

AJ & CI Snell, Windmill Farm

Tom Deards – Farm Manager

Windmill Farm is owned and run by company partners Anthony and Christine Snell, alongside Farm Manager Tom Deards who joined the farm in 2012. Of the whole 500 acre farm, 160 acres are used to grow soft fruit including blackcurrants, blackberries, raspberries, strawberries, red currants and blueberries. At peak times the farm can produce 75 tonnes of soft fruit a week, averaging 1,000 tonnes of strawberries per season. Ever-bearers are grown for their sweet taste and good quality.

The farm achieves such impressive production volumes through the use of polytunnels to protect the crop from UV, wind, rain and sometimes up to 400kgs of snow. Within the polytunnels, strawberries are planted at a density of up to 67,000 plants per hectare.



drainage. Foliar feeds are added to the crop, such as kelp early on in the season to create stronger roots. The foliar feeds also help to make the plants more robust.

Runners on the plants are taken off as they waste energy and attract powdery mildew and aphids. The runners are not used as propagation material, but clean certified plants are bought in each year. Outside the polytunnels there are rows of trees that have been planted to act as a windbreak. They also host a high amount of biodiversity, including beneficial insects which can help with pest control.



Every season, new, clean stock is bought in from Holland. The grow bags are reused for up to three seasons, for both environmental and cost saving reasons. At the end of their life, the grow bags are composted for a year before going into the arable rotation to be used as a soil improver or to be used as mulch on blackcurrants. The plants are grown on table tops in growbags, with eight litres of compost used for every five plants. The cocoa fibre mix includes 10% perlite, which maintains a good air flow and ensures that the plant does not get too wet through helping with root



Integrated Pest Management/Thrip Control

Tom Deards is a BASIS-qualified agronomist and the farm also uses a distributor agronomist and a Koppert employee who does regular crop walks. The farm believes that the Koppert visits are important to both parties and together they work out novel solutions to pest problems. Monitoring is a key part of the farm's IPM work and AHDB crop walker's guides are supplied to employees to increase their knowledge of and ability to identify pests and beneficials. The farm also has a local pest spotter that comes from Berry Gardens who produces a report each time and places pheromone traps throughout the polytunnels to help monitor pest species and numbers.

“The best tool on farm is a hand lens to identify pests, one of the biggest parts of IPM is monitoring.

You've got to predict everything. Having grown crops in this environment for a long time we have built up a history and knowledge. We have made mistakes, pests have beaten us and every year we have something that surprises us. It's about being vigilant; having crop walks and teaching staff about what to look for.”



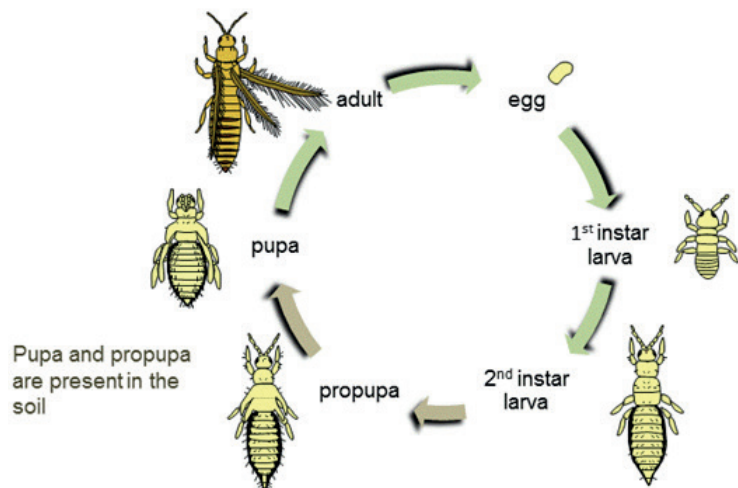
Background/lifecycle of thrip?

Thrips (*Thysanoptera*) are the farm's biggest pest challenge. Thrips cause distortion and bronzing, making fruit unsaleable as class 1. There is no chemical control for thrips so the farm relies on biological measures at different stages of the thrips' lifecycle. Strawberries are particularly susceptible to thrips, especially as they are grown over a long season. Thrips can move into the polytunnels at flowering when they are disturbed outside due to first cut silage right through to cereal harvest on neighbouring farms.

The first biological control introduced at the start of the season is ENTOMITE-M (*Stratiolaelaps scimitus*) which is effective against all thrips species. The beneficials are added to the soil because it is where thrips eggs are commonly laid and the lifecycle has a couple of instar stages that stay within the compost. Then they release THRIPEX-PLUS (*Neoseiulus cucumeris*) which eat the early stages of mites as they emerge. These come in breeder packs of 1000 and they are placed 1 pack every 2 metres. High numbers are needed to ensure good control of thrips at this early stage. Both these predatory mites can eat pollen as a food source so they can build up numbers in readiness should there be a rise in thrips numbers.

Every two weeks, an average of 15 mites a plant are added in, which equates to mites being added at least ten times a season and to 150 mites a season per plant, plus a breeder pack.

Thripor (*Orius laevigatus*) are also added which are a predatory bug on the nymph part of the thrip lifecycle. However, they are expensive to purchase.



There are other species of beneficial mites used throughout Europe but because they are not native to the UK they do not have approval to be used here.

Spider mites can also be a problem, more so in raspberries than strawberries, and beneficials called Spidex (*Phytoseiulus persimilis*) are used to reduce the prevalence. This beneficial is the only type of control for raspberries suitable for the climate and environment that is available to the farm. Spidex do not overwinter so every year they have to be reintroduced. The leaf to leaf contact of the plants allows the mites to move from plant to plant.

Vine weevil is controlled through watering nematodes onto the compost when the timing is right.

The farm also use monitoring traps outside the polytunnels for spotted wing drosophila (SWD) (*Drosophila suzukii*), a non-indigenous pest which has been found on the farm for the last five years. It is an invasive pest of soft and stone fruit crops and if left uncontrolled, can result in complete crop loss. Unlike the common fruit fly found in the UK (*Drosophila melanogaster*), which is only attracted to ripe and overripe fruits, SWD is attracted to under ripe fruits and therefore finds its way into fruit crops both before and during the harvesting period. The farm monitors for SWD using traps from Berry Gardens that hold a cider vinegar mix. These attract the flies which fly in and drown. The flies can also overwinter locally in hedges.



Aphids are not currently a problem on the farm, which Tom puts down to the presence of hover flies, parasitic wasps and ladybirds. They also use chemistry early on in order to avoid a build-up of aphids.

“You have to trust yourself. You can get advice, there is the knowledge out there – don’t be frightened to ask.”

Weed Management

Underneath each row of plants in the polytunnel grass is grown. The grass between the plants is cut regularly to keep the humidity stable and makes it easier for pickers to access the fruit with a trolley. The grass is managed with a mower rather than herbicides. However, if there was bare soil between the rows, the water would just run off, although some farms do have gutters to collect the runoff. Whilst having grass present increases the risk of powdery mildew, due to the warm and humid conditions in a polytunnel, the addition of bio fungicides means that the chance of powdery mildew occurring is less. If the control strategy is wrong you may get mildew, which is more commonly found on strawberries.

Fungal diseases: for raspberries, botrytis and sooty mould (*Cladisporium*) cause issues for the farm. Sooty mould occurs if the weather is damp and raining, making the plants ‘sweat’ nectar, attracting the mould.

Fungal diseases are combatted using biofungicides: Serenade (*Bacillus subtilis*) in all the soft fruit crops and Prestop (Glastoclaylant) and AQ10 in the strawberry crops. These chemicals are used at an approved time.

If weeds appear in crops, they are not picked by the pickers. The pickers keep their hands clean for berry picking only and the weeds are taken off by specific employees.

POLICY ASKS

- Some chemical armoury is still needed for those pests without a biological control
- Policy should seek to deliver measures that provide the double benefit of productivity gains that are also positive for the environment.

Use of Pesticides

The farm has used Tracer® containing the active ingredient Spinosad through an emergency 120 days approval. However, the chemical armoury is diminishing because it is difficult to obtain emergency authorisations to control pests, especially SWD, and resistance to certain active ingredients is developing.

The farm do not introduce predatory mites early on due to cold temperatures and are therefore able to use chemistry initially, which will degrade and the farm will then be able to introduce biologicals at a safe withdrawal time. The farm wants to avoid chemical use and use biological methods wherever possible and where chemical intervention is required, go for the most benign chemical first.

Challenges & Benefits

Both positives and negatives have arisen with the IPM practices being carried out on farm. The farm spend on biologicals is now higher than chemicals, at roughly 50% of costs, with ag-chem spend at roughly 20% and biofungicides at 30%. Whilst the biologicals cost more, the spend benefits the farm economically because if the farm has to stop picking a crop due to a pest it can be devastating, so the biologicals are another tool to ensure the crop can get to market.

Waste on the farm can be a challenge and occurs due to cold weather, insect damage, mildew, botrytis and misshapen fruit. The farm does its best to mitigate misshapes through climate control and reduces pest problems through chemical and biological controls. The waste percentage varies based on the growing system and variety, but if a crop goes wrong and the waste is around 20% of the crop it becomes damaging economically.

“The beneficials are working 24 hours a day.”

Overall the benefits are: yield increases, less wastage and a better footprint in terms of residue. The yield potential and berry quality has also improved due to plant breeding and improved genetics.

There is a good range of biological control options for the pests that are a problem to the farm, except for Capsid, a tarnished plant bug that causes misshaping, and SWD. The farm is aware of Capsid levels and if they need to they have the option to use a short persistency insecticide, such as an organic pesticide like pyrethrum. However, the approval for this may soon be lost and there is no biological solution to capsids. It is also difficult to control downy mildew on blackberries outside, and apart from foliar feeds the farm cannot do much to prevent it.

“If we don’t get the IPM right, it can be devastating.”

FOR FURTHER INFORMATION:

<https://www.ajandcislennell.co.uk/>

<https://www.windmillhillfruits.co.uk/>

<https://youtu.be/ue57Xv2bwrw>

[Koppert](#)

[crop walker’s guides](#)

[Berry Gardens](#)

[Link to biological pest management to ensure healthy crops poster](#)

[Link to Bill Goss vine weevil case study](#)

<https://horticulture.ahdb.org.uk/publication/0617-management-and-control-spotted-wing-drosophila>

[Link to biological pest management to ensure healthy crops poster](#)

<https://horticulture.ahdb.org.uk/download/3074/file>

<https://horticulture.ahdb.org.uk/biocontrol-videos>

[Approved time](#)

<https://assurance.redtractor.org.uk/contentfiles/Farmers-5320.pdf>