

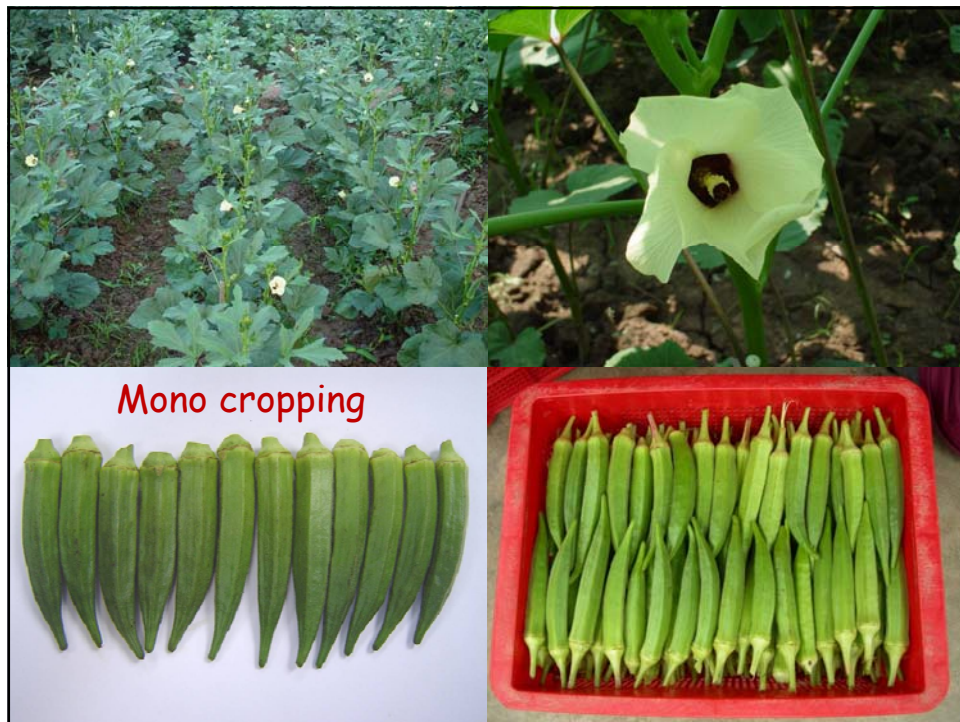


Contents

- Display on varieties of vegetable insect pest found in Thailand .
- Practical on insect classification in Agriculture for survey and monitoring.
- Agro-eco System Analysis (AESA).
- To make decision for control insect pest.
- Control methods: IPM ecological based.
- Various natural enemies :mostly used under IPM
- To reduce the use of chemical pesticides.

Varieties of vegetable





The agricultural system has changed from the past :

- from mixed crop which have more stability to monocrop
- from local consumption to exported market
- the production were increasing years by years to compete with the growth of world population.









Destroy forest to grow monocrop cause many pest problem



Cabbage transportation to market



Insect pest of cabbage



Dimond-back moth

Plutella xylostella Linnaeus

Family : Yponomeutidae

Order : Lepidoptera



Importance and Damage

Diamond-backed moth is the most important pest, it can destroy every kind of vegetable in brassica family, they can increase population very quickly, after mating in 1 day they can produce the eggs and they have very short life cycle. The worm are infested on leaves blade left over the vein.



Damage by DBM

Beet armyworm)

Spodoptera exigua (Hubner)

Family: Notuidae

Order: Lepidoptera



<http://idtools.org/id/citrus/pests/factsheet.php?name=Beet+armyworm>

Importance and damage

Beet army worm destroy vegetable in Brassica family. They can destroy the vegetable all year round , especially in dry season . The first instar ,they stay together and live at the leaves 2nd and 3rd instar, move to eat the other part of vegetable individually.



common cutworm

Spodoptera litura (Fabricius)

Family: Notuidae

Order: Lepidoptera



Importance and damage

Cutworm are translucens with small black spot through the body and 2 big spot near the head , always stay in group chew surface of leaves after hatching cause the small hole through leaves , when bigger more destroy on leaves vein head and infested all year round,especially in rainy season.



cabbage looper

Trichoplusia ni (Hubner)

Family: Notuidae

Order: Lepidoptera



<http://tutahpests.usu.edu/ipm/html/advisories/small-fruit-and-vegetable-advisory/articleID=10017>

http://www.cals.ncsu.edu/course/ent010/veg_fruit_pests/cabbage_looper.html

Importance and damage

The first instar, looper will chew the leaves surface when become bigger ,the worm will cut the leaves cause leafless, only stalk left.



Cabbage webworm

Hellula undalis (Fabricius)

Family: Pyralidae

Order: Lepidoptera



http://www.jpemoth.org/Crambidae/Pyraustinae/Hellula_undalis.html



http://www.suffolkmoths.org.uk/pictures/31360_1.jpg

Importance and damage

Cabbage web worm destroy shoot of cabbage cause broken shoot, the cabbage can not form heading. The symptom, usually see the fetal around the shoot and cover with the leaves which were connected by the web above.



Serpentine leafminer

Liriomyza brassicae (Riley)

Family: Agromyzidae

Order: Diptera



<http://www.snipview.com/q/Agromyzidae>



<http://aggie-horticulture.tamu.edu/vegetable/files/2012/01/leafminer.jpg>

Importance and damage

Adult lay the eggs under leaf tissue ,after hatching the maggot will eat the leaf inside the leaf tissue cause the white curve lines on leaves blade .If infested the young vegetable cause leaf blight , in bigger vegetable cause unfavorable, and cheaper yield.



Cabbage heart caterpillar

Crociodomia pavonana (Fabricius)

Family: Pyralidae

Order: Lepidoptera



Importance and damage

Cabbage heart caterpillar destroy cabbage by cutting the young shoot like cabbage web worm , usually found in the highland cabbage.



<http://archive.infonet-biovision.org/default/ct/109/pests>

Small white cabbage butterfly

Pieris rapae (Linnaeus)

Family: Pieridae

Order: Lepidoptera



Importance and damage

White cabbage butterfly destroy cabbage by cutting the cabbage leaves, usually found in the high land cabbage. The pupae are stick to the cabbage leaves.



Flea beetle

Phyllotreta striolata (Fabricius)

Family: Chrysomelidae

Order: Coleoptera



Importance and damage

Larvae are in the soil cutting or penetrate into the stem or root of cabbage cause vegetable wilt. Adult cut the cabbage leaves and shoot of cabbage ,usually stay together.



Cabbage shield bug

Eurydema pulchrum (Westwood)

Family: Pentatomidae

Order: Hemiptera



Importance and damage

Cabbage bug are usually found in the high land cabbage ,nymph and adults are sucking insect , suck the leaves cause wilt .



False cabbage aphid

Lipaphis erysimi (Kaltenbach)

Family: Aphididae

Order: Homoptera

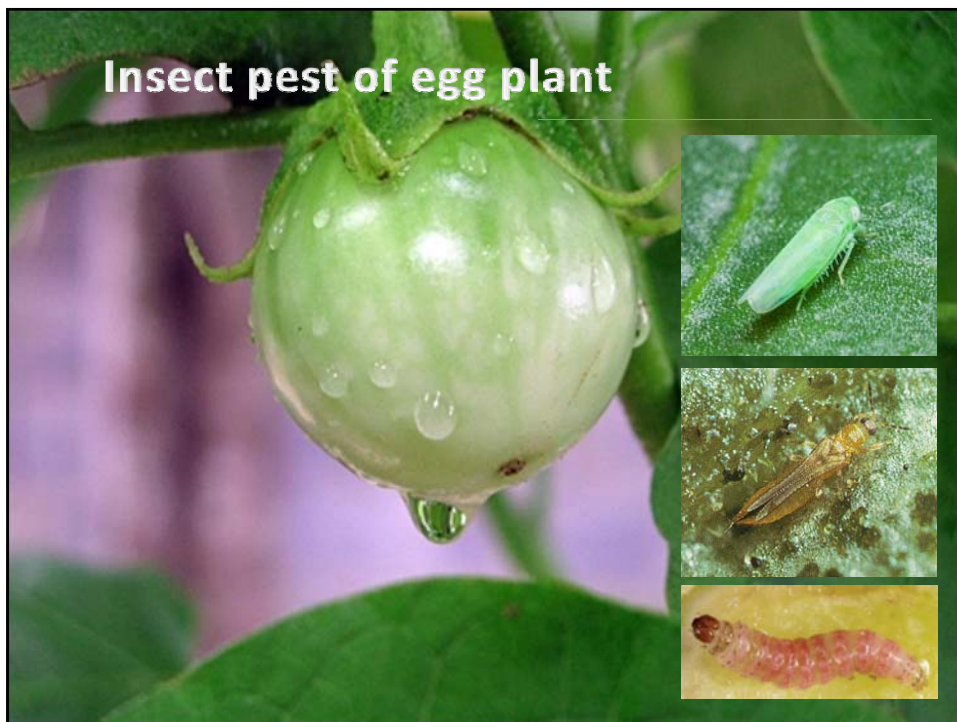


Importance and damage

Nymph and adult suck the vegetable , normally found every where but not so importance



Insect pest of egg plant



Cotton thrips

Thrips palmi Karny

Family: Thripidae

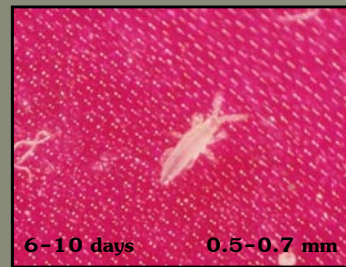
Order: Thysanoptera



<http://cues.cfans.umn.edu/old/inter/inmine/Thrip.html>



egg



6-10 days

0.5-0.7 mm

nymph (3)



3-4 days

0.7-0.8 mm

pupa



14-16 days

0.8-1.0 mm

adult

cotton thrips; *Thrips palmi* (life cycle 13-22 days)



http://entnemdept.ufl.edu/creatures/veg/melon_thrips10.jpg

Cotton leafhopper)

Amrasca biguttula (Ishida)

Family: Cicadellidae

Order: Homoptera



Tobacco whitefly)

Bemisia tabaci (Gennadius)

Family: Aleyrodidae

Order: Homoptera



http://www.wageningenur.nl/upload_mm/4/e/2/a3b8334d-ba45-409b-b728-104508cd8492_Whitefly_490x330.jpg

Egg-plant fruitborer)

ชื่อวิทยาศาสตร์: *Leucinodes orbonalis* Guenee

Family: Pyralidae

Order: Lepidoptera



https://commons.wikimedia.org/wiki/File:Leucinodes_orbonalis_larva_mid_instar.jpg



<http://ecport.org/PDB/000027/27984.jpg>



Twenty-eight-spot-ladybird beetle

Henosepilachna vigintioctopunctata (Fabricius)

Family: Coccinellidae

Order: Coleoptera



http://www.snipview.com/q/Henosepilachna_vigintioctopunctata

Pest always occur



Importance and damage

Larvae and adult cut the leaves cause small hole through leaf.



Red cucurbit beetle

Aulacophora indica (Gmelin)

Family: Chrysomelidae

Order: Coleoptera



Flea beetle and their control



Importance and damage

Larvae and adult cut and eat leaves and flower by eat inside the circle and then the other .



http://www.bougo.net/admin/wp-content/uploads/saie_060X307.jpg

Common cutworm

Spodoptera litura (Fabricius)

Family: Notuidae

Order: Lepidoptera



Importance and damage

Larvae cut and eat young leaves and inside flower.



<http://keys.lucidcentral.org/keys/sweetpotato/key/Sweetpotato%20Diagnoses/Media/Hindi/TheProblems/Pest-LeafChewingInsects/ArmyWorms/Armyworms.htm>

Cucumber moth

Diaphania indica (Saunders)

Family: Pyralidae

Order: Lepidoptera



<http://www.nhair.res.in/insectpests/images/Diaphania-indica1.jpg>



<http://lepidoptera.butterflyhouse.com.au/spid/indica4.jpg>

Importance and damage

Larvae are yellow colour with 2 white lines beside their body
They usually cut and eat shoot, and eat inside the fruit .



<http://www.nhair.res.in/insectpests/images/Diaphania-indica9.jpg>



<http://www.nhair.res.in/insectpests/images/Diaphania-indica3.jpg>

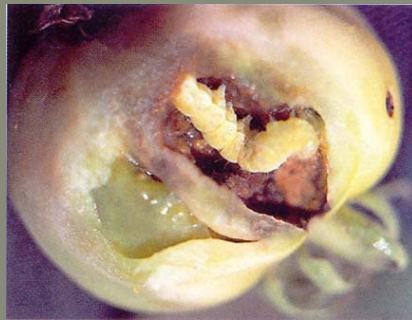


Cotton bollworm

Helicoverpa armigera (Hubner)

Family: Noctuidae

Order: Lepidoptera



Pest always occur



Importance and damage

They consume many kind of plant , normally they prefer flower cause of flower and no fruit



<http://agribiz.in/naufAgri/ugri50/ENTO331/lecture06/001.html>

Leaf miner)

Liriomyza sp.

Family: Agromyzidae

Order: Diptera



<http://aggie-horticulture.tamu.edu/vegetable/files/2012/01/leafminer.jpg>



https://i1.staticflickr.com/9/8360/8301298453_a8f35ba73_n.jpg

Importance and damage

The maggot were infested inside leaf tissue cause the white line curve on leaves.



http://entnemdept.ufl.edu/creatures/veg/leaf/vegetable_leafminer.htm

Melon fly

Bactrocera cucurbitae Coquillett

Family: Tephritidae

Order: Diptera



<https://agresearchmag.ars.usda.gov/ImageViewer?year=2015&month=Apr&story=cucumbers>

Importance and damage

Adult lay eggs on cucumber fruit after hatching the maggot growth inside the fruit ,difficult to control and cause a lot of damage.



<http://gamour.cirad.fr/site/images/stories/mouches%20bactocera%20cucurbitae%20larves%20a.%20franc%20cirad.jpg>

Cotton thrips

Thrips palmi Karny

Family: Thripidae

Order: Thysanoptera



http://entnemdept.ufl.edu/creatures/veg/melon_thrips.htm



<http://bezformata.ru/content/Images/000/056/320/image56320728.jpg>

DBM larval parasitoid *Diadegma semiclausum*



Importance and damage

Adult and larvae feed on the sap of leaf shoot and bud cause stunt and wither and curl leaves.



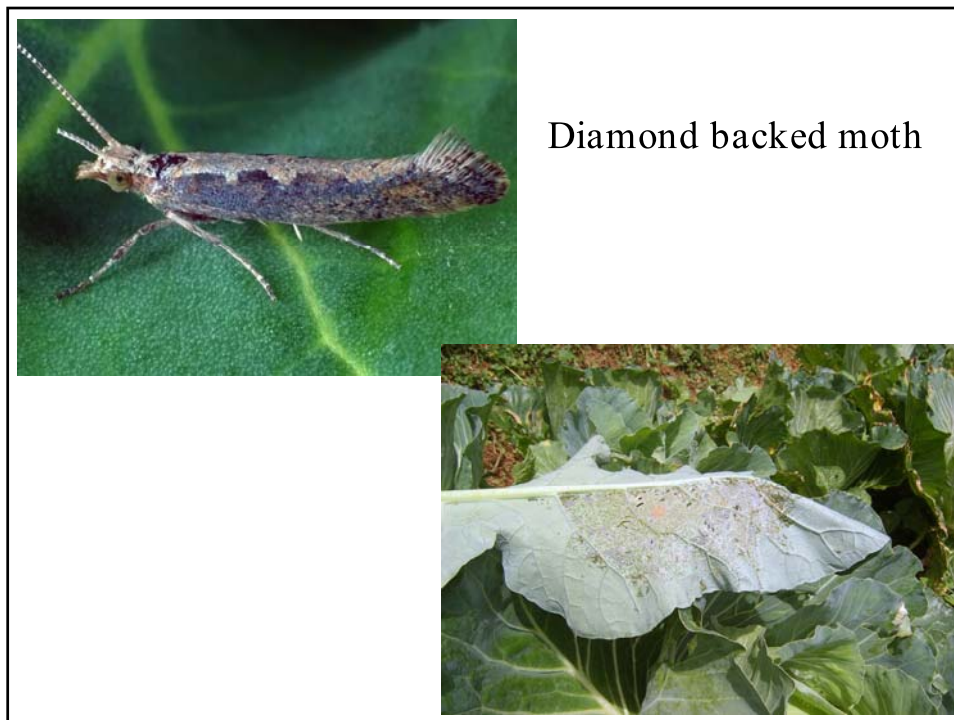
<http://www.cessiver.org.mx/wp-content/uploads/trips06.png>

Farmer spray while the pest always occur



Leaf minor





Importance and damage

Aphid suck and live under leaf blade shoot bud and inside flower.



<https://qm.illinois.edu/qm/volume17/frveg1710.html>

Pest of Chilli



Cotton bollworm

Helicoverpa armigera (Hubner)

Family: Noctuidae

Order: Lepidoptera



<http://agropedia.iitk.ac.in/content/chilli-fruit-borer>

Common cutworm

Spodoptera litura (Fabricius)

Family: Noctuidae

Order: Lepidoptera



http://agritech.inau.ac.in/horticulture/horti_vegetables_chilli.html

Chili thrips

Scirtothrips dorsalis Hood

Family: Thripidae

Order: Thysanoptera



<http://www.jakv-v-vegsoft.com/english/insect.php?vegid=3&insecid=3#>

Broad mite

Polyphagotarsonemus latus (Banks)

วงศ์: Tarsonemidae

Order: Acari



http://vegetableonline.ppath.cornell.edu/DiagnosticKeys/TomLeaf/Broad_Tom.htm

<http://www.promip.agr.hr/imgs/pragas/-caro-branco-5.jpg>

Diamondback moth (DBM)



Diamond Back Moth









Varities of chemical pesticides

