

# SAUTTER & STEPPER

## A Company With Tradition for Over 35 years

SAUTTER & STEPPER has existed since 1985. From the beginning on our company's main goal is to produce and establish beneficial insects as biological pest control. Starting with the production of *Encarsia formosa* and *Phytoseiulus persimilis*, *Neoseiulus barkeri*, *Neoseiulus cucumeris* and others followed very soon. After realizing the capability of *Chrysoperla carnea* larvae, production started in 1991. Since then, our main focus has been set on breeding *Chrysoperla carnea*. New ways of application and possibilities of packaging had to be found. The multicell was a revolutionary idea preventing cannibalism by keeping each



Bird's eye view of the production



Bird's eye view of the production

hungry predator with food in a single compartment. Therefore, handling and shipping has become very easy. We work hand-in-hand with national and international companies. In the meantime, SAUTTER & STEPPER have a distribution for over 60 beneficial insects, completed by monitoring systems, grow supplies and more, but never lost the focus on *Chrysoperla carnea* and

*N. barkeri*.

Member of



# Chrysoperla Carnea Larvae as Biological Pest Control



*Chrysoperla carnea* larva stabs an aphid

All three larval stages are well established as biological pest control, because they play an important role as natural enemies of arthropod agricultural pests worldwide, including aphids, mealybugs, whiteflies, mites, thrips, small caterpillars, and other arthropods, as well as eggs of pest insects. They accept nearly any prey as long as it is not too flat-bodied like Coccidae. With their sickle-shaped mouthparts, *Chrysoperla carnea* larvae stab their prey and inject

enzymes to liquify the body contents making it easier to suck out the body liquids (extra-oral digestion). In resemblance of an up to eight millimetre long alligator, they are even called aphid lions because of their extreme effectiveness.

*Chrysoperla carnea* larvae are not only generalist predators – another additional benefit is the resistance to multiple classes of insecticides. Furthermore, they are independent of light intensity and length of day. This makes them very attractive as pest control in conservatories, interior landscaping and for field grown cultivation for horticultural, ornamental or fruit and vegetable crops. Neither the humidity nor low temperatures (5-8°C) affect their activity. *Chrysoperla carnea* larvae can be introduced to cultures almost all year long.

## Chrysoperla Carnea Products Offered by SAUTTER & STEPPER

Depending on the customers demand and country of origin, we offer different products with different stages of *Chrysoperla carnea* and different application methods.

### Products with *Chrysoperla Carnea* Eggs



Packaging of *C. carnea* eggs

Because of their small packaging volume and low weight, the eggs of *Chrysoperla carnea* can easily be shipped chilled as loose material without additional substrate in a small cardboard tube and are a fairly economical method. They can be applied directly and evenly on leaves by hand or by adding a carrier material with a leaf blower. It is up to every customer to produce their own products



Fresh lime-green *C. carnea* eggs

with the *C. carnea* eggs from SAUTTER & STEPPER.

Another easy-to-use product is the ChrysoCard. Each little cardboard hanger has glued on lacewing eggs and food. These are as easy to ship because of the low weight and volume. They can be delivered with a unique branding on the cards depending on the regular ordered amount of ChrysoCards. When placing the small hangers directly on any plant, the freshly hatched larvae can start eating the prey right away.



ChrysoCards

## Products with *Chrysoperla Carnea* Larvae



Multicell with 500 Larvae ("MC 500")

The most important aspect when shipping larvae is that they are active cannibals. To prevent cannibalism during transport, the larvae either have to be separated from each other or need a lot of carrier material. Therefore, a multicell cardboard was developed. Each larva has its own little compartment with food and can't attack siblings. Each multicell contains approximately 500 larvae. Applying by hand by opening row-by-row, it is an ideal product for pest hot-spots or smaller areas. The shipping volume and weight is rather low compared to the larvae in buckwheat spelts.

The larvae in buckwheat spelts are easy to apply, especially for bigger cultivable acreage. The larvae are supplied with food so they can survive transport to the end customer in the highest quality. They can be applied directly to the plants or by using "BioBoxes". These little cardboard boxes with side openings, filled with the larvae in buckwheat spelts can hang on branches for the larvae to crawl directly to their meal. This application method is suitable indoors and especially outdoors because the BioBox offers protection against environmental influences.



Packaging of all *C. carneae* products

Overview of the important product characteristics:

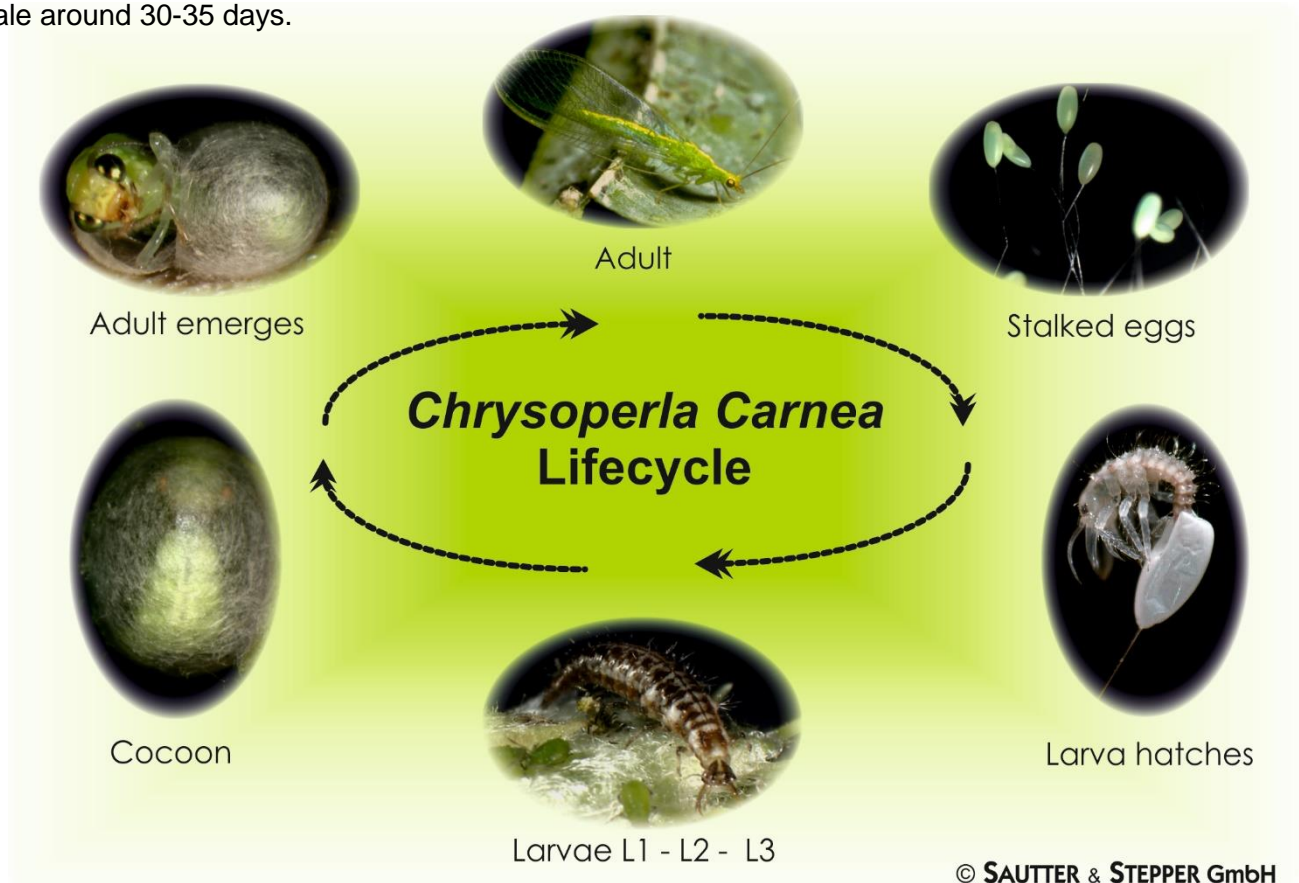
Characteristics	<i>Chrysoperla Carnea</i> Eggs		<i>Chrysoperla Carnea</i> Larvae	
	Loose Eggs	ChrysoCards	MC 500	Buckwheat
Transport Tolerance	High, with Cooling	High	High	Medium
Packing Volume	Very Low	Low	Medium	High
Weight	Very Low	Low	Low	Medium
Carrier Material	None	None	None	Buckwheat spelts
Application	Leaf Blower, by Hand	By Hand	By Hand	Leaf Blower, by Hand, BioBoxes

# Facts about the *Chrysoperla Carnea* Biology

## The True Allrounder of all Beneficial Insects

The green lacewing (*Chrysoperla carnea*) belongs to the large family Chrysopidae and therein to the subfamily Chrysopinae. It is one of the most extensively studied insects and well established as alternative or complement to pesticides in integrated pest management programs worldwide.

Their lifecycle includes seven stages: egg, three larval stages, prepupal instar, pupa and adult. The three instars hardly differ from each other and are the only important Stages for being used as biological pest control since they live as predators. The adults however, eat pollen, nectar, and honeydew. At the age of four to ten days, adults start to lay eggs. A single female adult lays in total several hundred eggs underneath leaves or near prey either in clusters or a single egg. To prevent cannibalism after hatching the eggs are on one-centimetre-long slender stalks. During the three to thirteen day egg period (depending on temperature), the colour turns from lime green to olive green to dark brown up to white after hatching. The larvae grow in three stages up to six weeks depending on temperature and food supply. Coming to the end of the third larval stage, they stop with the food intake and pupate by spinning a cocoon. After five days, an adult lacewing emerges, immediately begins mating and the life cycle starts again. The adult female lacewing can live up to 60 days; a male around 30-35 days.



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