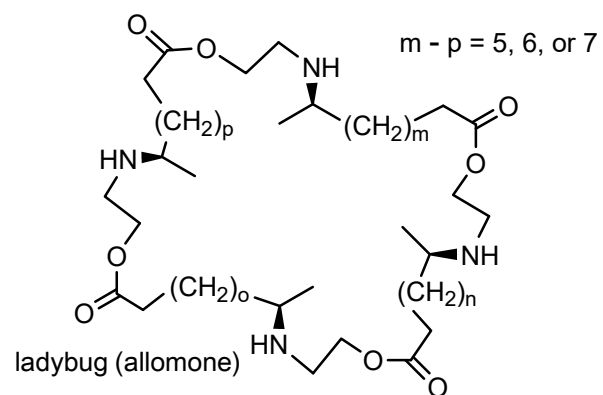
ladybug (allomone)

[C-2] Other: True alkaloids (xiv)

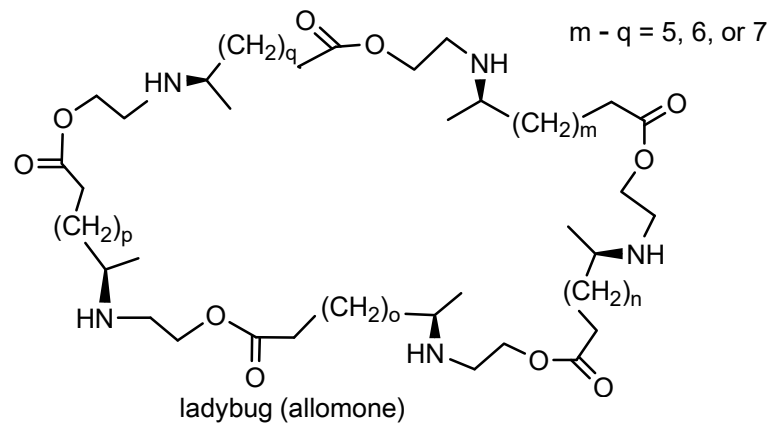
C30 – C36 ring



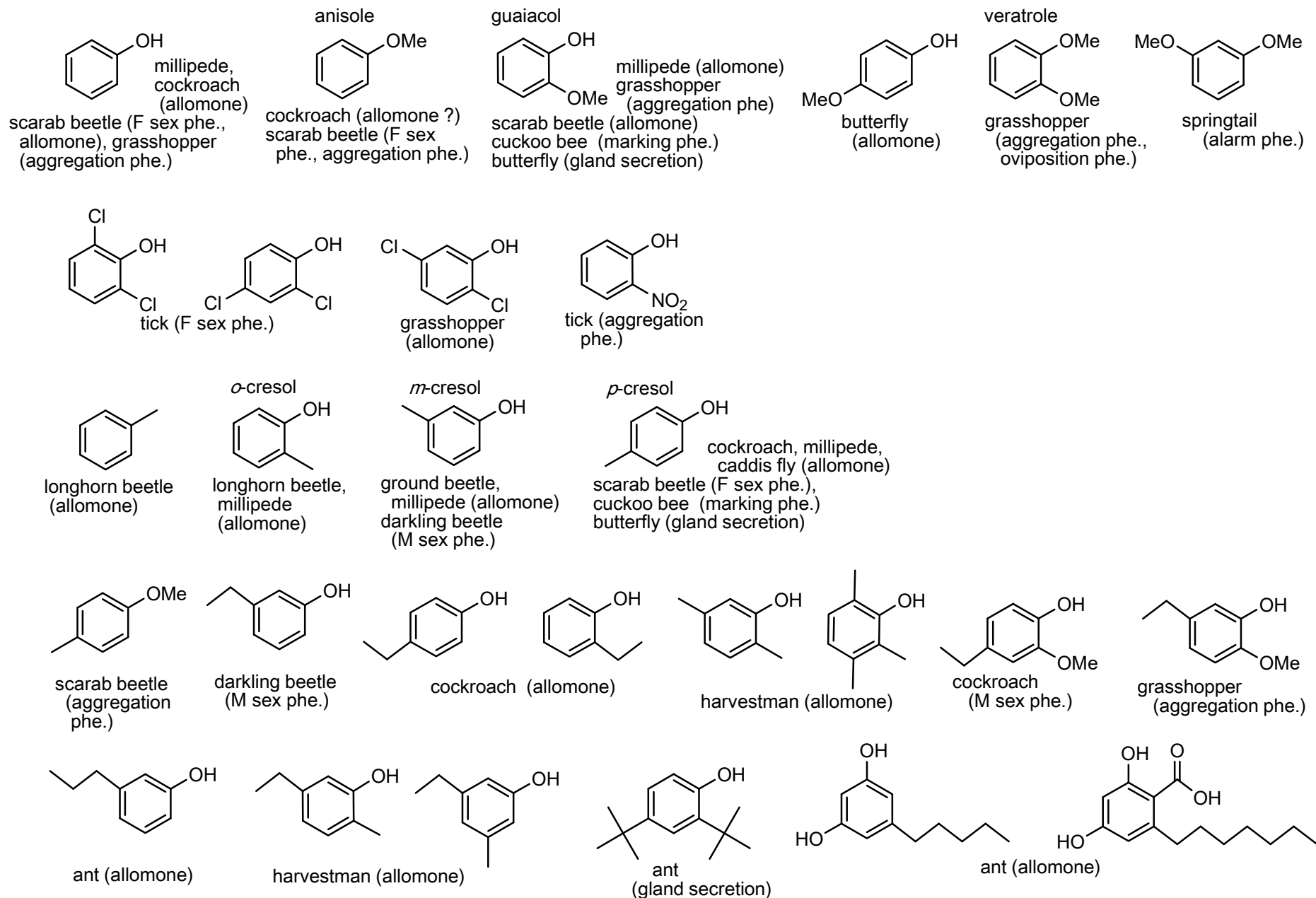
C40 – C48 ring



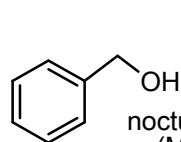
C50 – C60 ring



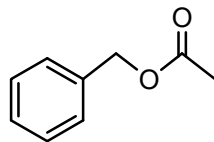
[C-3] Other: Aromatic comp. (i)



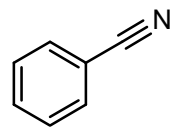
[C-3] Other: Aromatic comp. (ii)



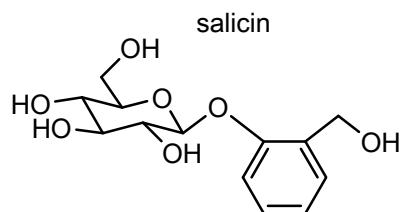
noctuid moth, grasshopper
(M sex phe.)
true bug, stink bug (M sex phe.,
aggregation phe., gland secretion)



honey bee
(alarm phe.)

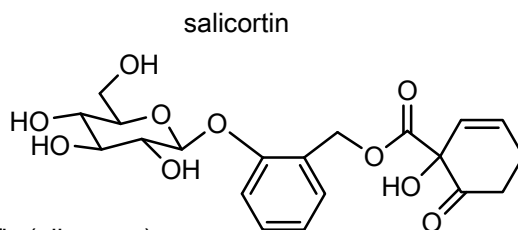


saturniid moth
(larva allomone)

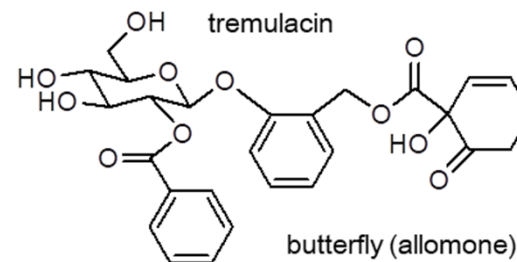


salicin

butterfly (allomone)

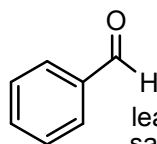


salicortin



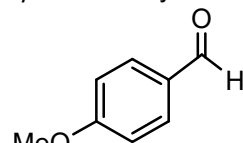
tremulacin

butterfly (allomone)



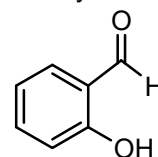
leaf beetle, tiger beetle,
saturniid moth, millipede,
sawfly, centipede (allomone), bee (alarm
phe.), assassin bug, noctuid moth (M
sex phe.), noctuid moth (oviposition-
detering phe.), stink bug, grasshopper
(M aggregation phe.)

p-anisaldehyde

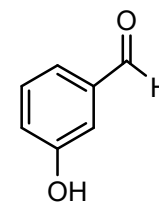


cockroach (allomone ?)
green lacewing
(M aggregation phe.?)

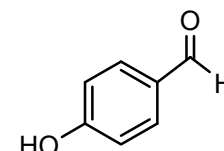
salicylaldehyde



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

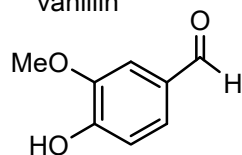


creeping water bug
(allomone)
ant (gland secretion)

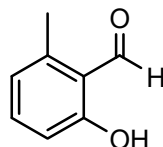


water bug
(gland secretion)
water beetle, creeping
water bug (allomone)

vanillin

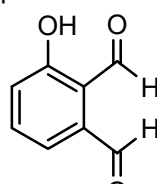


shield bug, pyralid moth,
butterfly (M sex phe.)
cuckoo bee (marking phe.)



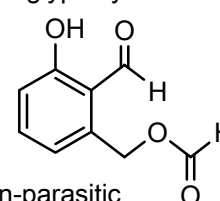
longhorn beetle
(allomone ?)
acarid mite, dust
mite (alarm phe., F sex phe.)
oribatid mite (alarm phe., allomone)

γ -acaridial

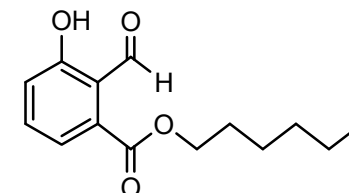


acarid mite, oribatid
mite (F sex phe.)

rhizoglyphinyl formate

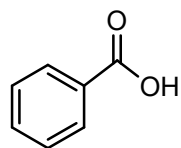


non-parasitic
mite, oribatid mite
(gland secretion)



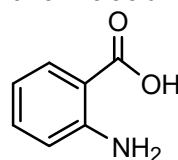
acarid mite (allomone ?)

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

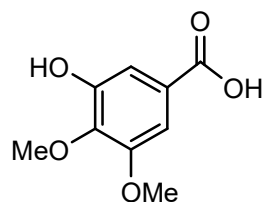


water beetle
(allomone ?)
ant (allomone ?,
gland secretion)

anthranilic acid

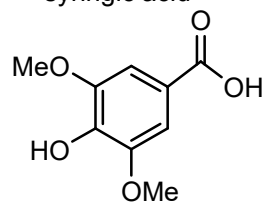


scarab beetle
(F sex phe.)



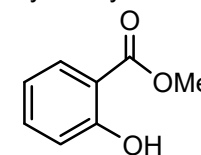
springtail (allomone)

syringic acid

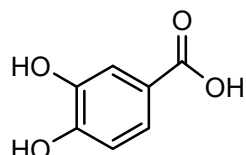


water bug (gland secretion)
creeping water bug, water
beetle (allomone)
bee (queen phe.)

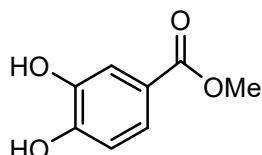
methyl salicylate



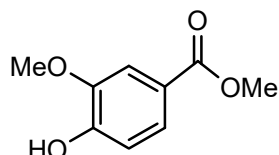
tick (aggregation phe.)
butterfly (allomone,
M anti-aphrodisiac phe.)
dung beetle (allomone)
ant (M aggregation phe. ?)



darkling beetle
(cuticle)

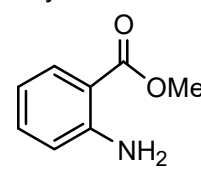


water beetle
(allomone ?)

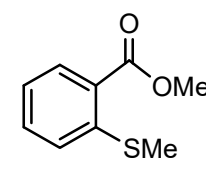


butterfly (M sex
phe. ?)

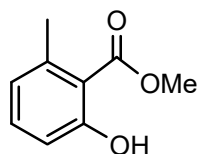
methyl anthranilate



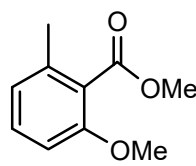
ant (alarm phe. trail phe.,
M aggregation phe. ?)



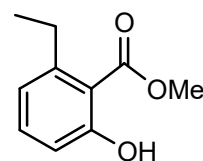
scarab beetle
(F sex phe.)



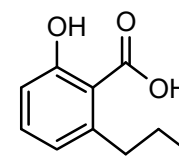
ant (primer phe., alarm phe.,
trail phe., queen sex phe.,
allomone, M aggregation phe.)
parasitoid wasp (F sex phe.)
ground beetle, darkling beetle
(allomone)



ant (trail phe.)

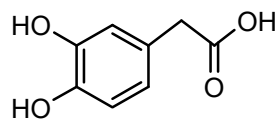


darkling beetle
(allomone)

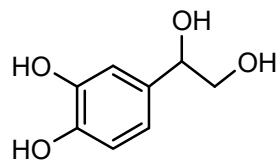


ant (allomone)

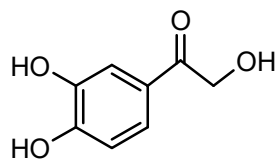
[C-3] Other: Aromatic comp. (iv)



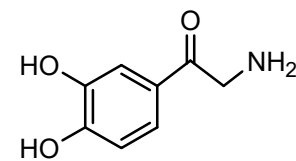
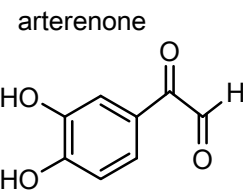
grasshopper, auger beetle, bark beetle (cuticle)



grasshopper (cuticle)

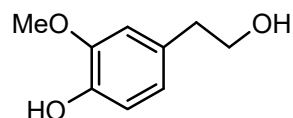


grasshopper, cicada (cuticle)



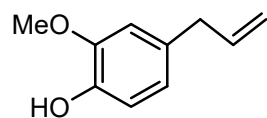
grasshopper, crane fly, blowfly, saturniid, butterfly, cockroach (cuticle)

homovanillyl alcohol

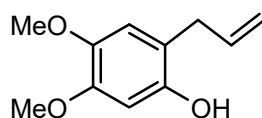


bee (queen phe.)
butterfly (M sex phe. ?)

eugenol

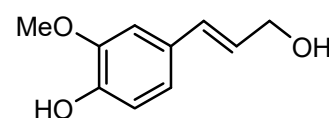


noctuid moth (oviposition-detering phe.)
fairy wasp (F sex phe.)

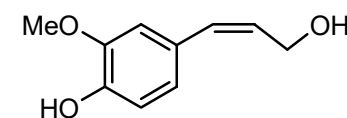


fruit fly (M sex phe., allomone)

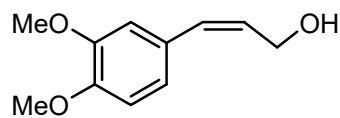
coniferyl alcohol



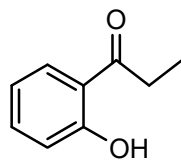
bee (queen phe.)
fruit fly (M sex phe., M allomone)



fruit fly (M sex phe.)

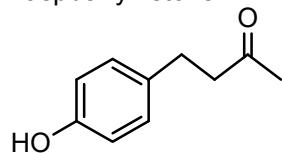


fruit fly (M sex phe.)



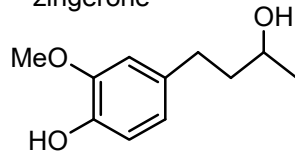
sap beetle (F sex phe.?)

raspberry ketone



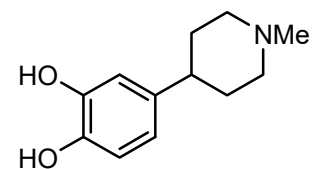
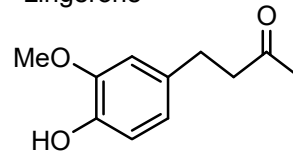
fruit fly (M sex phe.)

zingerone



fruit fly (M sex phe.)

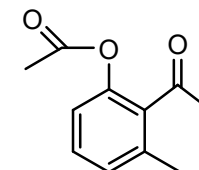
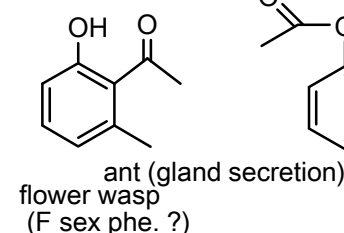
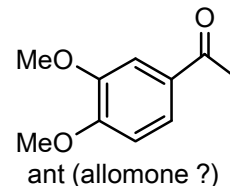
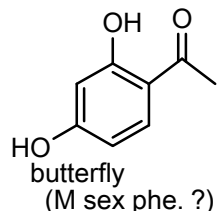
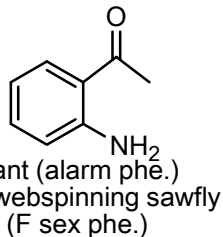
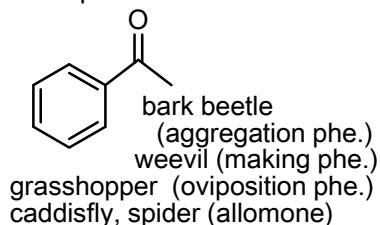
zingerone



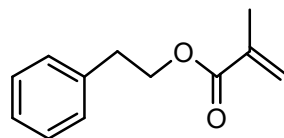
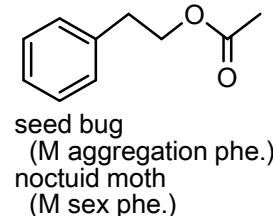
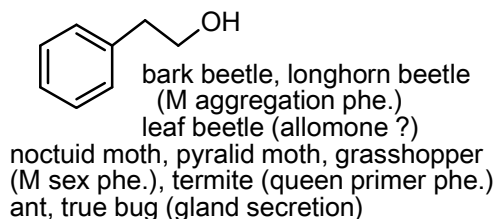
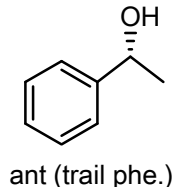
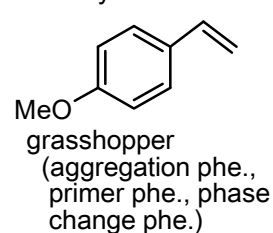
sap beetle (F sex phe.?)

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

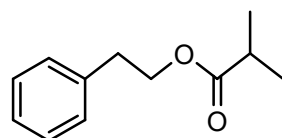
acetophenone



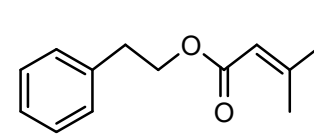
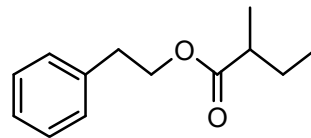
4-vinylanisole



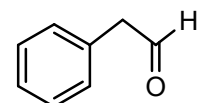
false ground beetle
(allomone ?)



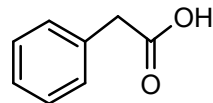
leaf beetle (allomone)



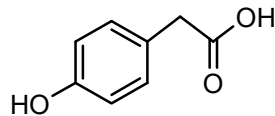
butterfly (gland secretion)



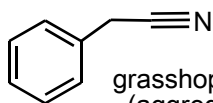
termite, saturniid
moth (allomone)
scarab beetle
(F aggregation phe.)



water beetle
(allomone ?)
ant (gland secretion)

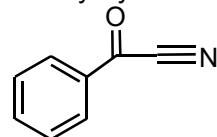


water beetle
(allomone ?)



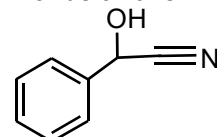
grasshopper
(aggregation phe.,
grasshopper, butterfly
(courtship-inhibition phe)

benzoyl cyanide



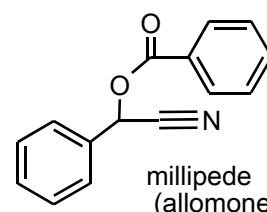
millipede (allomone)

mandelonitrile



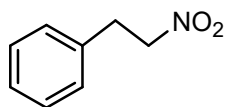
millipede, sawfly, thyridd
caterpillar (allomone)

mandelonitrile benzoate

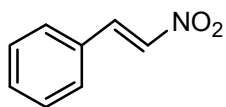


millipede
(allomone)

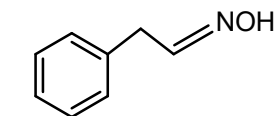
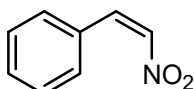
[C-3] Other: Aromatic comp. (vi)



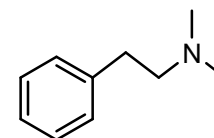
butterfly
(gland secretion)



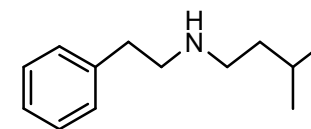
millipede (allomone)



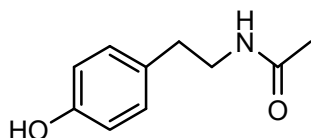
ant (gland secretion)



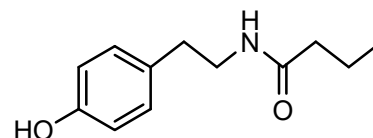
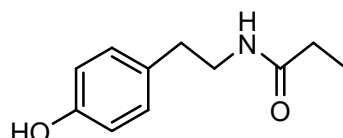
harvestman
(allomone ?)



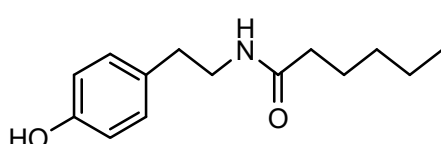
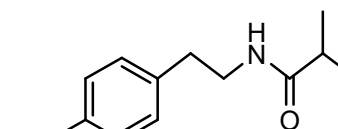
ant (trail phe.)



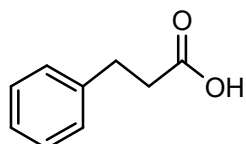
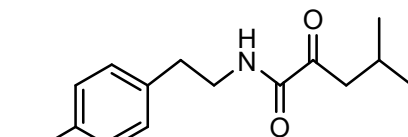
ant (M sex phe. ?)



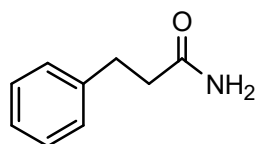
ant (M sex phe. ?)



ant (M sex phe. ?)

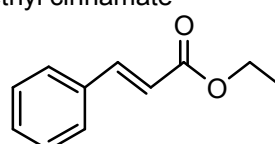


wasp (trail phe. ?)
stingless bee
(gland secretion)

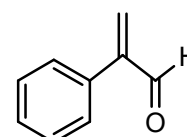


net-winged beetle
(allomone ?)

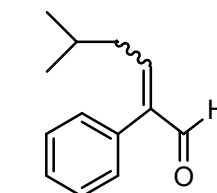
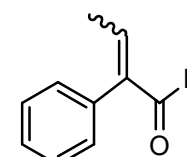
ethyl cinnamate



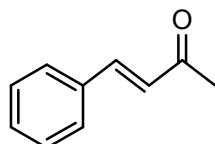
tortricid moth (M sex phe.)



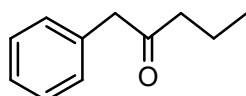
ant (gland secretion)



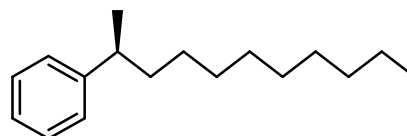
cave cricket
(M gland secretion)



ant (alarm phe. ?)

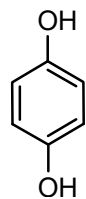


millipede (allomone)



termite (aggregation phe.)

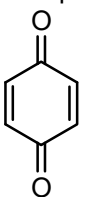
[C-3] Other: Aromatic comp. (vii)



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

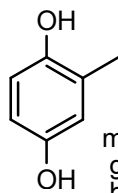
water beetle (gland secretion)

benzoquinone

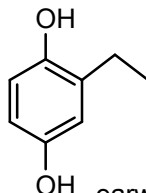


scarab beetle (F sex phe.)

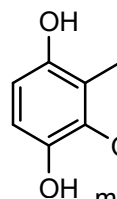
ground beetle,
darkling beetle,
cockroach, termite,
harvestman, millipede
(allomone), termite,
cockroach (alarm phe.)



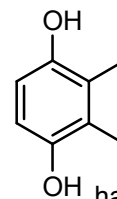
millipede,
ground
beetle, rove
beetle (allomone)



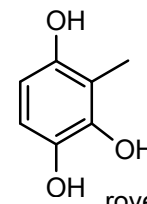
earwig
(allomone)



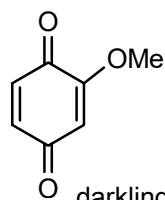
millipede
(allomone)



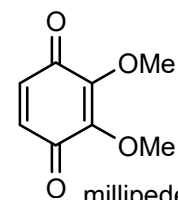
harvestman
(allomone)



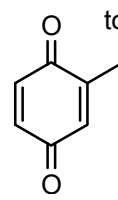
rove beetle
(allomone)



darkling beetle
(allomone)

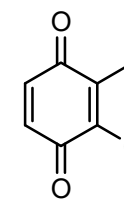


millipede
(allomone)

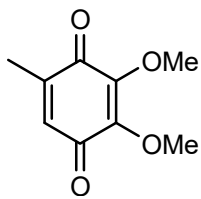


cockroach, millipede (allomone)

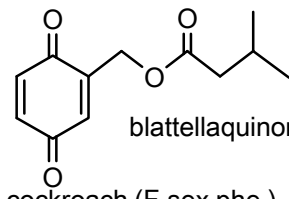
toluquinone



millipede,
darkling
beetle,
rove beetle (allomone)

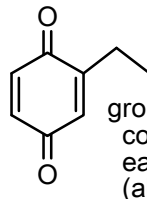


millipede (allomone)



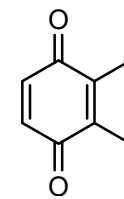
cockroach (F sex phe.)

blattellaquinone

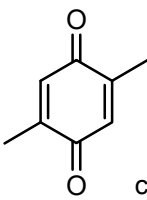


ground beetle,
cockroach,
earwig, millipede
(allomone)

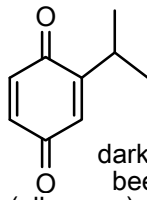
darkling beetle (M sex phe.)



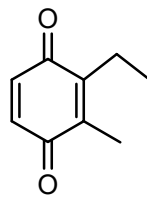
ground beetle,
darkling beetle,
cockroach,
harvestman, earwig (allomone)



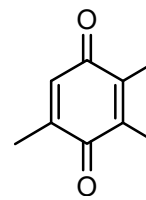
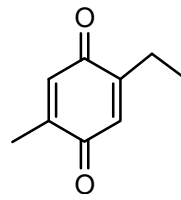
cockroach
(allomone, alarm phe.)



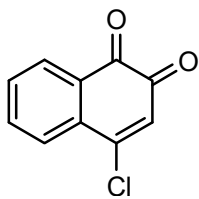
darkling
beetle
(allomone)



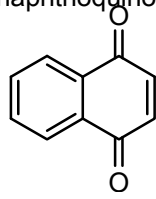
harvestman (allomone)



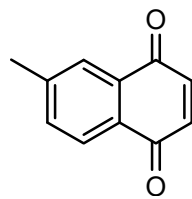
naphthoquinone



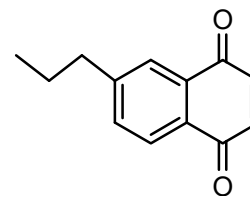
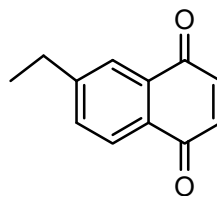
harvestman
(allomone ?)



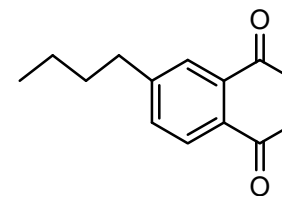
firefly, harvestman
(allomone)



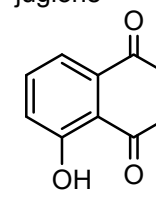
harvestman, darkling
beetle, (allomone)



darkling beetle (allomone)



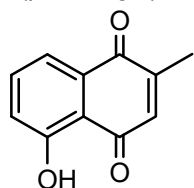
juglone



leaf beetle, thrips
(allomone)

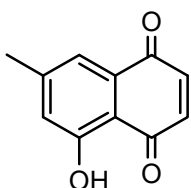
[C-3] Other: Aromatic comp. (viii)

2-methyljuglone
(plumbagin)

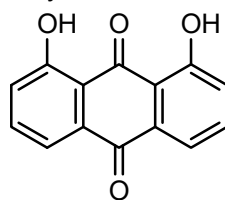


thrips (allomone), mite (gland secretion)

7-methyljuglone

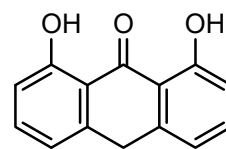


chrysazin

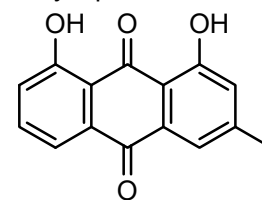


leaf beetle (allomone)

dithranol

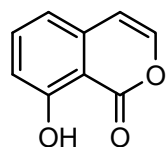
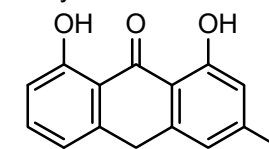


chrysophanol

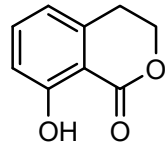


leaf beetle, aphid (allomone)

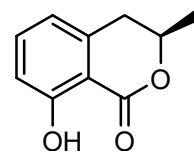
chrysarobin



darkling beetle (allomone)

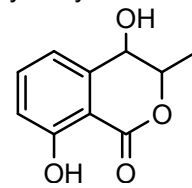


mellein

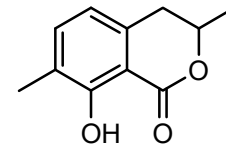


ant (M sex phe. ?, trail phe.
allomone, gland secretion)
termite, thrips (allomone)
moth (M sex phe.)

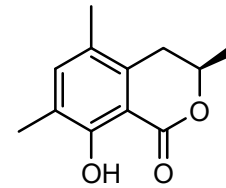
hydroxymellein



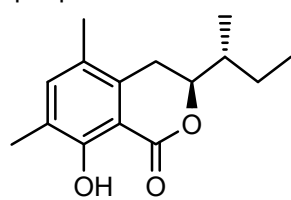
ant (gland secretion)



ant (trail phe.)

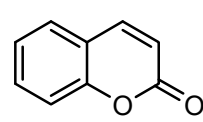


periplanotide E



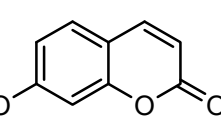
cockroach
(aggregation phe.)

coumarin

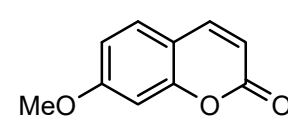


ermine moth (allomone ?)

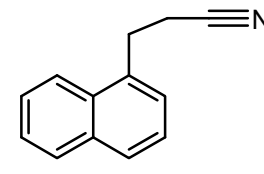
umbelliferone



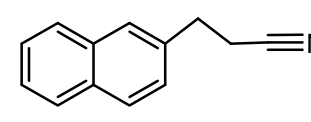
herniarin



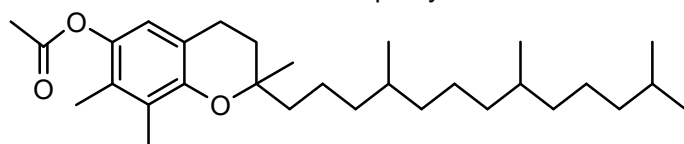
ermine moth (allomone ?)



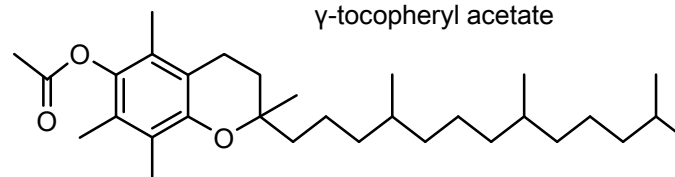
grasshopper (M sex phe. ?)



α -tocopheryl acetate

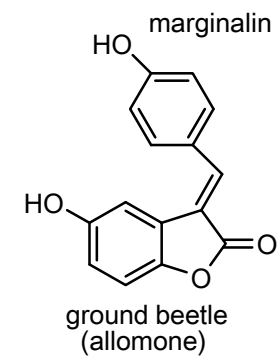
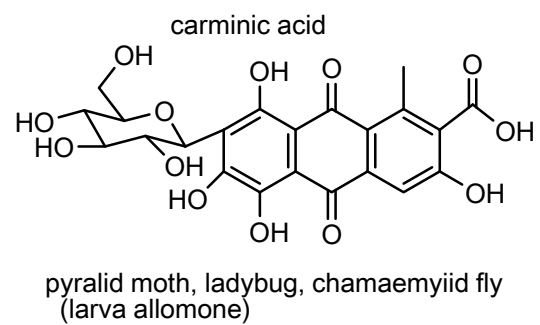
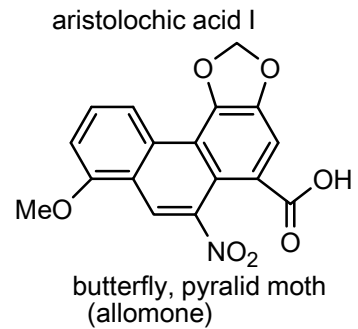
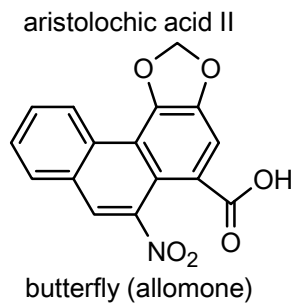


γ -tocopheryl acetate



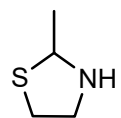
ladybug (allomone ?)

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

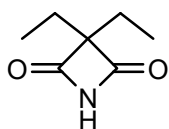


[C-4] Other: Ring comp. (i)

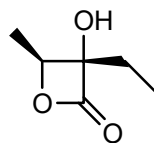
C3 ring



cockroach
(M sex phe.)

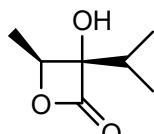


scarab beetle
(F sex phe.?)

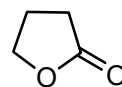


butterfly (M sex phe.)

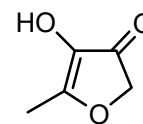
viridifloric β -lactone



C4 ring

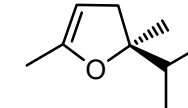
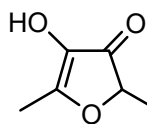


burrowing bug
(gland secretion)



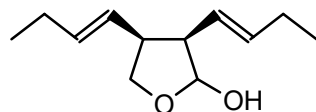
cockroach (M sex phe.)

furaneol

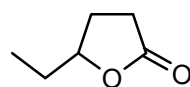


ship-timber beetle
(F sex phe. ?)

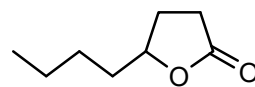
biprorulure



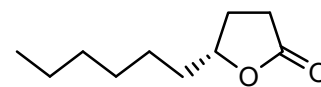
stink bug (M sex phe.)



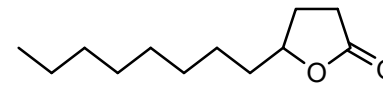
hide beetle
(F sex phe.)



parasitoid wasp, honey
bee (gland secretion)

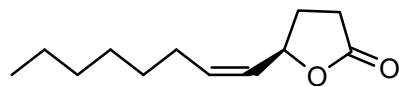


scarab beetle (M sex phe.,
M aggregation phe.)
rove beetle, thrips (allomone)
butterfly (M scent secretion)



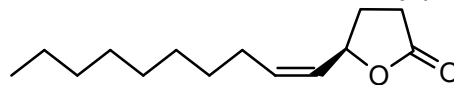
rove beetle (allomone ?)
parasitoid wasp (gland secretion)

buibuilactone

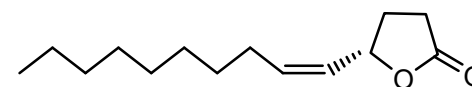


scarab beetle (F sex phe.)

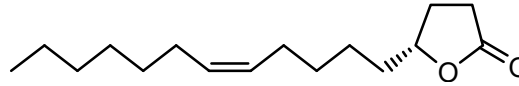
japonilure



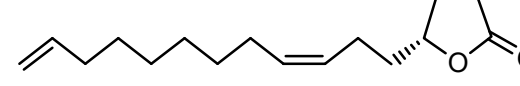
scarab beetle (F sex phe.)



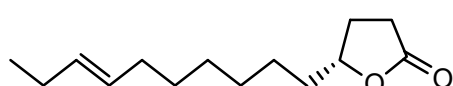
desmolactone



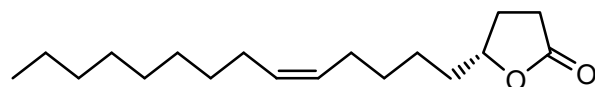
longhorn beetle (F sex phe.)



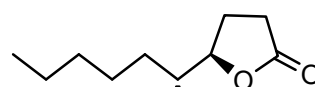
scarab beetle (F sex phe.)



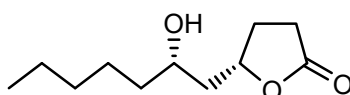
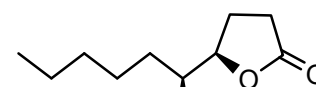
parasitoid wasp (M aggregation phe.)



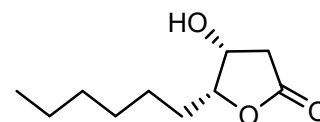
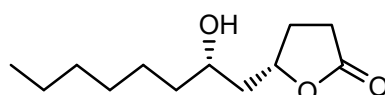
ant (secretion), stem sawfly (F sex phe.)



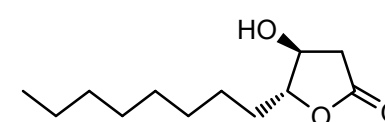
parasitoid wasp (M sex phe.)



butterfly (M sex phe.)



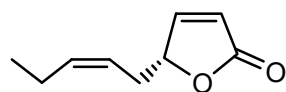
fruit fly (M sex phe.?)



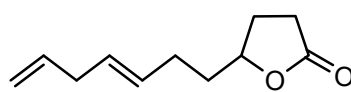
harvestman (allomone)

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

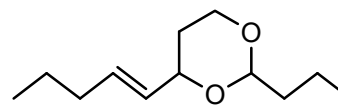
C4 ring



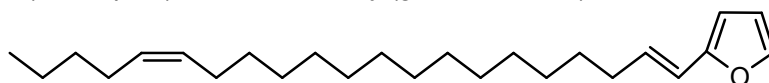
pyralid moth (M sex phe.)



fruit fly (gland secretion)



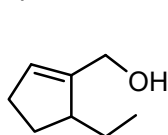
cockroach (allomone ?)



ant (allomone ?)

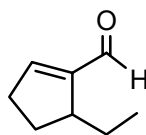
C5 ring

phoracanthol

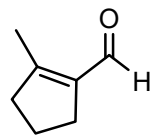


longhorn beetle (allomone?)

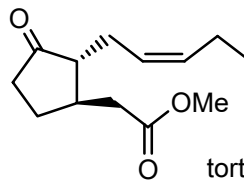
phoracanthal



ant (gland secretion)

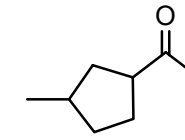
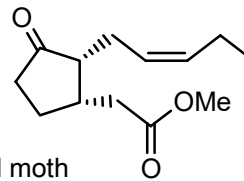


methyl jasmonate

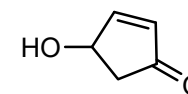


tortricid moth (M sex phe.)

methyl epijasmonate

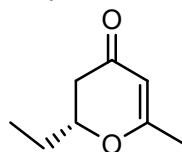


stick insect (allomone ?)

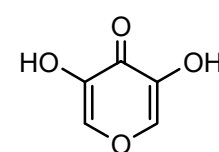
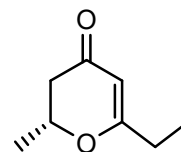


butterfly (secretion)

hepialone

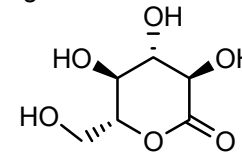


swift moth (M sex phe.)

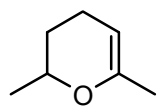


shield bug (M sex phe.)

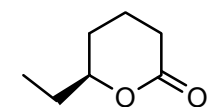
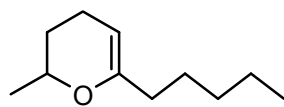
gluconolactone



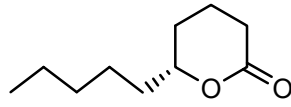
cockroach (allomone ?)



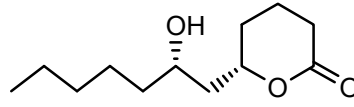
bee (cephalic secretion)



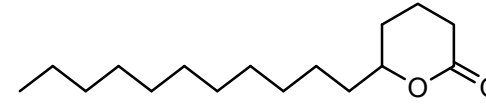
fruit fly (M sex phe.)



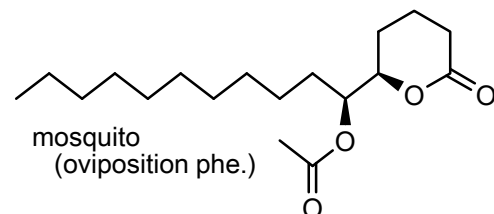
butterfly (M sex phe. ?)



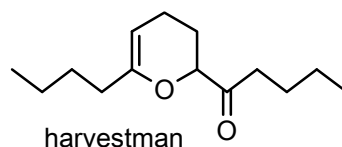
butterfly (M sex phe.)



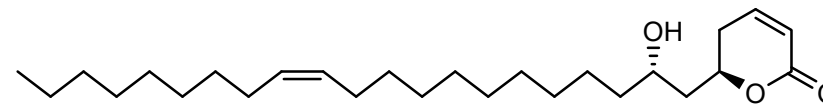
wasp (queen primer phe.)



mosquito (oviposition phe.)



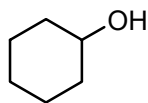
harvestman (allomone ?)



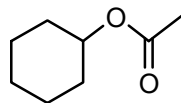
ant (gland secretion)

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

C6 ring

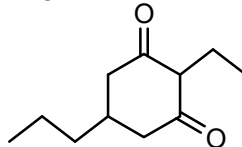


grasshopper
(aggregation phe.)

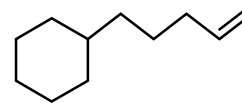


butterfly (F sex phe. ?)

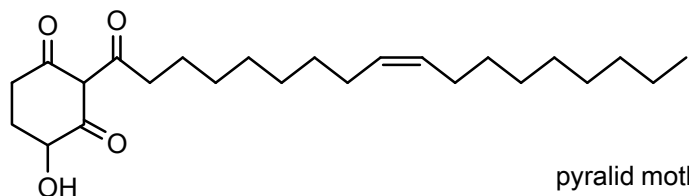
chiloglottone



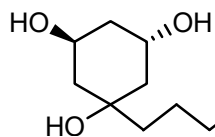
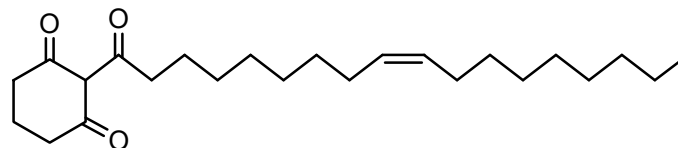
solitary wasp (F sex phe.)



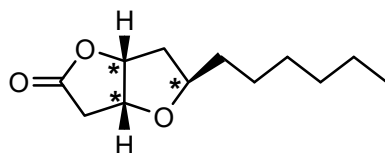
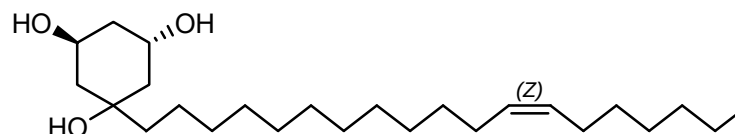
sap beetle (anti-
aphrodisiac phe. ?)



pyralid moth (larva trail phe.)

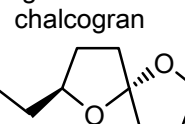


ant (gland secretion)



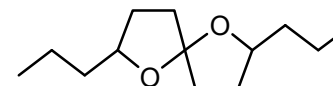
parasitoid wasp (gland secretion)

C7 ring



chalcogran

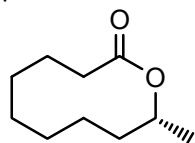
bark beetle
(aggregation phe.)



mining bee
(gland secretion)

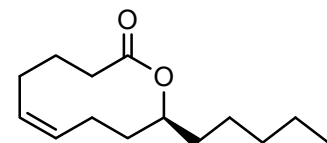
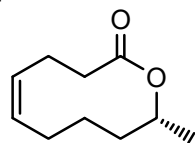
C9 ring

phoracantholide I



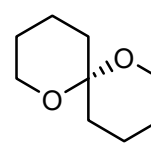
longhorn beetle (allomone ?)

phoracantholide J

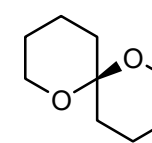
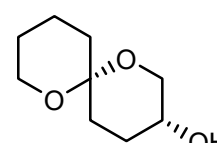


termite (queen recognition ?)

olean



fruit fly (F sex phe.)

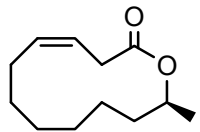


fruit fly
(F sex phe.)

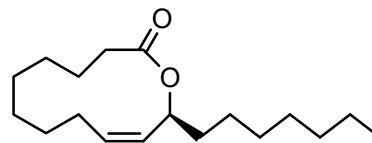
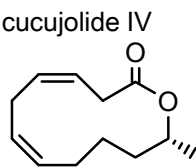
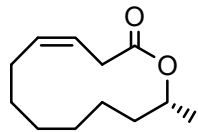
[C-4] Other: Ring comp. (iv)

C11 ring

cucujolide II



cucujolide IV

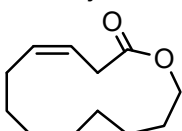


flat bark beetle (M aggregation phe.)

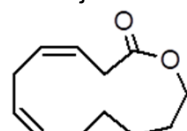
butterfly (M sex phe.)

C12 ring

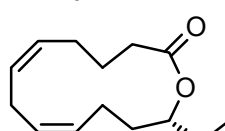
cucujolide VIII



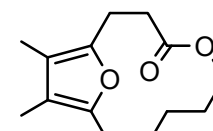
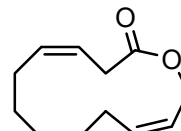
cucujolide IX



cucujolide X



parcoblattalactone



flat bark beetle (M aggregation phe.)

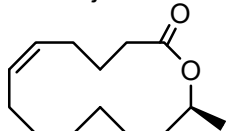
flat bark beetle
(M sex phe. ?)

cockroach (F sex phe.)

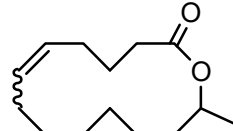
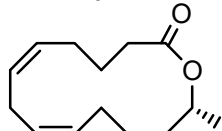
leaf beetle
(M aggregation phe.)

C13 ring

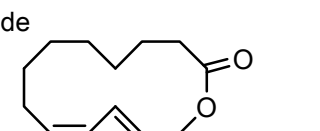
cucujolide III



cucujolide V



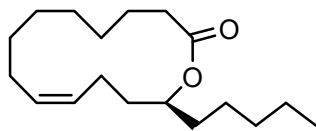
coriolide



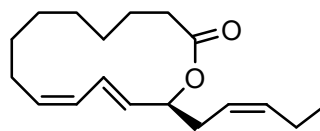
flat bark beetle (M aggregation phe.)

longhorn beetle
(allomone)

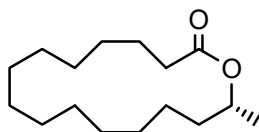
butterfly (M sex phe.)



butterfly (M sex phe.)

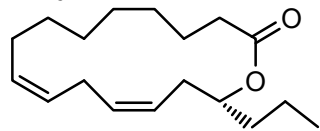


C15 ring



stink bug (M sex phe.)

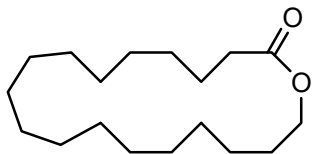
cucujolide XI



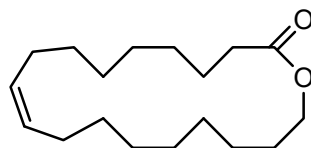
flat bark beetle (M sex phe. ?)

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

C18 ring

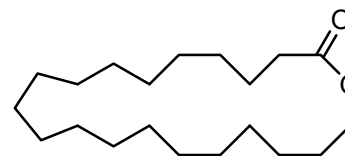


sweat bee (gland secretion,
F sex phe., queen phe.)



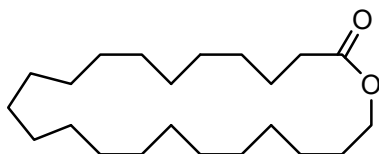
wasp (trail phe. ?)

C20 ring

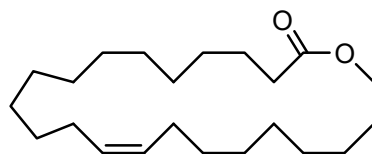


sweat bee (gland secretion,
F sex phe., queen phe.)
mining bee, plasterer bee
(gland secretion)

C22 ring

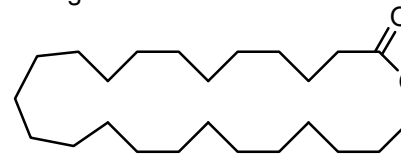


sweat bee (gland secretion,
F sex phe., queen phe.)
plasterer bee (gland secretion)

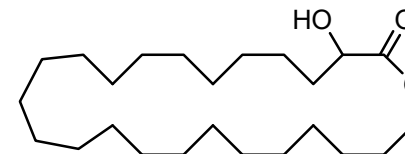


sweat bee (gland secretion)

C24 ring

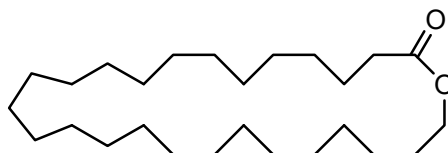


sweat bee (gland secretion,
F sex phe.)
plasterer bee (gland secretion)
termite (allomone ?)

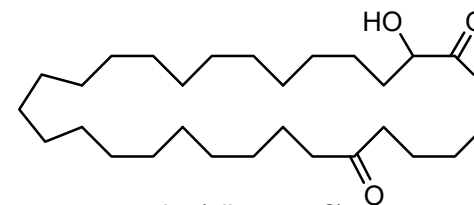
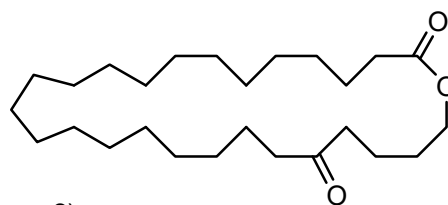


termite (allomone ?)

C26 ring

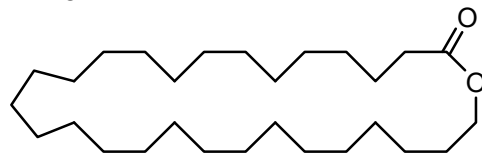


termite (allomone ?)



termite (allomone ?)

C28 ring



termite (allomone ?)

