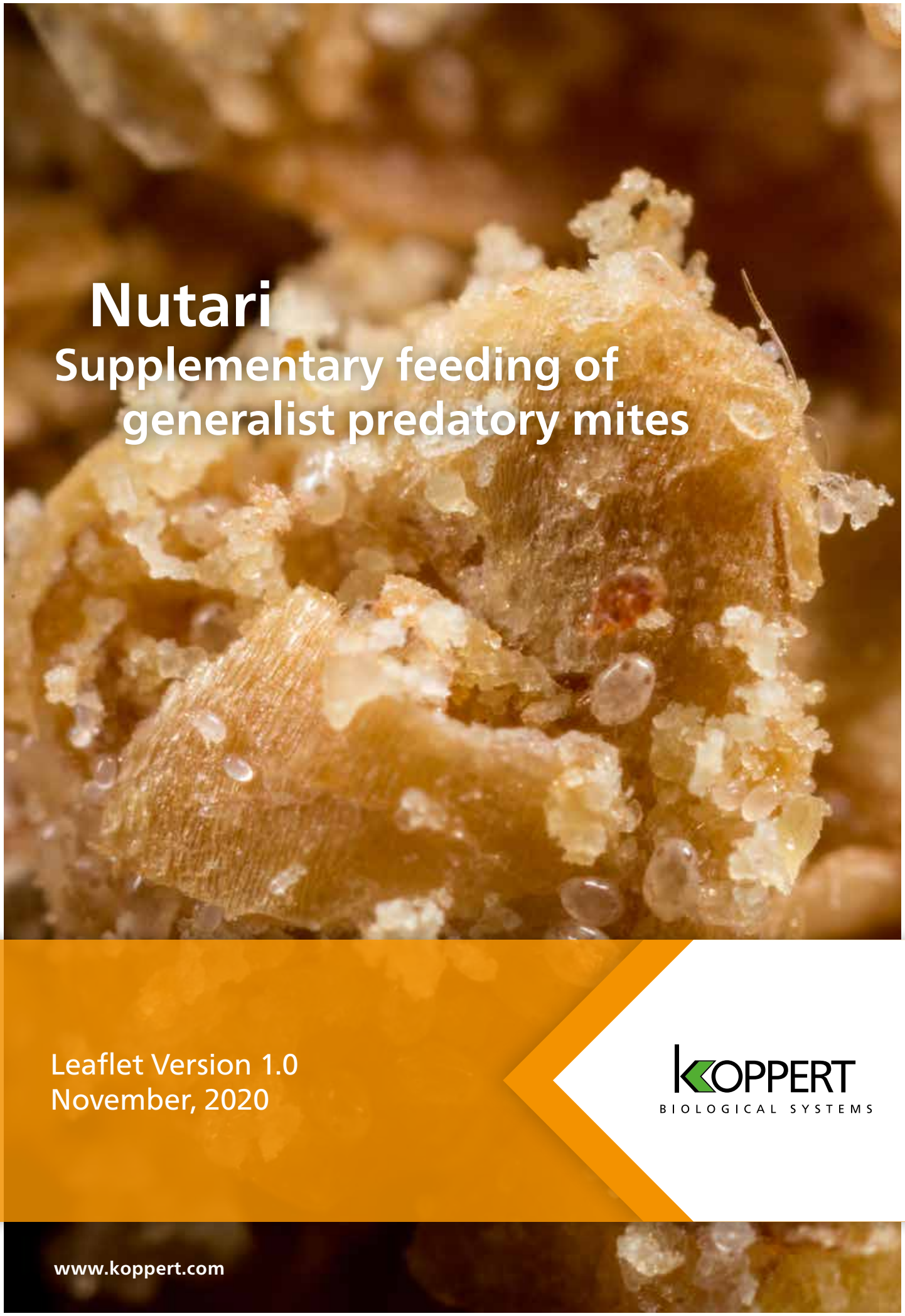

Nutari

Supplementary feeding of generalist predatory mites

Leaflet Version 1.0
November, 2020

KOPPERT
BIOLOGICAL SYSTEMS

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Introduction

Supplementary feeding is the application of food for natural enemies in the crop to improve biological control. In case of predatory mites, examples of supplements are prey mites, pollen, *Ephestia* eggs and *Artemia* cysts. Advantages of supplementary feeding are:

- Establishing a population of predatory mites before the pest is in the crop;
- Achieving larger and more stable populations of predatory mites that persist longer in the crop;
- Better pest control
- The frequency of natural enemy applications can be reduced.

Fig. 1. *C. lactis* on carrier material

In this leaflet we provide details about the use of the prey mite *Carpoglyphus lactis* as supplementary food for generalist predatory mites.

Advantages of using *Carpoglyphus lactis* as supplementary food for generalist predatory mites

The mite *C. lactis* (Fig. 1) is used as prey in the mass-rearing of most generalist predatory mites produced by Koppert. It has several characteristics that make it a good supplementary food source for generalist leaf-inhabiting predatory mites.

- The predatory mites can complete their life cycle and multiply when feeding on it;
- It is not a pest and does not cause damage to the plant;
- It has no or only a very slight positive effect on pests (far less than pollen);
- It is readily available in large quantities and stable quality;
- It can easily be applied;
- It increases predator numbers by 300-500%;

FAQ on the use of *C. lactis* as supplementary food

For which predatory mites does it work?

All our generalist leafinhabiting predatory mites: *Amblydromalus limonicus, Amblyseius swirskii, Neoseiulus californicus, Neoseiulus cucumeris, Transeius montdorensis.*

In which crops does it work?

We expect supplementary feeding to work in all crops where the predatory mites can establish and climatic conditions are suitable for predatory mite and prey mite survival. So far good results have been achieved in chrysanthemum, roses, citrus, courgettes, cucumber, eggplants, grapes, strawberries and sweet pepper.

Where to apply?

It is important that the prey mites land on the leaves. They can be released by sprinkling on the leaves (by hand or with an Air(o)bug) or by making small heaps on leaves. When making heaps, it is possible that yellow to brown spots appear on the leaves. This damage is caused by the diet for the prey mites contained in the product, not by the prey mites themselves.

How frequently?

To achieve a good establishment of the predatory mites, prey mites should be applied frequently. To let the predatory mite population grow, weekly releases are recommended; for fast growth of the phytoseiid population more frequent releases are necessary. When the desired phytoseiid density is reached, the frequency can be reduced.

What dose?

The release rate depends on the density of predatory mites you would like to have in your crop. We generally advise to release 1000 prey mites per m^2 mite weekly.

How long to continue?

The supplementary feeding should be continued as long as you need predatory mites in the crop. Do not stop when pests appear.

What is the effect?

In our experiments, we got on average 3-5 times more predatory mites with supplementary feeding *C. lactis* than without. The biocontrol effect of both curative and preventive strategies improved with supplementary feeding.

Are there disadvantages?

The *C. lactis* product may have a very slight positive effect on pests (but far less than pollen). Large quantities of the product may cause some phytotoxic reaction in the leaves and in certain crops the residue of the *C. lactis* product may not be acceptable (e.g. some potted plants).

Example of the use of *C. lactis* - vegetables

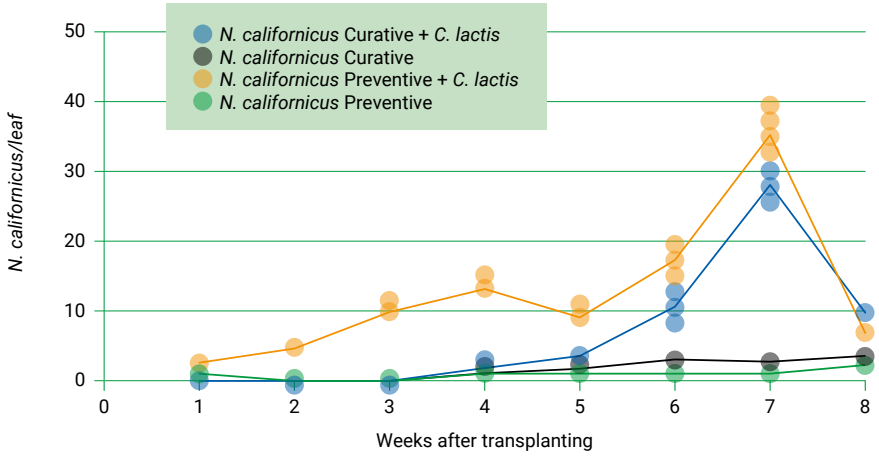
Cucumbers in Spain

In a cage experiment at Koppert Spain, we compared the control of two-spotted spidermites (*Tetranychus urticae*) with preventive and curative releases of *Neoseiulus californicus*, and with and without supplementary feeding with *C. lactis*. In all cases 50 T. urticae per plant were released in week 4. In the preventive approach, 25 *N. californicus* were released per plant in week 1, whereas the same numbers were only released in week 5 in the curative approach. 2000 *C. lactis* per plant were released weekly from the introduction of the predators until the end of the trial. With preventive as well as with curative releases, the spider mite control was much more effective with supplementary feeding than in cages without *C. lactis* application (Figs. 5 & 6). The preventively released *N. californicus* established well on the *C. lactis* provided as supplementary food. The population reached up to 35 predatory mites per leaf and provided excellent control of the spider mites, which failed to establish.

Similarly, the curatively released *N. californicus* quickly developed a high population when supported by supplementary feeding and provided good control of the spider mites (Fig. 6).

The preventive approach with supplementary feeding was better than the curative approach with supplementary feeding as it completely prevented spider mites to develop, whereas in the curative approach even with supplementary feeding the spider mite population initially grew and was only controlled after a few weeks.

Fig. 5. Cucumber plants at the end of the trial.
Left: preventive approach with supplementary feeding, right: untreated control



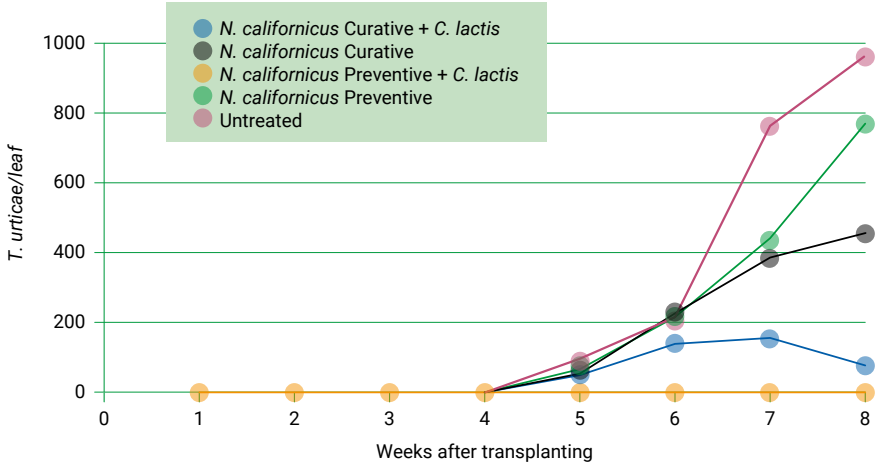


Fig. 6. Development of the *N. californicus* and *T. urticae* populations in cucumber with and without supplementary feeding. Different letters next to the treatment names indicate significant differences between the treatments.

Disclaimer: The information contained in this sheet is based on the current knowledge. New research might lead to new insights. The leaflet will be updated regularly.