



Organic hop growing in the Czech Republic

Ing. Josef JEŽEK, Ph.D.; Ing. Josef VOSTŘEL, CSc.; Ing. Ivo KLAPAL
Hop Research Institute Co., Ltd, Žatec, Czech Republic
e-mail: jezek@chizatec.cz

In the Czech Republic hop organic growing began regularly in 2009. Hop Research Institute Ltd. motivated the first three growers from Saaz and Tirschitz hop growing regions to enter it. First trials with hop biological protection were carried out as early as 1980s within the cooperation of the Hop Research Institute and Czechoslovak Academy of Sciences. At that time hop damson aphid was controlled with the help of native predators, especially *aphidophagous coccinellis* migrating into the experimental hop garden from neighbouring pea field. In 2015, organic acreage reached a total of 10.6 hectares of hops. The variety Saazer and Premiant are cultivated. Chmelařství, cooperative Žatec processes hops for granules type 90.

General principles are reviewed in the paragraphs of EU as well as in national legislation.

Manuring – just farmyard manure from organic farming and green manure are used to help to sustain good quality soil. Fertilizers are completely banned. Mustard (*Sinapis alba*) and Phacelia (*Phacelia tanacetifolia*) are used for this purpose. Weeds – only mechanical soil treatment (e.g. loosening) is used to prevent weed infestation of a hop garden. Herbicides are strictly prohibited.

Downy mildew (*Pseudoperonospora humuli*) – is the most dangerous disease of hops. Biological fungicide Polyversum, which induces defence mechanism of hop plants, is used to help to control primary infection in spring. This bio-fungicide contains spores of *Pythium oligandrum*, which occurs naturally in soil and therefore it is efficient if applied early in the season on the ground when hop shoots are 10 -15 cm long. Alginure contains extracts from seaweed (marine algae) and plant amino acids. It is recommended during the season for spraying on leaves. Copper fungicides are allowed to be used to control downy mildew as well. Nevertheless, the total amount per season is limited to 6 kg of copper/ha.

Damson-hop aphid (*Phorodon humuli*) – generally we may say that natural enemies of aphids (lady birds, lacewings, hoverflies, gall-midges, Anthocorid bugs and others) are more numerous in such hop gardens, as no harmful pesticides are used. Moreover, flowering Phacelia, which is used for green manuring, lures beneficial insects as well. Nevertheless, natural enemies are not usually numerous enough to control this dangerous pest. In this case extract from a tropical plant *Quassia amara* is recommended to brush on hop bines. Recently, Rock Effect was registered in organic farming. It contains extract from *Pongamia pinnata*, which has good effect on aphids and spider mites.

Two-spotted spider mite (*Tetranychus urticae*) – creation of natural balance between spider mites and their enemies is the main task within the control of this dangerous pest. Predatory mites *Typhlodromus pyri* are released to help natural enemies (acarophagous thrips, Anthocorid bugs, tiny lady birds *Stethorus spp.*, gall midges *Feltiella acarisuga* and others) to prevent damage. Rock Effect may be used to control this pest as well.

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The hop bale.



Bio-fungicide *Pythium oligandrum* is spraying to prevent primary infection in the spring.



Aphidophagous coccinellids help to control damson-hop aphid.



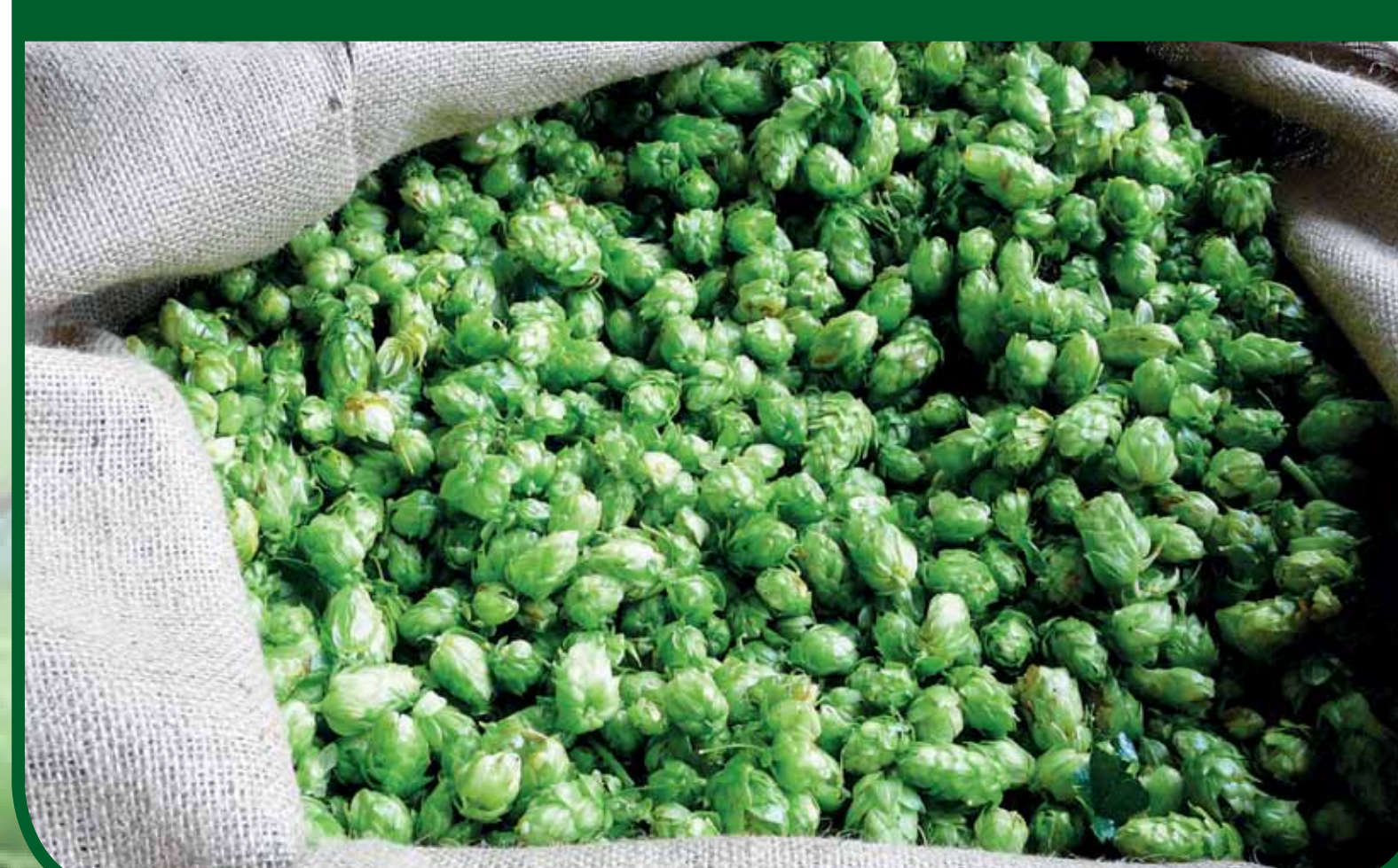
Predatory mites *Typhlodromus pyri* are released to control two-spotted spider mite.



Green manure lures the beneficial insects as well.



The hop cones.



The first stage of hop certification starts at a hop grower.

