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Rapeseed. 2. Insect control

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RAPESEED Crops are highly susceptible to attack from a number of insects and, in most cases, some crop protection measures will be necessary to achieve satisfactory yields.

This article discusses the insects that have been a problem in rapeseed crops in Western Australia to date. Knowledge of the control measures is limited by a lack of experience with commercial plantings in many districts, but the following notes should prove helpful, particularly to new growers. More specific information on the relative importance of the various pests and more detail on the economics of control measures will be available as the results of further trials come to hand.

RED-LEGGED EARTH MITE
*Halotydeus destructor* (Tuck.)

Rapeseed seedlings are highly susceptible to attack from red-legged earth mite, and will be killed or severely retarded by heavy infestations of this pest.

Seed treatment

Many growers favour seed treatment as a cheap, effective precautionary measure. At least 3 weeks’ post-germination protection can be expected, and by this stage the plant is well established. As an additional precaution against invasion of mites from surrounding pasture, a spray barrier of at least one boom width may be applied to such areas.

Methods and materials

Dimethoate at the rate of 12 fl. oz. 30% concentrate (Rogor) or 9 fl. oz. 40% (Diostop, Ridmite), or omethoate (Le-mat) at 20 fl. oz. concentrate, per 100 lb. of seed, may be used.

The method of mixing seed and chemical is as follows:

1. Place 100 lb. of seed in a cement mixer.
2. Mix one of the above chemicals with 1 pint of water and add gradually with the mixer in motion.
3. Add up to 1 pint of additional water to ensure that all the seed is moistened.
4. Run the mixer for a further 30 to 60 seconds to get rid of excess moisture.
5. Bag the seed and store under cover.

*NOTE: A respirator and gloves should be worn and the mixing done under well ventilated conditions.*

Treated seed should be sown as soon as possible, as any delay will result in a corresponding reduction in residual effectiveness of the treatment. Dry seeding will have a similar effect.

The above chemicals will be evaluated at various rates in Departmental trials this season.

Spraying

When seed has not been treated it may be necessary to protect the seedlings from established mite populations by spraying. As severe damage may occur before the crop is sufficiently advanced for foliage sprays to be used, pre-emergence DDT applications may be required. The non-persistent and systemic chemicals normally recommended are ineffective when applied to bare soil.

DDT applied at the rate of 16 fl. oz. 25% concentrate per acre shortly before the first plants emerge will give reasonable protection.

*Restrictions on the use of DDT*

DDT must not be used on pasture or fodder crops which are to be grazed by, or fed to, dairy cattle or stock being finished for slaughter.

In all other cases involving grazing animals a withholding period of 30 days should be observed after spraying.

DDT applied at the rate of 32 fl. oz. per acre to control both mite and cutworm in one operation.
CUTWORMS
*Agrotis* spp.

Cutworms are stout bodied caterpillars which vary in colour from pink to brown. A wide range of sizes is usually encountered, but mature caterpillars may be up to 1½ inches long. Characteristically they curl up and remain motionless when disturbed.

The caterpillars are active at night, attacking seedlings at, or just below, the soil surface. New shoots may be completely removed, leaving bare patches throughout the crop. During the day the caterpillars can be found in the soil an inch or more below the damaged plants or sheltering under surface debris.

In areas where cutworm are known to have been troublesome in previous years (especially on light sandy soils) the crop should be inspected regularly during the emergence and early seedling stages.

Where damage is confined to specific areas, control costs can be reduced by spot treatments.

**Treatments**

DDT at the rate of 32 fl. oz. of 25% concentrate per acre gives satisfactory control. Whenever DDT is used, great care must be taken to avoid the contamination of nearby pasture and fodder crops. Refer to the section on cabbage moth for alternatives to DDT.

A heavy aphid infestation which has caused many flowers to shed without forming pods. Seed yields may be greatly reduced if such infestations are not controlled.

APHIDS
Various spp.

Aphid infestations can be expected every year but with widely varying severity depending on weather conditions and natural enemies. The colonies of wingless aphids, clustered at the growing points of the plant, originate from winged individuals that fly into the crop from some outside source. Numbers increase rapidly during mild weather.

**Crop damage**

Heavy infestations at the early seedling stage will kill many plants. Outbreaks are likely to be most severe in seasons when mild temperatures allow breeding to continue into late autumn and early winter. The problem is increased if nearby weeds, such as wild turnip, or roadside rape plants are providing a ready source of infestation.

Although aphids may persist in crops for the whole growing period, numbers usually decline with the advent of colder weather. Activity increases as temperatures rise again in spring and serious outbreaks may occur at the pre-flowering and flowering stages. Yield reduction may result from flower damage and loss of plant vigour during this critical period. Yield losses from heavy infestations were substantial in Departmental trials last season. Further trials this season will attempt to define the best timing for treatments.

A moderate aphid infestation on rapeseed flower buds. Control may be necessary if weather conditions are such that insect numbers will increase rapidly.
Treatment

All heavy infestations should be treated, especially if they occur at the seedling or flowering stages. A moderate infestation, such as that illustrated, should also be treated if it occurs at the pre-flowering or flowering stages and weather conditions are such that an increase in numbers can be expected.

Demeton-S-methyl (Metasystox at 8 fl. oz. per acre) has given excellent results. This material gave better results than dimethoate (Rogor) in experiments last year.

CABBAGE MOTH

*Plutella xylostella* (L.)

The cabbage moth measures about $\frac{1}{2}$ inch across the expanded wings. It is greyish brown in colour with lighter markings which form a diamond pattern when the wings are closed.

The caterpillar of this small moth is a worldwide pest of rape and other brassica crops. It is usually light green in colour, up to 1 inch long and tapered at each end. When disturbed it wriggles and may drop from the leaf on the end of a silken thread. The caterpillar feeds between the upper and lower surfaces of the leaf, giving it a tissue-like appearance. Thin parts such as young leaves and flowers are eaten right through, producing a shot-hole effect, and severe infestations can result in plants being stripped of foliage.

Treatment

Cabbage moth attack may coincide with the presence of aphids and if both require treatment a combined demeton-S-methyl and DDT spray is suggested (8 fl. oz. cf Metasystox and 16 fl. oz. 25% DDT per acre). The possibility of economic control of both pests with a single insecticide will be investigated this season.

When moth control alone is required, DDT at 16 fl. oz. per acre is recommended, but certain restrictions apply to its use on crops that are to be grazed at a later stage (see insert on the use of DDT). Where residue problems are likely to arise the alternatives carbaryl (Sevin, Dicarban, Le-baryl, etc.) at 12 oz. of 80% wettable powder per acre, or trichlorphon (Dipterex, Klorfon) at 12 oz. of 80% soluble powder per acre, should be used. These should be regarded as minimal rates.

Long dry periods in winter encourage rapid development of this insect, and regular inspections of the crop at a number of different places should be made in order to assess damage and the development of an infestation. Immediate control measures should be taken if heavy infestations build up during flowering or podding.
EFFECT OF INSECTICIDES ON BEES

Many of the insecticides recommended in this article are lethal to bees. As flowering rapeseed crops are particularly attractive to honey bees, hives should not be left near crops during spraying operations.

RUTHERGLEN BUG

_Nysius vinitor_ Bergr.

These small, flying insects can be destructive to a variety of crops in dry weather when their food supply becomes short. Adult insects are slim and greyish in colour, about $\frac{1}{8}$ to 3/16 inch long, and rather like small flies. Immature bugs are shorter and a dark reddish colour.

They are sap suckers so that their effect on the crop is similar to that of aphids. However, the main concern so far has been the contamination they cause as they are harvested along with the grain. Although they are unable to damage harvested grain, their presence renders the grain unacceptable because of the possibility of oil taint.

Treatment

Some growers have solved the problem by attaching screens to headers, while others have obtained a clean sample by harvesting at night. These measures are more economical than spraying before harvesting. Also, due to the mobility of the insects and the incomplete kill obtained, spraying cannot ensure a clean sample.

Reasonable control of Rutherglen bug can, however, be obtained by using 10 fl. oz. 30% dimethoate (Rogor) per acre. Alternatively, the equivalent amount of the 40% dimethoate formulations Ridmite and Diostop may be used.

OTHER PESTS

Weevils

_Listroderes costirostris_ Schonh
_Desiantha_ sp.

The common vegetable weevil (_Listroderes costirostris_) and a smaller native weevil (_Desiantha_ sp.) have been associated with severe damage to rapeseed seedlings this season in southern districts as widely separated as Darkan and Jerramungup. The vegetable weevil (\$\frac{1}{8}$ inch long) is larger and more robust than the native weevil (3/16 inch long) and both have a pronounced snout, typical of all weevils. Both are greyish brown in colour, but the native weevil displays more colour variation and some specimens may be almost black.

Adult weevils are well camouflaged and are usually concealed in the soil or under surface debris during the day. They feed at night and are more easily located at this time. Damage this season seems to have been associated with light soils and retarded plant growth.

They are foliage feeders and damage can kill young and weak plants and leave bare patches throughout the crop. Stronger and more mature plants may survive with crescent-shaped sections missing from the leaves.

As emerging seedlings appear particularly susceptible and are easily destroyed, the crop should be watched closely during emergence, and treatment must be carried out as soon as damage is detected.

Sprays of 48 fl. oz. 25% DDT or 24 oz. 80% carbaryl per acre are suggested.

Cabbage White Butterfly

_Pieris rapae_ (L.)

This well-known pest was seen in rapeseed crops last season but it did not appear to cause serious damage. It can be expected to appear at about the same time as the cabbage moth and is controlled by the same sprays. In addition, methidothion (Ultraceide) can be used at the rate of 16 fl. oz. 40% concentrate per acre.

The cabbage white butterfly must not be confused with the much smaller cabbage moth. It is a large, conspicuous, white butterfly with dark smudges near the wing tips.

The mature caterpillar measures \$1\frac{1}{2}$ inches in length and is a velvety green colour with a faint yellow stripe down the back. The first indication of caterpillar attack is the appearance of large irregular holes in the leaves. Often the grey or green pupae can be seen attached by one end to the plant, supported by a silken band.
Cabbage Centre Grub

*Hellula* sp.

The centre grub starts its attack at the growing points of the plant and continues by tunnelling down the stem. This may result in stunted growth. The caterpillars are pale yellow with a number of brownish stripes along the length of the body. They are $\frac{1}{2}$ inch long when mature.

The insect has not caused much trouble locally, but it has been found in rapeseed crops and must be regarded as a potential pest. Sprays recommended for the cabbage moth should give reasonable control of this insect.

Native Budworm

*Heliothis punctigera* Wall.

This caterpillar attacks a variety of plants and may damage rapeseed crops at flowering and podding. It is not an important foliage feeder and usually concentrates on the fruit and flowers. The young caterpillar bores into the seed pod and eats out the entire contents. Its body is of uniform width and varies in colour from brown to pale green with a number of stripes of different shades. Fully grown, the caterpillar is about $1\frac{1}{2}$ inches long.

To date this potentially serious pest has not given much trouble in local rapeseed crops. It can be controlled with 32 fl. oz. 25% DDT per acre or with trichlorphon at the rate of 16 oz. of 80% soluble powder per acre or carbaryl at 20 oz. 80% wettable powder per acre.

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**DAMS AND TRICKLE SYSTEMS**

Laterals of trickle irrigation systems can be rolled up until next spring, leaving the orchard clear of obstructions which can hinder cultivation, mowing and spraying. The laterals can be stored alongside the mains or sub-mains of the trickle system, and they should be rolled up early in winter before weed growth makes their removal difficult.

Where mains and sub-mains are on the surface, farmers are advised to spray along them with a contact herbicide to make them visible and reduce the possibility of damage.

Farmers should also check that sand bag blocks placed in dam overflows last spring have been removed. Overflows are designed to deal with excess water and blocks left in during winter can cause the dam to be overtopped and the wall badly damaged.

Trickle irrigation systems, dam and roaded catchment construction are several aspects of irrigation and water conservation that will appear in the August *Journal of Agriculture*. 