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DEVELOPMENT OF *MYZOCALLIS CORYLI* GOETZE (*HOMOPTERA, APHIDODEA*) ON THE DIFFERENT HAZEL (*CORYLUS* L.) CULTIVARS

Elżbieta Wojciechowicz-Żytko

Department of Plant Protection, Agricultural University
Al. 29-Listopada 54, 31-425 Kraków, Poland
e-mail: ewojcie@ogr.ar.krakow.pl

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Abstract. In the experiment the population dynamics as well as the development of *Myzocallis coryli* on five hazel cultivars were investigated. In terms of host plant resistance to *Myzocallis coryli* the tested cultivars displayed very similar susceptibility. The obtained results show that no significant differences were found in aphid r_m. In spite of this, due to the longest prereproductive time, the lowest fecundity and the smallest number of aphids per 10 leaves, Kataloński is less suitable cultivar for the aphids from all tested hazel cultivars.

Key words: hazelnut cultivars, *Myzocallis coryli,* development

INTRODUCTION

The presence of two aphid species – *Myzocallis coryli* and *Corylobium avellana* – was recorded on the hazel (*Corylus* L.) plantations (Cichocka 1980; Janiszewska-Cichocka 1973; Gantner 2000; Szelęgiewicz and Cichocka 1990). The filbert aphid (*M. coryli)* is a major pest causing crop losses in the years of heavy infestation. Aphids feeding cause the losses of nuts through the direct feeding on leaves as well as the honeydew production leading to growth of sooty mold on leaves.

The aim of the study was to determine the number and population dynamics of *M. coryli* as well as the aphids development on the different hazel cultivars.

MATERIAL AND METHODS

The experiment was carried out in 1998–2001 in the eight years old hazel plantation situated in Mydlniki near Kraków. Five hazel cultivars were used in the experiment: Kataloński, Olbrzymi z Halle, Długi Wczesny, Webba Cenny and Warszawski Czerwony. No insecticide treatments were applied.

From April to August the number of *M. coryli* was recorded every 5–8 days on the 100 leaves from each cultivar.

In June in 1998 and in May in 1999 and 2001, clip cages, each containing one aphid, were put on the hazel leaflets (one cage per bush). The cages were inspected daily. As soon as an aphid commenced reproduction, the adults and any excess nymphs were removed to leave one nymph per cage. From the day on which aphids started reproduction their fecundity was recorded daily for the first 10 days of reproduction in one cage.

The aphid population parameter – intrinsic rate of natural increase (r_m) (Wojciechowicz-Żytko and van Emden 1995) was calculated upon the simplified method proposed by Wyatt and White (1977), from the equation:

$$r_m = \frac{0.738\ (\ln M_d)}{d}$$

Where: d – length of the prereproduction period, M_d – number of larvae born by one female.

The results were statistically analysed. Duncan's test showed the significance of the differences between the examined features.

RESULTS AND DISCUSSION

Population dynamics of *Myzocallis coryli* Goetze

In all years of observations the first aphids appeared in the end of April and beginning of May (Fig. 1). It corresponds with observations by other authors (Gantner 2000; Wojciechowicz-Żytko and Wojciechowicz 2002).

The subsequent observations pointed to an increase of the aphid's number and in 1998 and 1999 their maximum was found in beginning of June. During this period 34.1 (1998) and 54.5 (1999) aphids per 10 leaves were observed. In 2001 aphids appeared most numerously in first decade of May (21.7 per 10 leaves) and the second aphid increase was recorded in the beginning of July (13.9) (Fig. 1). Anasiewicz and Gantner (2000) observed the greatest number of aphids in first decade of May while Naeem and Compton (2000) noted their maximum in July.

The dynamics of aphid population number in 1998 and 1999 was similar (on average 18.8 and 26.1 aphids per 10 leaves respectively) whereas in 2001 almost two times smaller number of aphids was noted in comparison with other years (10.3 individuals). It was most likely caused by worse than usual weather condition – torrid heats and low rainfall. The remarkable influence of the weather conditions on the number, occurrence and the disappearance time of aphids was confirmed by the results of other authors (Cichocka 1980; Jaśkiewicz 1995).

From mid July the gradual decline of the number of aphids was observed. In all years of observation, from the beginning of August to the middle of September, only single individuals were noted. There were no significant differences between the number of aphids noted on the different cultivars, however the least number was observed on the Kataloński (Tab. 1, Fig. 1). It corresponds with previous observations made by Wojciechowicz-Żytko and Wojciechowicz (2002) and by Gantner and Jaśkiewicz (2002).

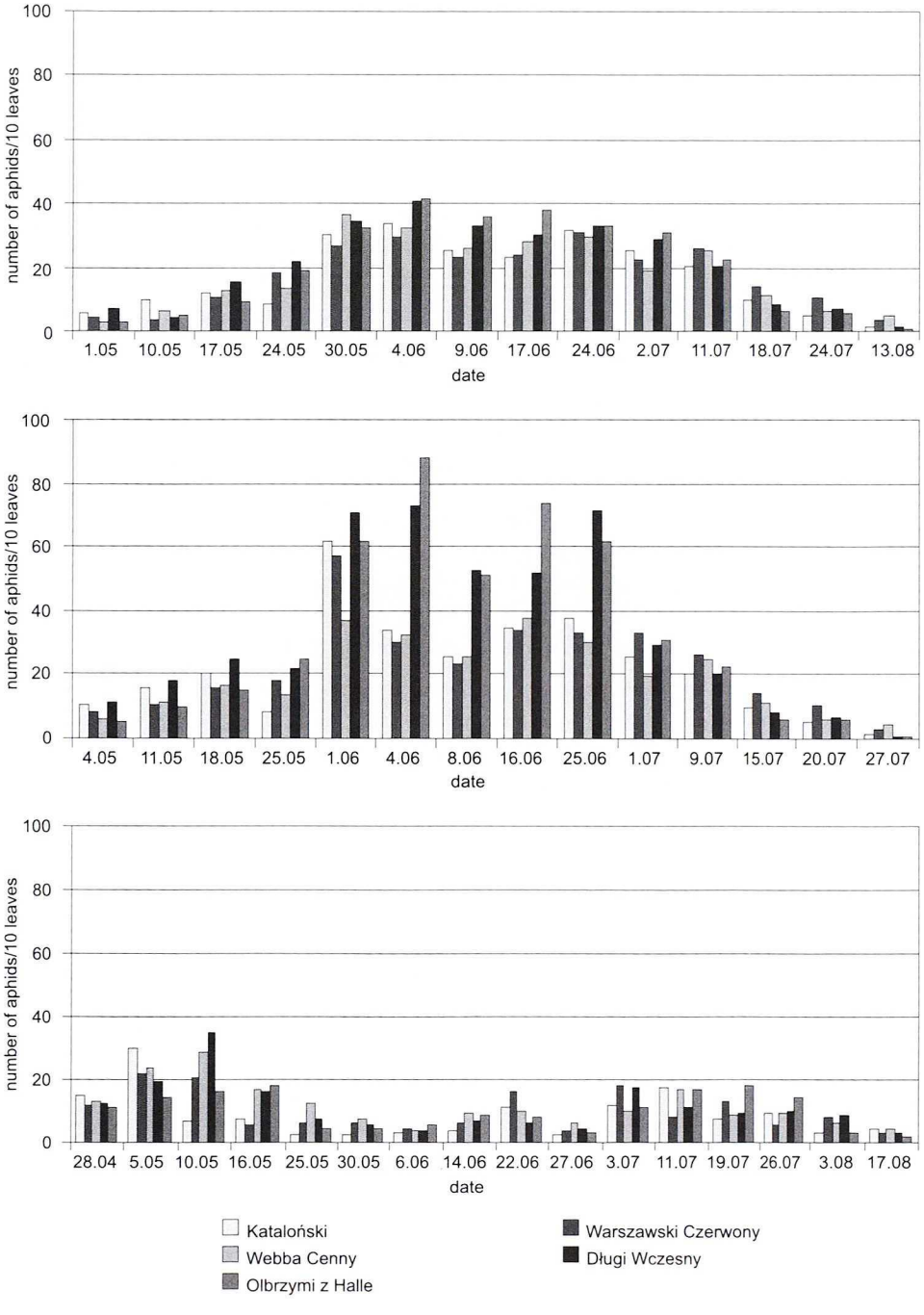
number of aphids/10 leaves
100
80
60
40
20
0
1.05 10.05 17.05 24.05 30.05 4.06 9.06 17.06 24.06 2.07 11.07 18.07 24.07 13.08
date
number of aphids/10 leaves
100
80
60
40
20
0
4.05 11.05 18.05 25.05 1.06 4.06 8.06 16.06 25.06 1.07 9.07 15.07 20.07 27.07
date
number of aphids/10 leaves
100
80
60
40
20
0
28.04 5.05 10.05 16.05 25.05 30.05 6.06 14.06 22.06 27.06 3.07 11.07 19.07 26.07 3.08 17.08
date
Kataloński
Webba Cenny
Olbrzymi z Halle
Warszawski Czerwony
Długi Wczesny

Fig. 1

Table 1. The occurrence of *Myzocallis coryli* on the different hazel cultivars (Mydlniki 1998–2001)

Cultivar	Kataloński	Warszawski Czerwony	Webba Cenny	Długi Wczesny	Olbrzymi z Halle
1998					
Total number of aphids	242.54	248.57	254.92	287.18	283.77
Mean number of aphids per 10 leaves	17.32	17.76	18.21	20.51	20.27
1999					
Total number of aphids	310.23	315.92	276.52	461.61	457.74
Mean number of aphids per 10 leaves	22.16	22.57	19.75	32.97	32.7
2001					
Total number of aphids	139.99	159.61	187.1	177.81	160.13
Mean number of aphids per 10 leaves	8.74	9.98	11.69	11.11	10.0

Development of *Myzocallis coryli* Goetze

In terms of host plant resistance to *M. coryli* the 5 tested cultivars of *Corylus* L. were all of very similar susceptibility. The obtained results show that no significant differences were found in aphid r_m (Tab. 2).

In spite of this, during the experiment, some statistical separation of aphid fecundity and its development time on the different cultivars were noted.

Table 2. Development and reproduction of *Myzocallis coryli* on the different hazel cultivars

Cultivar	Year	Days to reproduction		Fecundity (no. of larvae per female)				r_m
				in 10 days		in 1 day		
		average	oscillation	average	oscillation	average	oscillation	
Kataloński	1998	12.13	10–14	19.5	12–26	1.95	0–8	0.18
	1999	15.0	13–16	21.88	17–30	2.18	0–6	0.15
	2001	17.75	16–19	18.0	10–29	1.8	0–5	0.12
	mean	**15.02c***		**19.79 a**		**1.98**		**0.15 a**
Warszawski Czerwony	1998	11.25	11–13	20.12	12–33	2.01	0–7	0.2
	1999	14.38	13–16	22.13	18–27	2.21	0–5	0.16
	2001	16.75	16–19	20.13	14–26	2.01	0–6	0.13
	mean	**14.13 a**		**20.79 b**		**2.08**		**0.16 a**
Webba Cenny	1998	11.62	10–13	21.13	11–32	2.11	0–8	0.19
	1999	14.88	14–16	19.13	16–23	1.91	0–5	0.15
	2001	16.25	16–17	19.5	14–25	1.95	0–6	0.14
	mean	**14.25 a**		**19.92 a**		**1.99**		**0.16 a**
Długi Wczesny	1998	12.0	11–14	16.0	8–26	1.6	0–6	0.17
	1999	14.5	13–16	20.5	15–26	2.05	0–5	0.15
	2001	17.13	16–19	22.75	12–24	2.28	0–6	0.13
	mean	**14.54 b**		**19.75 a**		**1.98**		**0.15 a**
Olbrzymi z Halle	1998	11.5	11–14	18.62	10–29	1.86	0–9	0.19
	1999	15.1	14–16	23.75	18–35	2.37	0–5	0.16
	2001	17.25	16–19	17.0	9–26	1.7	0–5	0.12
	mean	**14.62 b**		**19.79 a**		**1.98**		**0.16 a**

*Means in each column followed by the same letter are not significantly different at $\alpha=0.05$

Although the largest fecundity of females noted on Warszawski Czerwony significantly differed from the smallest on Kataloński and Olbrzymi z Halle, the r_m value for the cultivars in the analysis was not significant (Tab. 2). The fastest aphid development occurred on Warszawski Czerwony while the prolonged development time of aphids was noted on Kataloński cultivar (Tab. 2). Although, the r_m value for all cultivars was similar; it seems that Kataloński cultivar is less suitable (the longest prereproductive time, the lowest fecundity and smallest number of aphids per 10 leaves) for the aphids from all tested hazel cultivars.

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POLISH SUMMARY

ROZWÓJ ZDOBNICZKI LESZCZYNOWEJ (*MYZOCALLIS CORYLI* GOETZE) NA RÓŻNYCH ODMIANACH LESZCZYNY

Celem trzyletnich badań było ustalenie różnic w porażeniu pięciu odmian leszczyny przez zdobniczkę leszczynową *Myzocallis coryli* Goetze.

Nie zanotowano różnic statystycznych we wrodzonym tempie wzrostu populacji mszyc (r_m), natomiast swierdzono istotne różnice w rozwoju i płodności mszyc rozwijajacych się na różnych odmianach leszczyny.

Zaobserwowano najdłuższy okres przedreprodukcyjny, najmniejszą płodność samic oraz najmniejszą liczbę mszyc/10 liści na odmianie Kataloński. W związku z tym można tę odmianę zaliczyć do mniej podatnych na żerowanie mszyc od pozostałych.