



Cultivation manager Jack van Wingerden proudly presents the nursery's main product, the white *Dendrobium*.

IPM draws attention to new pests such as mealybug

“Fascinating how lacewing larvae grab mealybugs with their pincers”

The Netherlands-based Van den Bos family specialised in cut freesias for many years. Seven years ago they started growing *Dendrobium nobile* in a renovated tomato greenhouse next to their nursery, and an extra greenhouse for pot *Cymbidium* is set to come on stream next year. The growers are planning to switch gradually to “exclusive” orchids. This year they introduced integrated pest management in response to customer demand. The downside is that new pests such as mealybugs are starting to appear.

Bos Orchids & Flowers in Poeldijk is 6.8 hectares in size. Of that, just under two hectares are already being used to grow *Dendrobium nobile*, an epiphytic orchid originating from Asia. There are only three growers in the Netherlands growing this special plant, which produces flowers at almost every leaf axil. Bos produces an average of 18,000 units per week.

At present, more than 80 percent of their plants are white. The main variety is ‘Apollon’. “We also have some colours,” says junior cultivation manager Jack van Wingerden. “At the moment we are growing three varieties under licence from a breeder originating from Japan. We are looking for healthy, strong varieties in more colours. We are also working with Floricultura to take our range to the next level. Colours are generally more susceptible to pests and diseases. They secrete sugars which attract pests like mealybugs.”

Four growth phases

Floricultura propagates the plants for Bos from tissue culture. When the plants arrive at the nursery they are two years old and have been topped three times. After that, it is at least another 45 weeks before the fastest growing varieties leave the nursery as flowering plants.

Cultivation is divided into four phases: propagation, a short day phase, a cooling

phase for flower bud induction and the roughly six-week finishing phase in which the flowers set. The plants are grown at a temperature of above 24°C, except during the cooling phase when they are kept at 18-20°C during the day and 14°C at night.

Next year the company plans to build another 1.5 hectares and add pot *Cymbidium*s. The area under *Dendrobium* is also growing at the expense of the Freesia area. Eventually the brothers Teun and Willem van den Bos want to switch over completely to orchids. “They are aiming to become the best ‘other’ orchid grower in the Netherlands and Europe,” says the young cultivation manager, who relishes a challenge.

New pests

Bos Orchids started using integrated pest management (IPM) a year ago. Van Wingerden: “There are two reasons for this. Firstly, the package of crop protection products currently available

isn't enough to control the main pest, thrips, and secondly, customers no longer want plants treated with the neonicotinoids Gazelle, Admire or Actara. When we used Actara to control thrips it dealt with secondary pests like mealybugs at the same time. Now that we have stopped using this product and use predatory mites instead, mealybugs are a problem in the crop."

Mealybugs have always been difficult to control. The males can fly. The fertilised females crawl into the leaf axils in the top of the plant and lay clusters of eggs in an egg sac. They protect themselves with a water-repellent woolly coating. The hatched young, known as "crawlers," spread onto other plants, where they develop into adults. "We have 50 plants per square metre, so they spread like wildfire," van Wingerden says.

Mealybugs occur in all production phases. After the short day phase the plant becomes tougher and less susceptible to pests. The bugs have a preference for the plant's growing tips.

Scouting

Van Wingerden spends two hours a week scouting among the Dendrobiums. He mainly checks the tops of the plants and the young shoots for possible infestations. "You only notice them once there is damage. We throw the worst affected plants away, but that's only around 500 a year. The rest we treat with lacewing larvae. When I find a plant with mealybugs, I break off the young shoots and mark the plants with red signs so that we can keep a close eye on them as they are growing."

Van Wingerden taps into his network for this. He met Marvin Koot of Biobest in De Lier when he was off duty – playing football. They are now working on IPM at the Van den Bos brothers' nursery together.

Mealybug research

Controlling mealybugs is one of the specialist nursery's top priorities. There are five different species that cause problems in greenhouse horticulture. The nursery has been researching these pests for some time. Crop protection consultant Marcel Verbeek: "They were already a problem in Ficus 15 years ago. With the disappearance of chemicals and customers demanding 'clean' products, mealybug infestations will only increase. First we ran a



Lacewing larvae are mainly intended to be used curatively.



Jack van Wingerden (left) is happy with consultant Marcel Verbeek's expertise and experience.

lot of trials with parasitic wasps. It turns out they are selective. Plus they aren't a commercially viable option for growers as you need them in such large numbers. The predatory beetle *Cryptolaemus* did a good job, but they are very sensitive to chemicals and they are expensive."

Lacewing larvae came onto the scene six or seven years ago, originally for aphids. They were also found to perform well on mealybugs, spider mites and thrips. "Back then we only sold them in packs of 1,000. But now that we have optimised our breeding methods, we can now also supply them in buckets of 10,000 at a reasonable price," Verbeek says.

Real firefighters

Lacewing larvae (*Chrysoperla carnea*) have great potential in the fight against mealybugs. Verbeek shows a short video and some photographs showing a larva, which looks like a ladybird larva with large jaws, attacking a mealybug.

"It's a fascinating sight to see how it devours the mealybug with its pincers," van Wingerden agrees. "They are actually nocturnal creatures, but you can still see them diving straight into the top of the plant and eating up the mealybugs. When you compare that with chemical control, they get much better results. The chemicals don't reach the mealybugs that are hidden away."

Verbeek sees lacewing larvae as real firefighters. "They are mainly intended to be used curatively. We recommend using them at the seat of the fire." Because the larvae almost never develop into adults, Biobest is continuing its research.

Strategy in Dendrobium

For now, Bos Orchids is very happy with the product. Depending on the size of the infest-

ation, van Wingerden orders a can of 1,000 or a bucket of 10,000. He divides up the larvae from the bucket into coffee cups, which he sets out in various places. This works well for the staff. All they need to do is put them out and they can forget all about spraying times.

One thing the cultivation manager has noticed is that the lacewing larvae don't eat all the mealybugs but only around 90 percent of them. "They leave some behind for their offspring, so to speak. That's why we haven't moved away from chemicals completely."



With the disappearance of chemicals, mealybug infestations are on the rise.

Summary

Bos Orchids switched to integrated pest management in spring 2018. Cultivation manager Jack van Wingerden uses natural predators against the various pests. Mealybug is a new problem in Dendrobium that has been on the rise since they stopped using chemicals that also worked on mealybug. Specialists have been trialling biological controls for years and have found lacewing larvae to be an effective predator. But as they don't eat up everything, research into new options continues.