



Blossoming cabbage fields help beneficial insects

Cabbage crops are susceptible to pests. FiBL is investigating a new approach: putting flowering plants that attract and provide nectar for beneficial insects between the cabbage fields. The nectar of flowering companion plants such as the cornflower attracts parasitic ichneumon wasps, whose eggs and larvae destroy the pests. And the flowers look really pretty, too.

Organic farming denotes biodiversity, as numerous international scientific studies show. In comparison with their conventional colleagues, organic farmers do significantly more to benefit biodiversity. Depending on their altitude, organic farms have between 46 and 72 percent more near-natural land and are home to 30 percent more species than farms not managed organically. As a result of the lower intensity of cultivation and the greater proportion of near-natural land, many rare and endangered plant and animal species occur on organic farms. Encouraging biodiversity remains one of FiBL's key research topics.

Up close among the pests

Biodiversity is not just important for its own sake; it is also useful, for example in pest control. Various species of ichneumon wasp lay their eggs in or on the bodies of pests; the larvae then develop at the expense of the host insect and destroy it. "We have clear indications that deliberately planted wildflower belts not only bring about a significant increase in general biodiversity – they also increase the parasitization rate of pests. They can thus prevent crop failure and reduce the use of plant protection products," explains Oliver Balmer, coordinator of the FiBL biodiversity projects. However, the effect of the wildflower belts falls sharply with increasing distance.

For this reason the researchers are going a step further. "With suitable plants sown right in among the crop, beneficial insects will be attracted as close as possible to the pests." In this way pest numbers should continue to fall.

Laboratory tests are being carried out to find out which plant species best encourages the parasitoids. Among the favourites are cornflower (*Centaurea cyanus*), common buckwheat (*Fagopyrum esculentum*), common vetch (*Vicia sativa*) and bishop's flower (*Ammi majus*). Cornflowers are being sown in field trials on Swiss organic farms. The aim is to discover which parasitoids occur and how often, and how companion plants encourage their occurrence and their parasitization effect. In order to determine which species are involved and the parasitization rate, FiBL is carrying out DNA analysis (polymerase chain reaction, PCR) in its own molecular laboratory.

The initial results show that pests in areas with cornflowers were indeed more heavily parasitized than in areas without flowers. Thus the cornflower is contributing to enhanced natural pest control.

Further field trials have already shown that companion plants in cabbage fields do not harm cabbage growth or yield; this is a key issue for farmers. When harvested, cabbages from the areas with companion plants weighed on average the same as those from areas without companion plants. Suitability for practical use seems assured.

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① The ichneumon wasp (*Microplitis mediator*) lays its eggs in the caterpillar of the cabbage moth (*Mamestra brassicae*). Parasitized caterpillars cause less feeding damage to cabbage leaves. ② PhD students Céline Généau (left) and Élodie Belz breed cabbage moths and ichneumon wasps so that they can carry out specific tests. ③ They use laboratory tests to find out which flowers are preferred by ichneumon wasps but avoided by cabbage moths. ④ The cornflower (*Centaurea cyanus*) has proved particularly valuable. ⑤ There was significantly more frequent parasitization of cabbage moth larvae in the cabbage fields with cornflowers than in those without cornflowers.