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HOP PROTECTION AGAINST ALFALFA SNOUT BEETLE (*Otiorhynchus ligustici* L.) WITH THE HELP OF METEOROLOGICAL DATA IN BOHEMIAN AND MORAVIAN HOP GARDENS

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Figure 1: Adult of alfalfa snout beetle (*Otiorhynchus ligustici* L.) eating on a young hop shoot.

The family *Curculionidae* contains more than 40.000 species, all of which have a head that is extended into a long snout or rostrum. The jaws are on the end of the rostrum and the antennae are implanted in the middle (Malais & Ravensberg, 1992). Some of them cause damage on roots of various plants. Numerous species of root weevils, *Otiorhynchus* spp. infest hop (*Humulus lupulus* L.). Whereas black vine weevil (*O. sulcatus* F.) is dominant species infesting hop in Washington and Oregon hop yards (Mahaffee, et al., 2009), alfalfa snout beetle (*Otiorhynhus ligustici* L.) is the most important pest from this family in Czech and Moravian hop gardens (Vostrel, 1999).

The wingless beetles are about 9-13 cm long of black to black-brown colour. They usually shelter under clods of earth during the day where they are difficult to see since their colour blends with the soil. They are active in the spring when they lay eggs in the soil from which the legless larvae develop and feed on the roots before pupating (Neve, 1991). Severe larval infestation can significantly shorten the life of a hop yard. The larvae of this beetle are not easily controlled chemically because they live in the soil in hop crowns. In trials carried out to try to control larvae in a nontraditional way good results were obtained neither from the pesticides applied in the form of watering in the autumn nor from granular insecticides applied onto soil surface to the hop plants and by injection into the rootstock. (Vostrel, 1988). The only efficient way to control *O. ligustici* is to apply an efficient insecticide in the spring when newly born adults emerge from soil and damage young hop shoots. In the past treatment was recommended when 100 beetles per 100 plants were found out (Petrlik & Stys, 1988). Nevertheless, population density of weevils in Czech a Moravian hop gardens has decreased in comparison with the recent years and therefore it has been necessary to overestimate the economic threshold, which is now 10 beetles per 100 plants. Besides counting beetles at the soil surface on hop shoots and under clods of earth, soil temperature in the depth of 50 cm is measured with the help of the soil probe. It was found out that beetles began to emerge from soil when temperature in 50 cm reaches the value of 8 °C. Nevertheless, 13-15 °C in the above-mentioned depth is necessary for mass emergence of beetles. It usually happens in the second half of April, which is also the recommended time for treatment of young shoots to control this pest and to prevent oviposition by females. The occurrence of alfalfa snout beetle (*Otiorhynchus ligustici* L.) was monitored in the hop gardens within Moravian (Tršice) hop region in 2009-2011 (Table 1-3, Figure 1-2).

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TABLE 1: The occurrence of alfalfa snout beetle (*Otiorhynchus ligustici* L.) in the hop gardens within Moravian (Tršice) hop-growing region in 2009

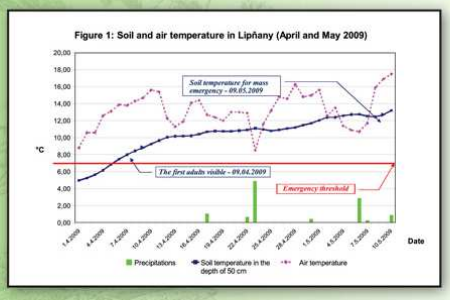
LOCALITY	DATE OF EMERGENCY	ALTITUDE (m)	SLOPE	ORIENTATION OF THE LOCALITY		DRAINAGE	YEAR OF PLANTING
Lipany	09.04.	266	2.7°	E	77 %	Yes	1995
				NE	23 %		
Kokory	05.04.	253	3.2°	W	24 %	No	1978
				SW	76 %		
Prusy	11.04.	222	2.0°	NE	39 %	Yes	1999
				N	53 %		
				Plain	8 %		
Čechovice	13.04.	256	2.2°	NE	27 %	No	1998
				N	9 %		
				NW	11 %		
				W	33 %		
				SW	8 %		
				Plain	12 %		

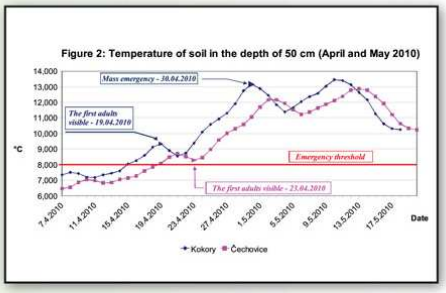
TABLE 2: The occurrence of alfalfa snout beetle (*Otiorhynchus ligustici* L.) in the hop gardens within Moravian (Tršice) hop-growing region in 2010

LOCALITY	DATE OF EMERGENCY	ALTITUDE (m)	SLOPE	ORIENTATION OF THE LOCALITY		YEAR OF PLANTING	PRUNING
Kokory	19.04.	253 m	3.2°	W	24 %	1978	08.04.
				SW	76 %		
Prosenice	19.04.	226 m	1.2°	S	24 %	1995	31.03.
				SE	16 %		
				Plain	60 %		
Lazníky	20.04.	283 m	1.1°	SW	62 %	1997	16.04.
				NW	1 %		
				W	2 %		
				Plain	35 %		
Lipník nad Bečvou	20.04.	229 m	0.9°	E	1 %	2001	04.04.
				W	1 %		
				SW	10 %		
				S	23 %		
				SE	3 %		
				Plain	62 %		
Čechovice	23.04.	256 m	2.2°	NE	27 %	1998	20.04.
				N	9 %		
				NW	11 %		
				W	33 %		
				SW	8 %		
				Plain	12 %		

TABLE 3: The occurrence of alfalfa snout beetle (*Otiorhynchus ligustici* L.) in the hop gardens within Moravian (Tršice) hop-growing region in 2011

LOCALITY	DATE OF EMERGENCE	ALTITUDE (m)	SLOPE	ORIENTATION OF THE LOCALITY		YEAR OF PLANTING	PRUNING
Lipník nad Bečvou	06.04.	229 m	0.9°	E	1 %	2001	01.04.
				W	1 %		
				SW	10 %		
				S	23 %		
				SE	3 %		
				Plain	62 %		
Lazníky	07.04.	283 m	1.1°	SW	62 %	1997	08.04.
				NW	1 %		
				W	2 %		
				Plain	35 %		
Čechovice	08.04.	256 m	2.2°	NE	27 %	1998	10.04.
				N	9 %		
				NW	11 %		
				W	33 %		
				SW	8 %		
				Plain	12 %		
Velký Týnec	08.04.	254 m	2.3°	N	16 %	2000	10.04.
				NW	45 %		
				W	27 %		
				SW	11 %		
				Plain	1 %		
Čechy	10.04.	222 m	0.8°	E	6 %	1997	19.04.
				NE	10 %		
				N	11 %		
				NW	1 %		
				Plain	72 %		





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