



Insect pests of crucifer vegetables

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Cabbage white butterfly

I. Egg: enlarged ten times. 2. Larva or caterpillar; 3. pupa; enlarged about 2.5 times. 4. Eggs on leaf; 5. larva or caterpillar; 6. pupae attached to plant; 7. adult butterfly; all actual size.

Illustration: E. H. Zeck

The crucifer vegetables—cabbage, cauliflower, broccoli, Brussels sprouts, turnip and radish—may be attacked by a number of insects. Some of these, such as cabbage white butterfly, cabbage moth and cabbage aphid, feed only on crop and weed plants of the family Cruciferae. Others, such as Helicoverpa caterpillars and cutworms, feed on a wide range of plants.

CABBAGE WHITE BUTTERFLY

The cabbage white butterfly, *Pieris rapae*, is the most common pest of crucifers in New South Wales. Its larvae feed voraciously, chewing large holes in the leaves and fouling the plants with excrement. Cabbage white butterfly is most active in the spring and autumn months. It is a native of Europe.

The butterfly is cream to yellowish, with black-tipped forewings and central spots; the wingspan is 40 to 50 mm. The butterflies are often seen obtaining nectar from plants unrelated to crucifers; they are attracted to blue and yellow flowers. They place their pale yellow, spindle-shaped eggs singly, usually on the outer leaves. The younger caterpillars feed on the undersides of these leaves, and move towards the centre of the plant as they grow. Older caterpillars are usually on the upper surfaces of the central leaves. When fully grown the caterpillars are about 30 mm long and velvety green, with faint yellow stripes down the back and along each side. The pupae are about 18 mm long, greyish brown, yellow or green and are usually attached to the undersides of the older leaves of the host plant or to some nearby object. The life cycle under suitable conditions occupies about a month.

The cabbage white butterfly is parasitised by several species of wasps. Two of the most common parasitoids are *Cotesia rubecula* and *Cotesia glomerata* from the hymenopteran family Braconidae. They can



Pupal cocoons of wasp parasite *Apanteles glomeratus*, near cabbage white butterfly caterpillar killed by the wasp larvae that developed inside it. — Photo: M. Hill

be recognised by yellow silken cocoons beside the dead caterpillars. *C. rubecula* produces a single cocoon from each host whereas *C. glomerata* produces a mass of cocoons from each host.

CABBAGE MOTH

The cabbage moth, *Plutella xylostella*, is also a serious pest of crucifers. The youngest caterpillars are leaf miners. Older caterpillars feed in sheltered situations on the undersides of leaves or in the outer heart leaves, making many small holes that are often window pane-like because the upper epidermis has been left intact. The moths are about 9 mm long and greyish brown, with a series of diamond-shaped markings on the centre-line of the back when the moth is at rest. The moths are active at night, laying clusters of yellow

Cabbage white butterfly—female at left, male at right. Wingspan 40 to 50 mm. —Photo: M. Hill.



eggs along the ribs and margins of the more sheltered leaves. The caterpillars are tapered at each end and when fully grown are green and about 12 mm long.

When disturbed the caterpillars wriggle away and drop from the leaf, attached by silken threads. When fully grown they pupate in silken, net-like cocoons attached to the leaves. In warm conditions the life cycle takes about 3 weeks. Cabbage moth is more troublesome in dry weather.

Natural mortality is mainly caused by several imported parasitic wasps including *Diadegma semiclausum*, *Diadegma rapi*, *Diadromis collaris*, *Apanteles ippeus* and *Cotesia plutellae*. Rain or overhead irrigation can also cause high levels of mortality. Control of cabbage moth in commercial Brassica crops still relies heavily on insecticides. It needs to be noted however that cabbage moth is notorious for its rapid development of resistance to insecticides. Hence it is important to rotate insecticides of different groups. Spray decisions should be based on regular monitoring instead of calendar days.

HELICOVERPA CATERPILLARS

The caterpillars *Helioverpa armigera* and *H. punctigera* damage a wide range of crops formerly known as Heliothis caterpillar. (Helicoverpa was formerly known as Heliothis caterpillar.). In some seasons, cabbages and cauliflowers are attacked. The caterpillars may feed on the outer leaves of young plants or burrow into the hearts of older plants. The moths have wingspans of 30 to 45 mm and are generally buff to reddish brown, with darker markings,

Damage by cabbage moth. —-Photo: M. Hill.





The cabbage moth. Length about 9 mm. —Photo: M. Hill.

and are often seen flying in crops at dusk. The females lay their dome shaped, yellowish white, 0.5 mm diameter eggs singly on the leaves. The caterpillars grow to 40 to 50 mm long. At this size they are green, yellow, pink, reddish brown or almost black, often with a broad yellowish white stripe along each side of the body and a dark-edged whitish line down the middle of the back. They have conspicuous body hairs on tubercles. When fully grown the caterpillars pupate in the soil.

Emergence of the moths from pupae in the soil depends on the soil moisture content. Thus crops are more likely to be attacked after a period of rain. Helicoverpa caterpillars have a very wide host range including lucerne, sweet corn, tomatoes and ornamental and weed species. They are most troublesome in late summer and autumn. Once they have penetrated cabbage hearts they are protected from insecticide sprays.

Young cabbage moth caterpillars and their damage. — Photo: M. Hill.





Cabbage moth caterpillar about to become a pupa, inside the silken net-like cocoon.—Photo: M. Hill.

CABBAGE APHID

Feeding by large numbers of cabbage aphid, *Brevicoryne brassicae*, a sap-sucking insect, causes wilting and stunting in young plants and yellowing, curling and leaf distortion in older plants. This pest is most prevalent in late summer and autumn. It is the most common pest of Brussels sprouts. The adult aphid is about 2.5 mm long, soft-bodied, greyish with a mealy covering, and may be winged or wingless. The immature stages resemble the wingless adults. This aphid clusters densely on the leaves.

Two other aphids are commonly associated with crucifers. Green peach aphid, *Myzus persicae*, is usually on the undersides of older leaves. It is about 2 mm long when adult and green to pale yellow or pink. This aphid, which has a very wide host range, is important only as a vector of virus diseases. Turnip aphid,

Cabbage damaged by cabbage aphid.—Photo: M. Hill



A heliothis caterpillar. Length 40 to 50 mm when fully grown. —Photo: A. Searle.

Lipaphis erysimi, a greenish, wax-dusted aphid, about 2 mm long when adult, feeds only on cruciferous plants, but is found more commonly on cruciferous weeds than on crop plants.

Aphids on crucifers are often kept under control by natural enemies-mainly tiny wasps that parasitise the aphids, and ladybirds and their larvae and lacewing and hover fly larvae that eat the aphids.

CUTWORMS

Cutworms, *Agrotis* spp., are soil-inhabiting caterpillars that feed on stems and foliage near ground level, usually at night, and destroy seedling plants. By day the caterpillars hide in the soil, 1 to 10 cm deep, usually near damaged plants. They are smooth-bodied caterpillars, 25 to 50 mm long when fully grown, and grey, grey-green, blackish, or brown with a pinkish red tinge. As some other caterpillars do, they coil up and





Cabbage aphid adults are soft bodied, greyish with a mealy covering and about 2.5 mm long. —Photo: M. Hill

remain green, still if picked up. The adults are stoutbodied moths with pale brown, brownish grey, purplish brown or grey-black forewings and wingspans of 30 to 55 mm. The females lay their eggs on the soil or on the lower parts of plants.

Ground that has been cultivated recently after rain or flooding, and weedy cultivated or uncultivated ground, is most likely to be infested.

CLUSTER CATERPILLAR

Cluster caterpillar, *Spodoptera litura*, is a leaf eating caterpillar that feeds in groups when young. As they grow older the caterpillars feed singly, spreading out to other parts of the plant or to neighbouring plants;

Leaf damaged by young stages of cluster caterpillar.





Cutworm caterpillars damaging a young plant. They are 25 to 50 mm long when fully grown. —-Photo: M. Hill.

they chew large holes in the leaves and may tunnel into cabbage hearts. The adults are stout-bodied moths with wingspans of 30 to 45 mm. The forewings are brownish with cream markings, and the hindwings are white. The females lay their eggs mainly on the undersides of leaves in clusters covered with brown scales from the moths' bodies. When fully grown the caterpillars are 40 to 50 mm long and are brown, black or grey, with a row of dark, rounded-triangular marks along each side of the back and two pairs of large yellowish or white spots near the head.

This pest occurs most commonly in late summer and autumn.

Close-up of young stages of cluster caterpillar and their damage on underside of leaf. — Photos: A.





Cluster caterpillar. Length 40 to 50 mm when fully grown. —Photo: M. Hill.

CABBAGE CENTRE GRUB

Caterpillars of cabbage centre grub, *Hellula hydrates*, tunnel into the growing points of the plants, covering the entrances with webbing and excreta. Occasionally they feed within the leaves of older plants, forming blisters. The adult is a grey-brown moth with a wingspan of about 18 mm. It holds its wings horizontally when resting.

The females lay their eggs on young growth. When fully grown the caterpillars are about 12 mm long and creamish with brown longitudinal stripes.

This pest can be troublesome throughout summer and autumn, mainly in hot dry weather.

CABBAGE CLUSTER CATERPILLAR

Cabbage cluster caterpillar, *Crocidolomia pavonana*, occurs only very occasionally in New South Wales. The caterpillars feed in groups on the tops of the leaves and often produce a considerable amount of webbing. They are about 20 mm long when fully grown, and are green, or green with light brown backs,

Cabbage centre grub. Length about 12 mm when fully

and have black spots and light longitudinal markings. The adults are light brown moths with a wingspan of about 25 mm. They lay their eggs in clusters.

LOOPER CATERPILLARS

Looper caterpillars, *Chrysodeixis* spp., move with a looping motion and feed mostly on the undersides of leaves. Young caterpillars eat through to the upper epidermis of the leaf, leaving window pane-like holes. Older caterpillars chew large, ragged holes. They are 30 to 40 mm long when fully grown, with green or blue-green, white-striped bodies that taper towards the head. The adults are dark brown moths with silver markings on the forewings and wingspans of 30 to 40 mm. The females lay whitish, 0.6 mm diameter, slightly flattened eggs singly, usually on the undersides of leaves.

Looper caterpillar infestations are often suppressed by natural enemies—parasites, predators and diseases.

ONION THRIPS

Onion thrips, *Thrips tabaci*, feed by piercing the surface shallowly and sucking up the sap. On crucifers the thrips feed mainly on the lower sides of the leaves. The damaged areas look silvery and severely damaged young plants may wilt. The adult is about 1 mm long, greyish brown, narrow-bodied, with fringed wings. The adults lay their eggs in the plant tissue. The immature thrips are creamy yellow and wingless.

Dry conditions during the spring and early summer favour the development of damaging populations of thrips. A good fall of rain usually ends the problem on crucifers.



Cabbage centre grub in growing point of young plant. — Photo: A. Searle.



AFRICAN BLACK BEETLE

Crops are damaged by African black beetle, *Heteronychus arator*, when they are planted into beetleinfested former grassland, or alongside infested grassland, or when swarming beetles fly in. The beetles chew the stems of seedlings just below ground level, making a ragged injury, and the plants die. The beetle is about 12 mm long and shiny black and can usually be found in the soil near the damaged plants. African black beetle is a pest of coastal districts, and is troublesome from late August to November and again from January to March. It breeds mainly in grassland, where the white, soft larvae ('curl grubs'), with hard brown heads, feed on organic matter and plant roots in the soil. Dry conditions during the spring and early summer favour its development.

RUTHERGLEN BUG

Occasionally in hot, dry conditions in spring and early summer Rutherglen bug, *Nysius vinitor*, appears in plague numbers. It invades crops, usually as flying adults, but sometimes as crawling swarms of immature bugs. The bugs suck sap from stems and leaves. Severely attacked plants, particularly young plants, wilt and may die. The Rutherglen bug adult is about 5mm long, narrow-bodied and greyish brown, with prominent black eyes and silvery wings. The immature bugs are reddish and pear-shaped.

Rutherglen bug breeds on weeds and moves into crops when the weeds dry off. When immature bugs are swarming into a crop they can be stopped by a furrow with the steep side nearest the crop. Rutherglen bug can be controlled by insecticide spraying, but repeated spraying is needed during

African black beetle. Length about 12 mm. —Photo: A. Searle.



A looper caterpillar. Length 30 to 40 mm when fully grown. —Photo: M. Hill.

plagues. Also spray infested weed growth around the crop.

CONTROL

Check crops frequently for pest development, especially when the plants are young. Cutworms and black beetle rapidly destroy young plants. Do not plant into land where black beetle is in evidence; this is usually land that has been growing grasses and has had only a short cultivation preparation. Do not plant alongside grassland, as the beetles may walk from there into the crop. Cabbage aphids can severely restrict growth of young plants, so take care that damaging populations do not develop.

Insect activity is largely governed by weather conditions. During the colder months in many

Ragged injury where African black beetle adult chewed the stem of a young plant just below ground level. —Photo: M. Hill.







Onion thrips and damage on the lower side of a cabbage leaf. The adult thrip is about 1 mm long — Photo: M. Hill.

districts the activity of insect pests of crucifers virtually ceases. At other times of the year insect activity may be so great that control sprays will be needed at 7 to 14 day intervals. Regular treatment at these intervals is much more efficient than spraying after damage develops. Small caterpillars of any species require less insecticide to kill them. Some insects such as cabbage moth and Helicoverpa caterpillars feed in sheltered positions, and controlling them adequately is very difficult if they have become well established in the crop.

Cabbage white butterfly, cabbage moth, cabbage centre grub, cabbage cluster caterpillar and cabbage and turnip aphids feed only on cruciferous plants. Abandoned crops are reservoirs of infestation for subsequent crops, so plough in old crop residues as soon as harvesting is finished.

Edited by A. T. Munroe Division of Agricultural Services



Rutherglen bug adult. Length about 5 mm. — Illustration: E. H. Zeck.

DISCLAIMER

The information contained in this publication is based on knowledge and understanding at the time of review (October 2003.) However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the

ALWAYS READ THE LABEL

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