Crop specific guidance – Pulses: Combining peas, Vining peas, Field Beans and Broad Beans.

The IPM Tool allows you to prioritise pests that are important on your farm. This helps guide decisions on which IPM measures are appropriate. Implementing IPM can result in 'trade-offs' where methods to control one pest may increase another. Some of these trade-offs are included in the notes below and in the Tool. Prioritising pests will help decide which pests are most important where there are trade-offs. This guidance documents provides advice on IPM measures for pulses insect pests and diseases. For information on IPM interventions for weeds, refer to the separate IPM Weeds guidance document.

Insect Pests

Insects in pulses cause damage to the crop either through direct feeding or through the transmission of viruses. For many years control has been virtually reliant on the use of insecticides. However, a reduction in available chemistry, primarily through legislation, and increasing resistance issues have necessitated the need to adopt integrated pest management.

Few of the non-chemical methods are likely to be 100% effective in pulse crops. However, they do reduce the requirement for chemical control. Combinations of one or more techniques are likely to be most effective. Also, in some instances the presence of some insect damage will not necessarily impact on yield.

Select low risk locations / Break crops

Some pests are relatively immobile, and numbers increase only when their host crop is grown too often in the same field. To limit the impact of bean weevils and pea aphids, sites where infestations have previously occurred should be avoided. Other pests such as wireworms have a long-life cycle so need the host crop to remain for several years. Growing alternative, non-host crops for appropriate periods can avoid this build-up. The length of the break may vary between pests.

In field non-cropped areas / Beetle banks / Diverse crop margins or strips

Beetle banks consist of stands of wildflowers and grasses and are designed to act as reservoirs of beneficial insects such as ground beetles and parasitoids, which help to provide natural biological control of pests including pea aphid and pea moth.

Diverse crop margins and strips act in a similar way to beetle banks to increase natural enemies. However, some of the plant species could benefit pests. More diverse strips should harbour greater biodiversity and greater numbers of beneficials. Ladybirds, hoverflies and lacewings are natural enemies of pea aphids, and the pea moth is attacked by four species of parasitic wasp.

Sowing Date

Late sown spring crops of peas and field beans can be more susceptible to damage caused by pea and black bean aphids as flowering is more likely to coincide with aphid migration into the crop. Also later sowing can delay harvest and may subject spring crops to summer drought stress at flowering. Winter

sown beans are less susceptible to bean weevil damage than spring beans, as their growth is more advanced when the weevils are active so they are better able to tolerate feeding damage. Pea moth are a risk to pea crops which are in flower or pod in June or July, therefore early or late-sown peas may miss the moth flight period and reduce the risk.

Early sowing or planting of spring crops, from late February onwards for spring beans and early March onwards for peas, can result in rapid plant establishment which in turn can increase the tolerance of the crop to pest damage and drought.

Early Harvest

The impact of bruchid beetles can be reduced by harvesting beans before they reach maturity. If the beans are allowed to mature, the beetle can complete its lifecycle and overwinter creating the potential for infestation in the following year. In peas, the pea moth can build large populations where plants reach full maturity. Unharvested green peas should be cultivated before the moth larvae can leave dried pods.

Bioprotectants natural substances

Majestik is a contact insecticide containing the natural substance maltodextrin approved for use on all edible crops and has been known to give some reduction of aphid numbers. Majestik can have adverse effects on non-target insects or other beneficials that are covered by the spray but has no residual effect.

Decision Support Tools (including thresholds)

IPM decisions should be made based on the results of monitoring and forecasting combined with threshold information where available. Treatment thresholds are the population level or density that must be reached before intervention becomes economically beneficial. Thresholds enable growers to make decisions based on the level at which pests will impact economic crop yield. They are essential in guiding pest control decisions and preventing the unnecessary use of pesticides.

Links are provided to appropriate decision support tools in the IPM Tool.

Planning pest management strategy

Planning the optimum non-chemical strategy for managing each pest can help to avoid 'fire engine' use of pesticides. Previous records of pest damage are very useful to help predict the likely timing of pest attack. Records should also be kept of the success of non-chemical pest control strategies.

Decision Support / Monitoring techniques

Pest monitoring is an essential component of integrated pest management. This can involve visual inspection of the crop or some sort of trapping system (e.g. water traps, sticky traps, or pheromone traps). Pest numbers are related to thresholds and decisions on the need for treatment. Pheromone traps are available for pea and bean weevil and pea moth.

Monitoring and forecasting of pest populations can ensure timely control. Monitoring of pests can be divided into three main principles: observation, weather, and correct identification.

Observation includes regular crop walking, noting populations of insects, weeds, or disease severity, recording crop damage and numbers of beneficial species seen. Using traps can help monitor insect populations

Weather is one of the main influences for pest development. Monitoring recent and forecast weather can help predict the impact that pests may have on the crops and prepare for timely control measures. Correct *identification* of pests can help prevent early outbreaks and is important for deciding on effective control measures. The use of pest ID information (see links in the tool) traps, local warnings, and professional advice from qualified agronomists can all help.

Diseases

Diseases impact on pulses mainly through reducing green leaf area and photosynthesises, and later disease outbreaks during flowering and pod set which can reduce yield and the resulting quality of the harvested peas or beans.

Field History, Rotation & Break crops

Crop rotations are crucial for peas and beans to reduce levels of disease pressure. A 1 in 5 years rotation is recommended to reduce levels of infection from diseases such as botrytis and downy mildew, and for bean rust at least 1 in 4 years rotation is recommended. Where pulses are grown in short rotations (1 in 3 years), this is likely to increase the build up of soil borne pathogens such as sclerotinia spp., fusarium spp., and pythium spp. (which can cause foot and roots rots), with a minimum 1 in 5 years rotation recommended.

Winter and spring crops of beans growing at the same time should be spatially separated and grown away from sites where beans were grown in the previous year to reduce infection by botrytis. In fields which are planned for peas, these should be suitably distanced from fields where there are existing high levels of leaf spot infection.

Spring beans rarely suffer yield losses from leaf and pod spot infections (*Ascochyta fabae*), as the main infection period is over the autumn to winter when air borne spores from infected crop debris are present which affect autumn sown beans. Leaf and pod spot infection can affect spring sown peas and delayed sowing can reduce the risk from infection.

Control volunteers & weeds

Pea and bean volunteers carry a range of diseases and are most significant as a 'green bridge' for powdery mildew, downy mildew, botrytis and bean rusts. Ideally volunteers should be destroyed prior to the emergence of new crops. Direct and non-inversion drilling increases the risk of disease transfer from previous crop residues and volunteers to the newly growing crop.

Seed testing

The use of certified seed is important for most crops to ensure that heavily infected seed stocks are not used and can be an effective approach to reducing some diseases. Seed testing of home saved seed should be used to identify common seed-borne diseases. In peas, farm-saved seeds should be tested against leaf spot pathogens to ensure disease-free material is planted.

Hygiene

This is the first defence against the introduction of soil-borne diseases into clean land, particularly for soil borne diseases like sclerotinia spp., fusarium spp., and pythium spp. Machinery used in infested fields should be power-washed before use in uninfected fields, and soil should at least be knocked off from boots and tools. Clean fields should be visited first in the sequence of crops so that cleaning down equipment can be done at the end of the day.

Primary Cultivations / Crop residue burial

Burial of crop debris by ploughing can reduce inoculum for some pathogens which produce inoculum on plant debris, which can be beneficial for pea and beans diseases including leaf and pod spot, downy mildew, botrytis and bean rust. On the negative side the use of ploughing can reduce soil biodiversity. Sclerotia can be deeply buried by ploughing but can remain dormant for many years and will germinate if brought into the topsoil by future cultivations. Sclerotia left on the soil surface can lose viability and reduce the sclerotia bank in the soil, and can form part of a minimum tillage strategy for control.

Varietal choice / Resistant varieties

Resistant varieties are a key part of non-chemical disease control. There are good sources of information on disease resistance to many of the major pathogens in the descriptive lists for combining peas and winter and spring beans published by PGRO. This information is updated annually to account for new pathogen strains which can infect previously resistant varieties.

Nutrient management / Avoid excessive N application

Crops which are nutrient deficient can be predisposed to disease infection. Ensure appropriate soil nutrient supply by regular soil sampling and testing and use of appropriate fertilisers. Excessive nitrogen will exacerbate mildew. Where excess nitrogen is used, crops are more likely to lodge or produce dense crop canopies and this favours these pathogens that develop under very humid conditions ie. botrytis, bean rust and sclerotinia stem rot.

Microbial bioprotectants

Contans® WG (*Coniothyrium minitans* strain CON/M/91-08.) is available to control sclerotinia in beans. Contans is applied by spraying the soil surface or crop debris following harvest of the previous crop and then incorporating the sprayed soil and/or debris into the upper soil layer prior to planting the crop.

Decision Support tools

IPM decisions should be made based on the results of monitoring and forecasting combined with threshold information where available. Treatment thresholds are the disease level or density that must be reached before intervention is required or economically beneficial. Thresholds enable growers to make decisions based on the level at which pests will impact economic crop yield. Decision support and disease monitoring tools are available for sclerotinia stem rot.

Links are provided to appropriate decision support tools in the IPM Tool.