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Taifun Soy Info

Taifun Zentrum für Sojaanbau

Specialist information for soy producers and processors

Bugs in soybeans

Soybean pest bugs: known across the globe, but only becoming an issue in Central Europe with the introduction of new species

Some bug species have a great preference for legumes. Worldwide, bugs are the most important insect pests in soybeans. In Brazil alone, seven species are classified as yield relevant. After the introduction of two invasive bug species, reports of massive bug infestation in soybean have been getting more common in Germany in the last years.

We have investigated which species occur, to what extent yield relevant damage is to be expected and how insects are dealt with in the large growing regions.

Bugs as insect pests

The order of true bugs (Heteroptera) comprises about 40,000 species worldwide with a very large variety of forms. Among them there are several distinct beneficial insects as well as a few pest insects. The latter mostly feed by sucking sap. Enzymes are released into the plant which, in addition to the loss of sap, contribute to the damage. Similar to aphids, pest bugs are often vector of viruses; the sucking points also form entry points for fungal diseases. Especially in the cultivation of fruits and vegetables, defective appearance resulting from a pest bug can cause great economic losses.

In the case of soybeans, the late vegetation period of the soybean plants can lead to an immigration of bugs from harvested neighbouring crops. In recent years, this has led to extremely high infestations in some regions. However, as these events usually only occurred when the pods were maturing, no significant damage could be observed.

A strong bug infestation before ripening certainly has an effect on the soy yield. Picture source: Jürgen Recknagel, LTZ

Several bug species have a great preference for legumes. For example, there are many reports of damage to bush beans when the pods are damaged at pod filling. The suction point itself is usually barely visible. In soybeans the damage often shows as single insufficiently developed grains in the affected pods.
Seed quality can also be significantly affected by bug infestation if the infested grains do not mature properly.

It was suspected that bugs can trigger the "Green Stem Syndrome", sometimes also referred to as the "Stay Green Syndrome", in soy. However, this could not be confirmed. Apparently, the bug enzymes can lead to delayed ripening of stems and leaves, but this often also occurs without bug infestation.

Which bug species like soybeans?

Bugs are very mobile, and many bug species are generalists. Accordingly, several species can be found in soybeans. Among the indigenous species, the green shield bug (*Palomena prasina*) and the European tarnished plant bug (*Lygus rugulipennis*) are found in soy.

Native generalist, which can occasionally be found in soya: adult summer form of the green shield bug. Picture source: Wikipedia

In rare cases, the European tarnished plant bug can occur massively in soy stands. Picture source: arthropodafotos.de

However, the recently observed regional mass infestation, which raised the question of the damage potential of bugs in soy, was mainly caused by the newly introduced species "southern green stink bug" and "brown marmorated stink bug". Contrary to previous assumptions, they survive by finding protected hibernating spots even in regions where the average temperature in January is below 5°C.

The different developmental stages of bugs can give the impression that different species are involved in the infestation. Depicted are three stages of the southern green stink bug.

Southern green stink bug (*Nezara viridula)*

The southern green stink bug, also known as southern green shield bug or green vegetable bug, originates from East Africa. From there it has developed into an important pest of various crops worldwide via trade routes. In Brazil, as in the USA, it has been a significant soy pest for a long time. In Germany, the species was first introduced in Cologne in the 1970s. In the Upper Rhine region, it has been spreading rapidly for about 10 years and has become a feared pest in fruit cultivation.

By now it can be found in many other regions, but so far with much lower population densities than in the climatically mild Upper Rhine region.

The LTZ has published a good general description of the southern green stink bug: http://www.lallf.de/fileadmin/media/PDF/ps/themen/Nuetzlingstagung_2016/2016_11_30_Zm_Reiswanze.pdf

Image of the southern green stink bug. The three white dots on the front of the back shield distinguish them from the native green shield bug.

In some regions no longer a rare sight: mass infestation of soy by the southern green stink bug. Pictured is the third nymph stage.

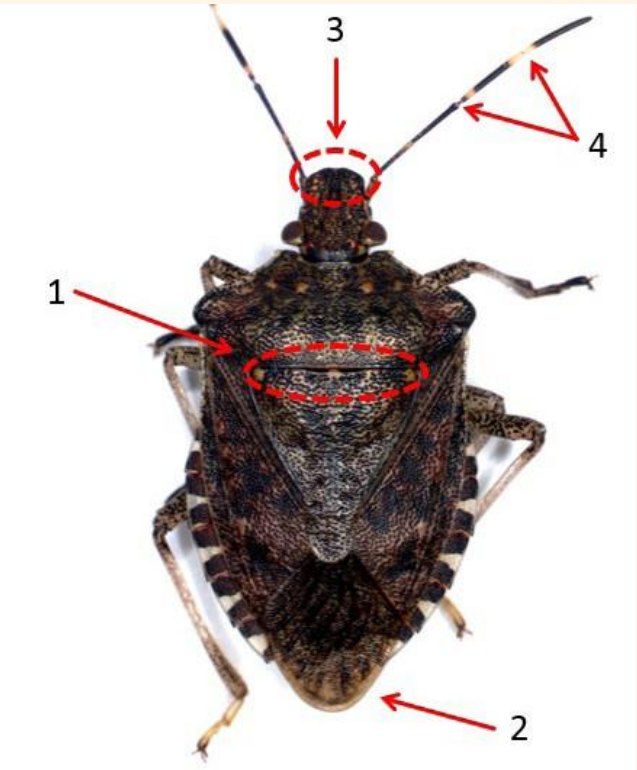
Brown marmorated stink bug (*Halyomorpha halys)*

The brown marmorated stink bug was introduced to Germany from Asia only a few years ago. Yet is has already established itself in several regions such as the Lake Constance and the Upper Rhine region, but also in climatically cooler areas. The brown marmorated stink bug sucks on foliage and fruits and has more than 200 known host plants around the globe, including stone and soft fruits, pome, vegetables, corn or soy. Depending on climate and food supply, populations develop regionally either faster (e.g. in northern Italy, where massive damage to pears, peaches, apples, hazelnuts, maize and soy has been reported) or slower (e.g. in Switzerland). In winter, the animals are often found in houses, where they are harmless for humans, but give off an unpleasant odorous substance when disturbed.

Optically, it resembles the indigenous mottled shieldbug, but is distinguished by the black spots on the wing cover and the underside as well as a thorn on the underside.

The brown marmorated stink bug is about 15 mm long and shows four to five bright dots behind the neck shield (1, figure) and a transparent wing cover interspersed with lines (2, figure). On the flat, rounded head there are two edges (3, figure) and a light band on the last antenna elements (4, figure).

It spreads rapidly, especially since, unlike in its Chinese habitat, it has few natural enemies. In the United States the tree bug was introduced earlier and is causing considerable damage in various crops. Hence, it is also clearly classified as a soybean pest in the USA. This coincides with the increasing mass occurrence in soybean fields in Germany.



Brown marmorated stink bug, Laimburg Test Centre, 2018.

Detailed publication of the LTZ on the brown marmorated marbled stink bug can be found here (in German).

Nymph stages of the brown marmorated stink bug: The Chinese species is expected to establish in large parts of Central Europe.

Control

The central challenge is that no antagonist species have yet established themselves for the introduced species. Ichneumon flies, ladybirds and tachnia flies are potential antagonists. It is to be hoped that they will adapt to the new bug species. A high biodiversity in agricultural landscape with continuous flowering and retreat possibilities for beneficial insects is the top priority as reliable insecticides for the control of bugs in soy are currently not available in Germany.

Conclusion

At present, despite regional significant infestation, bugs do not cause massive damage in soybeans in Germany. Studies on the actual damage caused are missing. Also, in climatically comparable Ontario, where the two invasive species described above have been common for some time, the damage to soy is limited. According to information from local practitioners, other legumes tend to be more affected. This gives reason to hope that soybeans will not be one of the most important target plants of the newcomers in the long term.

The introduction of new pests often triggers fear and scare. However, experience has shown that many species adapt to their native ecosystems after a few years, equilibrium with antagonists is achieved and farmers learn to live well with the species. During the research on bugs in soy, the impression arose that also this topic gives hope for a less exciting story.

For comprehensive information on all aspects of soy cultivation visit:

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