

Oilseed rape protection against pests in Czech Republic

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Oilseed rape is not a traditional crop in the Czech Republic as cereals, sugar beet, hop, fodder crops or potatoes. 30 years ago their oil with expressive content of erudic acid was not suitable for food supplies. Because of its high content of glukosinolates in oil seed cake it was not usable food for animals. In the year 1926 on the landscape of nowadays Czech Republic oilseed rape was grown only on 1000 ha; it was 0,015 % of arable land. Harvested area in 1975 was 45 000 ha of oilseed rape. The principle turn point was in 80' of 20th century. Growing of non-erudic acid and "00" varieties was expanding. Demand at food markets after oilseed rape oil was growing up. In 90' areas of growing were expanding, where oilseed rape was one of a small group of crops in transforming Czech economy which gave a profit. In the year 1993 oilseed rape was grown on 162 000 ha, but ten years later the growing area was around 350 000 ha. In the years 2000-2003 historically largest area of oilseed rape was grown in the Czech Republic. Average part of oilseed rape on arable land was more than 12 % and by some growers it was over 25 %, but sporadically this part grew with other plants from cabbage family up to 40 % of cropping pattern. In this case basic rules of crop rotation were disturbed. Also the isolation spaces between harvested oilseed rape and new sown areas were so small, that it was not problem for pests to fly from one area of growing to another.

Nowadays the production area in the Czech Republic is decreasing. Harvested area of oilseed rape was 275 000 ha in 2006. Sowings in 2007 are higher, around 300 000 ha. Winter oilseed rape is mainly grown. The area of harvested spring oilseed rape was only 12 000 ha in 2006. Considering to higher yields the production of rape increases – the second highest production (860 000t) was in 2006 after record in 2005. In context with the support of biofuels enlargement of rape area is expected. Over the last 10-15 years the occurrence of pests in oilseed rape growths was changed and the malignity has increased as well.

Changes in structure of grown crops, destruction of crop rotations, enlarging of minimalization technologies of growing, expansion of oilseed rape to warmer and dryer lowlands and partly changed climate conditions are main factors, which affect development of pests.



Fig. 1: Native genera slugs

Pollen beetle (*Meligethes aenus* Fabr.) was one of the most important pests on oilseed rape till middle of the 80's last century. Its harmfulness has decreasing tendency. Protection against him is effective and it does not cause any economic damages. Regarding to bees protection mostly pyrethroids (cypermethrin, deltamethrin, zeta – cypermethrin or lambda – cyhalothrin) is possible to use in the period of flower-bud and at the beginning of flowering. Registered neonicotinoids - thiacloprid and acetamiprid – are not used so often because of their price. Resistant populations of the pollen beetle against commonly used pyrethroids were found in Western Europe and the protection in France and Germany is very complicated. In the case of enlarging of resistant populations to the Czech Republic very similar problems will also occur here.

Early 90' of last century Turnip ceutorrhynchus (*Ceutorhynchus napi* Gyll.) and Cabbage stem weevil (*Ceutorhynchus pallidactylus* Mars. = *C. quadridens*) are expanding markedly in spring period. Nowadays these two weevils belong to very important pests of oilseed rape. The growers are doing the protection against weevils on 90 % of all areas of rape. Considering to enormous mechanical damage of stem they assist also to expand of fungal diseases. Chemical preparations are applying in the period of first spring warming (end of March or beginning of April) and mostly used combination is cypermethrin and chlorpyrifos or pyrethroid bifenthrin. Other preparations including neonicotinoids – thiacloprid and acetamiprid are used very little.

Since 1995 are slugs dangerous pests in oilseed rape. Young growths of rape were in warm and wet autumn strongly damaged. Be the side of native genera slugs (Fig. 1) *Deroceras reticulatum* (Mull.) and *Deroceras agreste* (L.) were more represented on the centuries break species from South Europe. Mostly is represented orange-brown colored 8-10 centimeters long Spanish slug (*Arion lusitanicus* Mab.) (Fig. 2). Cold winter 2002/2003 with large temperature oscillations and very dry growing season of the year 2003 caused that population of all harmful slugs species were almost disappeared. Since the year

2004 was seen only small economic occurrence of native slugs, South European's slugs were not registered.



Fig. 2: *Arion lusitanicus*



Fig.3: Adult of
Phyllotreta.nemorum

Since 1998 cause the pest economic damages also in autumn period. Record was in very hot period 2000-2002, later their meaning fall down.

If the weather is dry and sunny from the end of August and September damages on winter oilseed rape are causing species from the genus *Phyllotreta* (Fig. 3). They damage mostly small plants, but they occur rarely in big amounts also on old plants. Nowadays is seed stock mostly stained. In Czech Republic is possible to use only one insects stain (imidacloprid + beta-cyfluthrina) and one stain with combined (insecticidal and antifungal) effect (thiomethoxam + fludioxonil + metalaxyl – M).

From September till continuous ice-cover in rape growth is possible to see especially by hot and dry autumn Cabbage stem flea beetle (*Psylliodes chrysocephala* L.) and Cabbage gall weevil (*Ceutorhynchus pleurostigma* Mars.). Also by these pests was the main boom in the years 1999-2002, nowadays it is only in local importance without bigger economic meaning.

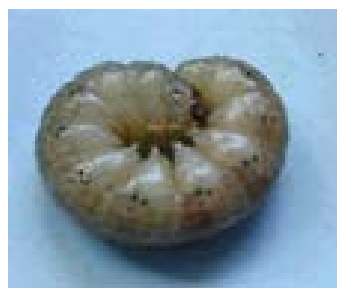


Fig. 4: Cutworm of
Agrotis segetum

More important damages were first found in 1998 caused with Turnip moth (Fig. 4) (*Agrotis segetum* Denis et Schiffer). Their occurrence vary each year, it depends on mostly on weather. Now is manifesting a rising tendency.

In couple of years was detected strong local occurrence of third generation of Coleseed saw-fly (*Athalia rosae* L.) (Fig. 5). Populations of some night-butterflies are growing up very similar. Damages are local. In the event of damages it is possible to protect the growths in autumn with pyrethroids deltamethrin, alfa – cypermethrin and lambda – cyhalothrin. In the years 2004-2006 was such treatment seldom.

Since 2000 made economic important damages of most areas so named pod pests. Economic meaning of Cabbage seedpod weevil (*Ceutorhynchus obstrictus* Mars.) declines, but the meaning of Brassica pod midge (*Dasineura brassicae* Winn.) is rising. In 2003 it caused on weak rape growth large damages. From the year 2002 Brassica pod midge (Fig. 6) becomes most important pest on oilseed rape. It could endanger earnings from oilseed rape cultivation. Plant protection

against this pest is still not solved enough. It is tested lot of preparations, which are effective against adults or larvae. Bionomic investigations in conditions of the Czech Republic are running. Mostly preparations used in plant protection are neonicotinoids as acetamiprid and thiacloprid. Also effect of tissue hardening with nitrofenols is used. In hot years is treated 100% of growing areas, sometimes also two times.



Fig. 5: Adult of *Athalia rosae*

From the year 2002 we found from the stage of flowering root collar damages and damages of the top part of root system by Cabbage root fly (*Delia radicum* L.). Mechanical damage of root system with larvae of *Delia radicum* causes propagation of fungal diseases, mainly *Verticilia* sp. First occurrence of this fly on emerging young growths were found in autumn 2005 and in the year 2006 it was even more. Till this time there were not registered any higher economic damages. Effective protection was still not found. In a case of expansion it could be very dangerous pest, especially for young growths.

In last 15 years the importance of individual pest species was quickly changed. In 80' of 20th century only one insecticidal treatment against pollen beetle was used. At the beginning of 21st century is necessary to apply sometimes more than 6 insecticidal and fungicidal treatments through the whole vegetation season and sometimes could be the treatment ineffective. It is used to do 2 herbicide applications and 1 or 2 applications of regulator of growth trough season. From ecologic and economic reasons is this amount of treatments not sustainable.

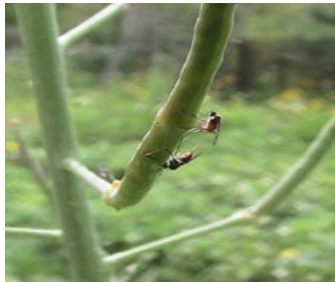


Fig. 6: Adults of *Dasineura brassicae*

The solution in plant protection could be using combination of chemical, agrotechnical, breeding and biological methods against harmful organisms. Testing of integrated rape protection on very small areas also the ecological farming, without using of synthetic fertilizers and pesticides was started.