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Dynamics of pear psylla *Caccapsylla pyri* L. (*Homoptera, Psyllidae*) populations in some wild and grown pear cultivars*

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Abstract: The dynamics of pear psylla populations was observed on *P. communis, P. ussuriensis* (b_1 and b_2 - control trees) and on five (b_1, b_2, b_3, b_4 and b_5) grown cultivars: Bartlet, Passe Crassane, Gouyt, Highland and General Leclerc during 1994/95. The samples were taken once a month during the growing season. Counting different developmental phases of pear psylla helped establish the effect of year (season), cultivar and month on its population dynamics.

The presence of different developmental phases of pear psylla is established in all observed cultivars and control trees, as well as the disparity in its life cycle as a consequence of a strong influence of weather, beneficial insects and two interruptions in its growth dynamics (July and August 1994 and August 1995) due to absence of pear vigour growth.

It was found out that each factor highly influenced the total of hatched eggs; cultivars show different attractiveness to oviposition.

Nymph/egg ratio, as an indicator of preference in nymph nutrition, was equalized during individual growing seasons, somewhat higher in 1995, and nearly equal between grown cultivars and *P. communis.*

No differences in adults number existed in comparisons III-IX, IV-V, VII-VIII between the cultivars b_2 and b_4, b_5, b_6; b_3 and b_4; b_6 and b_4, b_5.

Key words: attractive, cultivar, egg, growing season, larvae, nymph, pear orchard, pear psylla, population dynamics, preferential, vegetation.

* The work presents MS thesis defended at the Faculty of Agriculture in Novi Sad, on the 4th of December in 1996. It includes 71 typed pages, with 14 photos, 2 schemes, 3 tables, 8 histograms and 23 graphs, 109 cited literature sources. Original is in Serbian, with abstracts in Serbian and English.

Introduction

According to the oldest written data, as a fruit, pear has been grown in China since the year 2000 B.C., and in Europe some thousand years later. In the 50's and 60's of this century, aiming at higher economic benefits, pear was first grown in large-scale orchards, then in monoculture, setting out highly selected planting material on yield, with more intensive pruning, irrigation, N fertilization, and increasing use of insecticides. Still, global approach to pest control was one-sided (Burts, 1982). All this, as a result of the eco-biocenosis imbalance, caused the appearance of R[1] selected organisms - conditionally new pests which pear psylla, *Cacopsylla pyri* L., belongs to, as a limiting factor of pear production and expansion.

Either by its presence in an orchard throughout growing season while reproducing and producing three (Lal, 1934), four (Wille, 1950), five (Bonnemaison and Missonier, 1955; Grbić, 1974; Pavićević Branislava, 1977; Souliotis and Broumas, 1990) six (Brainiste et al., 1994) or seven generations pear year (Matias, 1984), or by overwintering on hidden locations (Wille, 1950; Bonnemaisson and Missionner, 1955; Violier Brigitte and Fauvel, 1984; Nguyen et al. 1984), pear psylla represents a serious pest in well cared orchards (Injac, 1993). As an oligophagous pest, psylla can impair grown pears directly, indirectly, and as a vector of MLO[2]-cause of "pear decline".

In the years of a high psylla infestation which are highly frequent for R-selected organisms, this pest causes serious damages on the leading pear orchards of France, Russia, Yugoslavia, Italy, Belgium, Portugal, Greece, Romania, resulting in tremendous economic losses in the pear annual production and drastically declining export potential, too.

Psylla can be efficiently controlled if overwintering population of this pest decreases. In this regard, due to its high toxicity, residues and leaching in groundwater's (Breiniaux, 1984; Baudry, 1989), the previously used DNOC was replaced with deltametrin (Bigre, 1989) and vamidation (Schwarz, 1982; Bigre, 1987). A new approach to control of pear psylla number relies on the application of juvenoid fenoxycarb (Krysan, 1990) which interrupts the overwintering female diapause so that females lay eggs on copulation. When exposed to severe winter temperatures, eggs may be damaged, whereas in the spring, females lay only their small number so that overall fertility of overwintering adults (Stratopoulou and Kapatos, 1993) may be significantly reduced. Earlier use of piretroids was proved to be sufficiently efficient (Vawetswinkel and Seutin, 1978; Stamenković and Milenković, 1992). Today, they are applied only twice a season for causing mites appearance and infestation (Bauron, 1987), as well as the resistance of the pest itself (Willett, 1987 according to Krysan, 1990; Burts and van der Baan, 1993; Coop et al., 1994).

Practically, no better breeding programmes on cultivar selection to resistance, or at least, lower attraction to pear psylla, have been contrived so far,

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[1] reproductive

[2] mycoplasma like organisms

allowing for the fact that the sources of germplasm resistance originating from far Asia (Westigard et al., 1970; Quama, 1984) or some remoter Balkan cultivars (van der Zwet et al., 1983) have small fruits, firm non-edible mesocarp, unsatisfactory market flavour and are commercially useless (Sheen et al., 1994).

Under the conditions of a natural pest infestation, with partly maintained equilibrium within the relationships: soil - plant - pest - beneficial insects, this paper is aimed at monitoring the dynamics of pear psylla population with existing pear variety. Considering our research goal on the basis of different pear psylla preference to the cultivars, the obtained results suggest the following: the existing variety may inhibit pear psylla growth to certain extent; good choice of less preferential cultivars for establishing new pear orchards and, introducing some new cultivars for further programmes towards breeding the cultivars which will be more resistant to pear psylla infestation.

Material and Methods

The sampling was made in the field once in a month over two growing seasons in 1994 and 1995 within producing-collection orchard of the Fruit Growing Centre "Zatezića kosa" in the vicinity of Čačak. The orchard was set up during 1984-85 on the area of 3.5 ha in 60 rows planted with 2671 trees consisting of 70 cultivars.

The material was collected by removing 5 shoots, 20 cm long of entirely 1 m long shoots from different expositions of the crown and from the middle. The material was collected from 5 cvs. (Bartlet, Passe Crassane, Gouyt, Highland, General Leclerc) as well as from the trees of two emerging species *P. communis, P. ussuriensis* used as the control. The samplings took 60 min. to avoid possible variations in number, particularly of adults.The sampled material was kept in finely perforated and labeled polyethylene sacks and then dispatched to the laboratory. Different pest instars were counted in the laboratory using binoculars MBS-10.

For determining a differing pear psylla preference to cultivars during the nypmphal nutrition, the ratio between the total nymph and egg number was calculated and multiplied with 100, as follows:

$$\frac{\text{nymph}}{\text{egg}}\ \text{ratio} = \frac{\text{total number nymph}}{\text{total number eggs}} \cdot 100 \quad (\textit{Westigard et. al., 1970}).$$

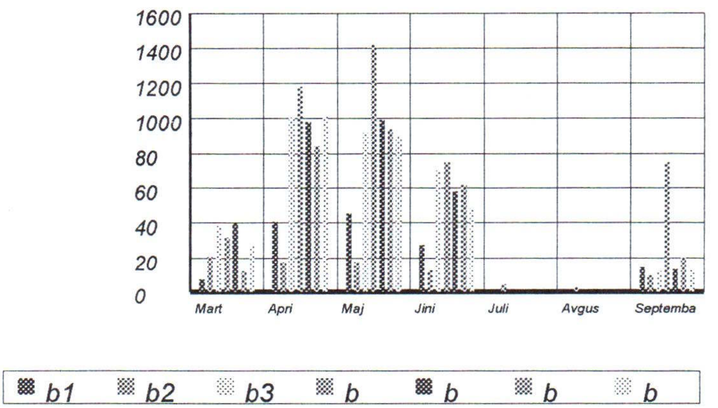
Data processing was made using a three-factorial analysis where A, B and C stand for year, cultivar and month, respectively. Standard methodology was used to find out the statistical significance of each factor (A, B, C) on the pear psylla dynamics, as well as to determine the interaction between these factors (AxB, AxC and BxC). LSD test was employed to test the differences between individual and interaction relationships.

The data were processed in the programme M-stat Meny Manager 4.0 (C) 1987, Michigan State University, Version 4.0/EM.

Results and Discussion

Following the dynamics of egg population (histogram 1 and 2), it was found out that maximal ovipositions dominated in the period April - May and egg number continued to fall until the sampling in August, whereas, in September, its increase recurred. Rieux et al. 1990 established the maximal oviposition during July when minimal egg number (1995) and absence of oviposition (1994) were registered. On the other side, Rieux et al., (1990) reported about a small number of the adults, though the oviposition was high in May, whereas from mid-June, the decrease in adults number and increase in egg number were manifested. This seemed to have resulted from a high fertility of the F_1 generation or from the oviposition of the migratory adults. This was due to possible random ovipositions induced by temperature rise from June, which led to a lower fertility (Nguyen, 1968 according to Derousier Sophie, 1984).

Histogram 1. Comparative Dynamics of Egg population during 1994.

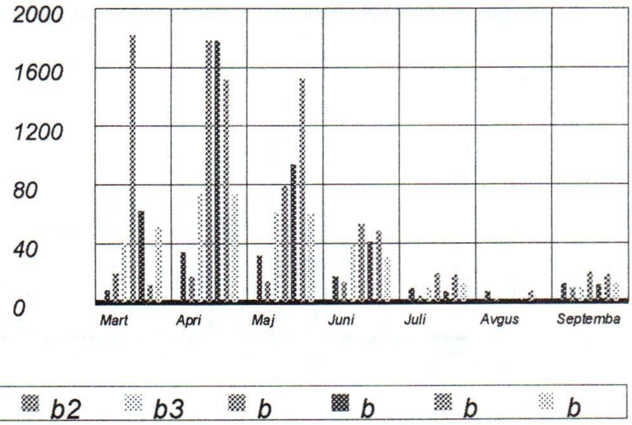


b_1 - P communis, b_2 - P. ussuriensis, b_3 - cv. Bartlet, b_4 - cv. Passe Crassane, b_5 - cv. Gouyt, b_6 - Highland, b_7 - cv. General Leclerc

According to the samplings, the decrease in adult pear psylla number coincided with that in egg number, suggesting the presence of an autochthonous adult population in the orchard during this period.

On the basis of the 2-year study of the pear psylla population dynamics under the conditions of reinstated equillibrium in pear orchard, the samplings taken in March showed that the fertility of overwintering females might be the result of a generally lower fertility because the females struggled for life quite a long time before it came to oviposition (Bonnemaison and Missonier, 1956; Stratapoulou and Kapatos, 1993) under adverse eco-conditions (snow, low temperatures), which might have decreased pest population to a certain extent.

Histogram 2. Comparative Dynamics of Egg Population during 1995.



b_1 - P communis, b_2 - P. ussuriensis, b_3 - cv. Bartlet, b_4 - cv. Passe Crassane, b_5 - cv. Gouyt, b_6 - Highland, b_7 - cv. General Leclerc

However, the samples taken in April indicated considerably higher egg number and the presence of both, winter and summer adult form. The potential fertility of ecloding adults of this generation was peculiarly high, and it is often used as the oviposition rate in the field (Stratapoulou and Kapatos, 1993).

In 1995, almost the all laid eggs were located in the series along main nerve and strong nerves on the back side of foliage. There were laid eggs neither on the foliage nor on the leaves on the upper part of the crown. The nymphs were also grouped in colonies with characteristic position (head toward the base), but only in the lower crown sections. This might be the result of certain development retardation caused by rapid temperature decrease, strong rain and snow (4^{th} of April).

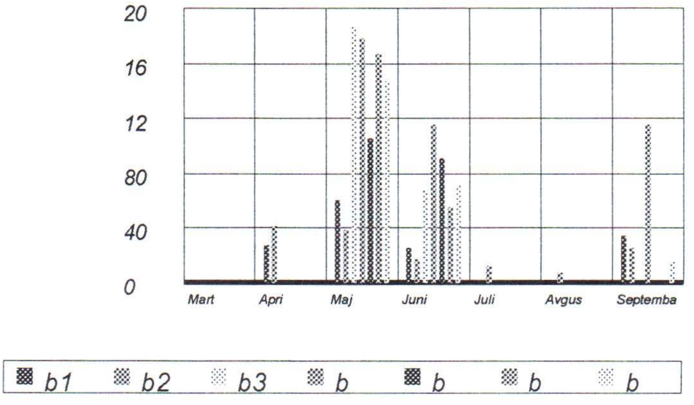
Considerably higher egg number (1780) on sensitive cv. Passe Crassane (Stamenković et al., 1993) compared to highly susceptible ones Bartlet and General Leclerc, resulted from a higher population density of winter form in pear orchard.

The dynamics of nymph population for the studied period, is given in histograms 3 and 4.

Laid eggs were more numerous than hatched nymphs on pear foliage during the vegetation. The values of nymph/egg ratio (Tab. 1) also pointed to a differing attraction within the studied variety and among the emerging species, depending on the sampling month as well as on the vegetation itself.

P. communis showed equal attraction to nymph diet at the beginning and at the end of both vegetations (March, April, May, September). However, during June, July and August, this attraction was reported to amount to Iv= 0-30, suggesting a strong impact of the physiological state of the insect host plant, depending on existing eco-conditions i.e. temperature and air humidity in this period.

Histogram 3. Comparative Dynamics of the Nymph Population during 1994.



b_1 - P communis, b_2 - P. ussuriensis, b_3 - cv. Bartlet, b_4 - cv. Passe Crassane, b_5 - cv. Gouyt, b_6 - Highland, b_7 - cv. General Leclerc

P. ussuriensis showed uniform values of the nymph/egg ratio throughout both vegetations, but much higher ones, compared to *P. communis.*

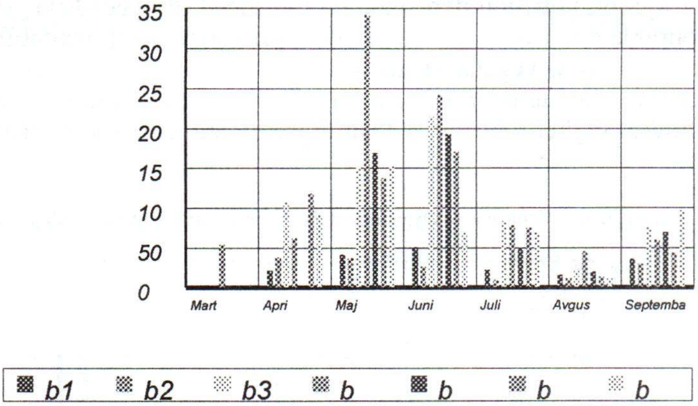
No remarkable differences in the level of attraction existed at the beginning of vegetation, at its end (III, IV, VIII, IX) or individually (during a single vegetation) in the examined variety (cv. Bartlet, Passe Crassane, Gouyt, Highland, General Leclerc). During a single vegetation, May, June and July (Tab.1.) showed rather uniform values, whereas their differing values in two vegetations. can be clearly noticed. In addition to varietal characters, the environmental factors also favoured the intensity of vegetative growth reflecting somewhat lower or higher preference in nymph diet.

The mean values of the nymph/egg ratio registered over individual vegetations showed highly uniform attraction during both vegetations with *P. communis* and *P. ussuriensis.* Within the studied variety studied, attracion levels were very much the same during individual, but quite different during two vegetations.

The overall average biyearly attraction clearly showed that the total average preference (15.5) of examined variety was close to the total mean value of the nymph/egg ratio with *P.communis* (15.3), but markedly lower in comparison with *P. ussuriensis* (23.5).

The values of the nymph/egg ratio recorded during vegetations indicated trophic attraction of the insect host plant during growing season, but to varying extent. Remarkably higher values reported for May, June and September, 1995 in relation to the same period of 1994, appeared to be the consequence of more vigorous growth under more suitable conditions within habitat, reflecting a better amino-acidic composition of leaf exudate (Pfeifer, 1978 after Injac, 1987).

Histogram 4. Comparative Dunamics of the Nimph Populations during 1995.



b_1 - P communis, b_2 - P. ussuriensis, b_3 - cv. Bartlet, b_4 - cv. Passe Crassane, b_5 - cv. Gouyt, b_6 - Highland, b_7 - cv. General Leclerc

Generally, *P. communis* and its cvs. indicated the equal preference during individual, but remarkable differences in attraction level over the two vegetations. This pointed at the effect of the plant physiological state on the nymph nutrition; for example, the vegetation of 1995 seemed physiologically more suitable for pear, contributing to a higher nymph/egg ratio.

Tab.1. - Nymph/egg Ratio Calculated on the Sampled Material

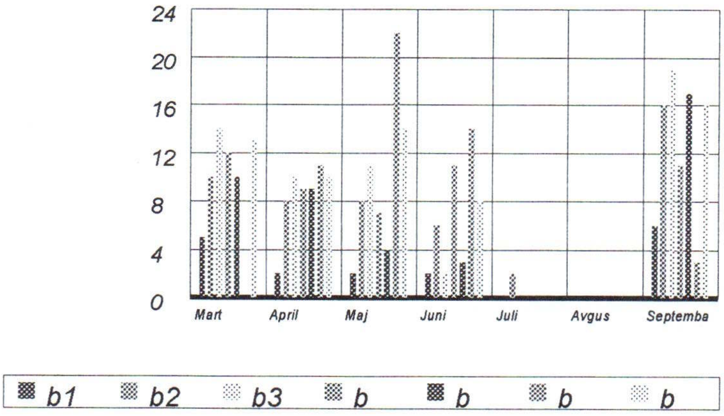
variety	year	month							X_1	X_2
		III	IV	V	VI	VII	VIII	IX		
b_1	1994	0	6.71	13.2	9.05	0	0	24.8	13.3	15.3
	1995	0	6.17	12.9	30	27.4	1.42	29.1	17.3	
b_2	1994	0	23.4	21.7	13.8	29.2	28	26.5	20.4	23.5
	1995	0	22.3	26.4	19.5	23.7	61.1	82.2	27.6	
b_3	1994	0	0	20.2	9.6	0	0	0	4.26	15.9
	1995	0	14.6	24.7	55.5	93.3	0	82.2	27.6	
b_4	1994	0	0	12.5	15.4	0	0	0	6.18	14.9
	1995	0	3.48	43.3	45.6	41	0	30	23.8	
b_5	1994	0	0	10.7	15.7	0	0	0	3.8	16.9
	1995	0	0	29.6	47	71.4	0	63.3	30.2	
b_6	1994	0	0	17.8	8.9	0	0	0	3.82	11.6
	1995	0	7.77	8.99	35.4	41.1	18.6	23.9	19.4	
b_7	1994	0	0	16.3	14.8	0	0	0	4.44	18.3
	1995	0	12.5	26.1	49.2	57.5	0	80	32.1	

x_1 - mean value during one vegetation
x_2 - total mean value for both vegetations

May and June of 1994 and July of 1995 favoured nymph diet during vegetation. Weather conditions influenced plant physiology, as an essential pre-requisite of nymph nutrition. However, March, April, July, August and September of 1994 and March and August of 1995 did not favour nymph nutrition at all, whereas during July and September, it was found out that pear suitability for nymph nutrition depended on the speed of vegetative growth, as a result of favourable environmental conditions, primarily good availability of soil moisture to ensure a new vegetative growth.

Regarding the number of adult pear psylla (histogram, 5 and 6) its population showed higher uniformity than those of egg and nymph instar.

Histogram 5. Comparative Dynamics of the Adult Psylla Population during 1994.



b_1 - *P. communis*, b_2 - *P. ussuriensis*, b_3 -Bartlet, b_4 - Passe Crassane, b_5 - Goyut, b_6 - Highland, b_7 - General Leclerc

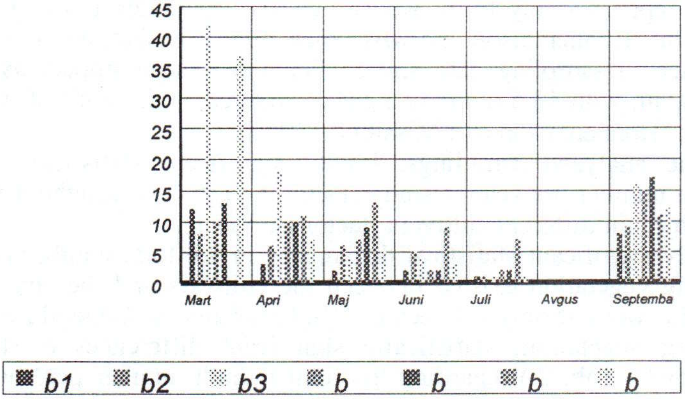
In January and February, on warmer days with temperatures exceeding 8-10°C, the adults of winter form were found in the crowns. The population density increased towards the middle of the orchard and towards the half of its rows, which indicated one specificity in the pest ethology, i.e. its tendency to overwinter within the orchard. The population density was higher in the lower and mid-parts of the crown over the vegetation in 1995, in the spring-summer period, as the result of the pest adaptation to unsuitable environmental conditions of biocenoids, i.e. the result of frequent rainfalls. Taken vertically, such a high population density was also reported by Grbić et al., 1988.

Highly numerous adults were detected in the samples taken in March and September, i.e. at the beginning of the vegetation and its end, as well as in the period of intensive pear growth - April, May and June.

Taken on the whole, the maximal number of adults was recorded in April, 1994 and in May, 1995, whereas according to Rieux et al., 1990, their highest number was detected in June.

However, not only the adults of the F_1 generation were discovered, but also those of the typically winter form, suggesting a relatively high overall fertility of this form and a long oviposition period lasting for nearly 2.5 months, since the first eggs had already been laid in February; somewhat shorter oviposition period lasting for 60 days (7.03-9.05) was reported by Grbić, 1974.

Histogram 6. Comparative Dynamics of the Adult Psylla Population during 1995.



b_1 - *P. communis*, b_2 - *P. ussuriensis*, b_3 -Bartlet, b_4 - Passe Crassane, b_5 - Goyut, b_6 - Highland, b_7 - General Leclerc

While no adults were descovered in the samplings on b_6 (Highland) taken in March, its number increased in the sampling date of April and May and reached its peak on the particular cultivar. An explanation lies in the psylla migratory ability (Wille, 1950), i.e. its migration from old and surrounding orchards as far as 200-300 m.

In July and August 1994, this pest abandoned the orchard. Its population declined in number as reported by Grbić et. al., 1988 and Nguyen and Lemoin, 1993.

During the next vegetation in July, an abruptly decreased number of eggs, nymphs and adult psyllas occurred, whereas during August the eggs were only present on the leaves of Highland, grown in the first row of the orchard, while in the remaining part the oviposition was not noticed. The presence of eggs only on this cultivar is possible result of pest migratory tendencies, i.e. sporadic oviposition, for this is the period when adult population abandon the orchard due to strong eco-pressure in biocenoid (Wille, 1950; Nguyen and Lemoin, 1993). Beside a rather long day, high temperatures (25-30°C) also significantly affects the pest ethology, because of the presence of poor vegetative growth in the insect host plant (Vrabl and Matis, 1977; Nguyen, 1968 according to Derousier Sophi, 1984) which slow down or completely interrupts shoot growth. On the other side, female fertility was weakened due to a temperature rise above 25°C and a long daytime (Nguyen, 1968 according to Derousier Sophie, 1984).

The material was sampled from pear orchard where psylla's behavior is different from how it behaves in intensive or industrial orchards. This is the main reason that no pear psyllas existed in pear orchard during the 2-month period (July-August) contrary to detection of their maximal number in intensive orchards during the same period (Gut et al., 1982).

The adults of winter and summer form were observed in the sampling material during September 1994, while the adults of winter form were observed in 1995. This points out at already confirmed adult natural inability to continuously reproduce any form, whose genesis was under a strong impact of the photoperiod (Bonnemaison and Missonier, 1956). In fact, about ten days of time difference in sampling date shifted the photoperiod impact as the days began to draw in, with 13.5 hours of light considered as the limit of insect form determination (Bonnemaison and Missioner, 1956).

In the analyzed samplings, highly significant statistical differences existed in egg number per year of study (factor A, Tab.1.) throughout vegetation (factor C, Tab.1.) in different cultivars (factor B, Tab.1.).

Highly significant statistical differences in the total number of nymphs hatched during vegetation existed between the cultivars and the control. These differences did not exist only between cv. Highland and cv. General Leclerc.

During vegetation, statistically significant differences existed in all months (factor C, Tab. 2.) regarding the total nymph number per shoots in all cultivars.

However, no significant differences on a year basis (factor A) existed in the total number of adult psylla. On the surveyed cultivars (factor B - Tab.1.), no differences in adult number existed only in the comparisons between:

P. ussuriensis- Passe Crassane, Goyut, Highland; Bartlet - Passe Crassane; Highland - Passe Crassan, Goyut.

Throughout vegetation per months (factor C - Tab. 1), no differences existed in comparisons March-September, April-May and July-August, i.e. at the beginning of the vegetation and its end, in other words, in the period of intensive insect host plant growth and the period of the absence of its vigour growth.

Tab.2. LSD Values of the Factors Influencing Different Psylla Instars

instar	egg			nymph			adult psylla		
P \ F	A	B	C	A	B	C	A	B	C
0,05	2.783	5.207	5.207	1.836	3.434	3.434	0.655	1.225	1.22
0,01	3.649	6.828	6.828	2.408	4.503	4.503	0.858	1.606	1.60

F - factor; A - year; B - cultivar; C- month;
P - probability;

LSD test was used to test the significance of the differences between interaction factors. The data were obtained from the analysis of the three-factorial trial, and the values are given in the Tab. 3.

Tab. 3. LSD Values of the Interaction Effects of the Year and Cultivar (interaction AxB), Cultivar and Month (interaction BxC), Year and Month (interaction AxC) on Various Psylla Instars

instar	egg			nymph			adult psylla		
P / F	AxB	BxC	AxC	AxB	BxC	AxC	AxB	BxC	AxC
0,05	7.007	13.77	7.007	4.857	9.087	4.857	1.733	3.234	1.73
0,01	9.655	18.06	9.655	6.638	11.91	6.638	2.272	4.240	2.27

F - factorial interactions: A xB - year x cultivar; B x C - cultivar x month; A x C - year x month; P - probability

Cultivar (factor B - Tab. 2.) had statistically high significant effect on the total of laid eggs. Thus, highly significant statistical differences existed between the observed cultivars and control, among cultivars per se, as well as in the number of laid eggs in different months (factor C - Tab. 1.) during the growing season.

The total of laid eggs was under a high statistical influence of the year (factor A-Tab. 2.) and month (factor C-Tab.2), regarding their interaction, there are statistically remarkable differences in the number of laid eggs (Fig. 1.) and hatched larvae (Fig.2.) on various cvs. during the years (interaction A x B - Tab. 3) and different months (interaction A x C - Tab. 3.) (Figs. 4 and 5).

The year (factor A - Tab. 2) had a profound statistical impact on the total of the nymphs, but none on the adult pear psylla number. Regarding the variety, comparing *P. ussuriensis* and Passe Crassane, Goyut and Highland, there are no differences in the total number of adults, which is the result of the various spatial distribution of the studied cultivars. *P. ussuriensis* was grown as a seedling in the container, then kept in the glasshouse in winter time, and finally transferred to pear orchard in the spring.

No statistically significant differences in psylla number were manifested on Bartlet, Passe Crassane, Goyut, Highland and General Leclerc during the vegetation, meaning they are equally attractive to adults (Fig. 9.).

In monthly samplings made throughout vegetation, no changes in psylla number were recorded in the following comparisons:

- March-September - the beginning and the end of vegetation;
- April-May - the period of´the most intensive growth and highly expressed infestation;
- July-August - the bimonthly highest average temperatures with adverse effects on the fertility.

Although the most of cultivars has moderate or high susceptibility to pests, the cultivars were not responsible for the dynamics of pear psylla population, but the leaf state and honeydew caramelisation were. Neither antixenosis (Quarta and Puggioni 1985) nor antibiosis (Butt et al. 1989) existed on any one cultivar or control tree.

Under natural infestation conditions - extensive production, individual trees or the equilibrium at the level of an orchard - pear psylla could behave within the limits of trophic preference of the species. However, after being met in highly exuberant cultivars, tending to overgrow in number and in search of food, psylla simply moved to some other cultivars irrespective of their preference, but for the plant tissue of a strong cellular pressure to enable its smooth growth.

Breeding programmes on furthering cultivar selection on resistance or lower attraction to pear psylla infestation are not available because the sources on germplasm resistance come from Asian pears (Westigard et al., 1970; Quama, 1984) or rather old Balkan ones (van der Zwet et al., 1983) being too small, firm, of non-edible mesocarp, with inadequate market flavour, and therefore, commercially useless.

Conclusion

On the basis of the obtained results of the dynamics of pear psylla population in wild and grown pear cultivars, we can conclude the following:

- that vegetative state of the insect host plant largely affects dynamics of psylla population in the orchard;

- the presence of different pear psylla developmental stages is established in all 5 cultivars and control trees *P. communis* and *P. ussuriensis*;

- pear psylla absence in the orchard was reported during July and August 1994 and in August 1995, as a result of poor vegetation;

- egg populations were most numerous in April, May and September, with declined number reported for the period June-September; the nymph populations appeared in the largest number during the period May-June, with the reported increase in September, whereas adults population decreases in number over the period June-September;

- high adult number over May-June, was accompanied by maximum oviposition, suggesting high fertility of the summer pest form; high adults number at the beginning and at the end of the growing season indicate allochthonousness of adult population in this part of the growing season;

- the total number of laid eggs was under a strong impact of all the three factors: year, cultivar, month, with pronounced statistical differences found between the control trees *P. communis* and *P. ussuriensis* and other cultivars. As regards differences within a variety itself (Bartlet, Passe Crassane, Goyut, Highland and General Leclerc), significantly high statistical differences might as well be noticed; they are the result of the different attractiveness of the studied cultivars to oviposition;

- nymph/egg ratio, as an indicator of the preference in nymph nutrition was leveled off during individual growing seasons. For comparison, this ratio was higher in 1995 than in 1994, as the result of more suitable environmental conditions and more vigour vegetative growth. Among grown cultivars, the mean values were levelled off during sampling period, where Iv=12.92-18.33 and 15.95 was very close to *P. communis.*

- the number of psylla was unaffected by year of study; during vegetation, neither the differences in the comparisons March-September, April-May, July-August, nor those between b_2 and b_4, b_5, b_6, b_3 and b_4, b_6 and b_4, b_5 existed;

- the influence of environmental factors and vegetative state of the insect host plant on pear psylla number is higher than the influence of the cultivar itself.

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DINAMIKA POPULACIJA KRUŠKINE BUVE *Cacopsylla pyri* L. (*Homoptera, Psyllidae*) NA NEKIM DIVLJIM VRSTAMA I GAJENIM SORTAMA KRUŠAKA*

-skraćena verzija magistrske teze-

Snežana Tanasković

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Rezime

Dinamika populacija kruškine buve praćena je na *P. communis*, *P. ussuriensis* (b_1 i b_2 - kontrolnim stablima) i pet (b_1, b_2, b_3, b_4, b_5) gajenih cv.: Vilijamovka, Krasanka, Gijova, Hajland i General Lekler tokom 1994. i 1995. god. Uzorci su uzimani jedanom mesečno tokom vegetacije; prebrojavanjem različitih razvojnih stadijuma štetočine posmatran je uticaj godine (vegetacije), sorte (cv.) i meseca na dinamiku populacija.

Prisustvo različitih razvojnih stadijuma kruškine buve ustanovljeno je kod svih posmatranih cv. i kontrolnim stablima, uz nepodudaranje životnog ciklusa usled značajnog uticaja vremena i prirodnih regulatora brojnosti i dva prekida u dinamici populacija, juli i avgust 1994. odn. avgust 1995. usled odsustva vegetativnog prirasta na kruški.

Na ukupan broj položenih jaja visoko statistički značajno utiču sva tri posmatrana faktora; cv. pokazuju različitu atraktivnost prema ovipoziciji.

Nimph/egg ratio, kao pokazatelj preferencije u larvalnoj ishrani, ujednačen je tokom pojedinačnih vegetacija; viši je tokom 1995., a među gajenim cv. i *P. communis* ujednačen.

U broju imaga razlike ne postoje u poređenjima III-IX, IV-V, VII-VIII; između cv.: b_2 i b_4, b_5, b_6; b_3i b_4; b_6 i b_4, b_5.

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* Rad predstavlja odbranjenu magistarsku tezu 4.12.1996.god. na Poljoprivrednom fakultetu u Novom Sadu. Urađen je na 71 strani kucanog teksta i sadrži 14 fotografija, 2 šeme, 3 tabele, 8 histograma i 23 grafikona, 109 citiranih literaturnih izvora. Original je na srpskom sa sažetkom na srpskom i engleskom jeziku.

Appendix

Fig. 1. Interaction Effects of the Year and Cultivar (interaction AxB) on Dynamics of Egg Population

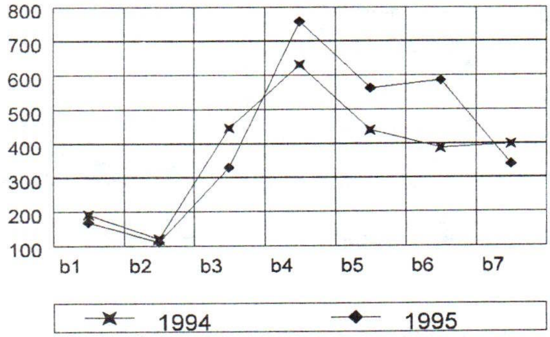

Fig. 2. Interaction Effects of the Year and Cultivar (interaction AxB) on Dynamics of Nymph Population

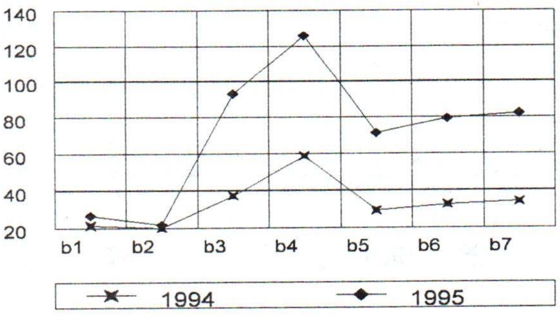

Fig. 3. Interaction Effects of the Year and Cultivar (interaction AxB) on Dynamics of Adult Psylla Population

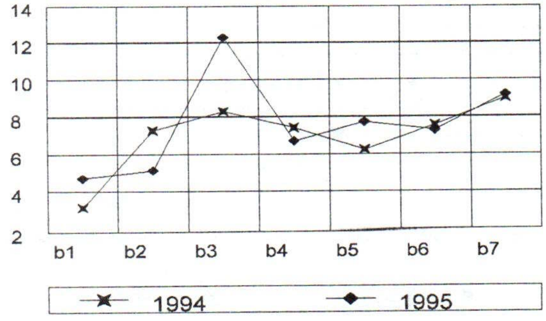

Fig. 4. Interaction Effects of the Year and Month (interaction AxC) on Dynamics of Egg Population

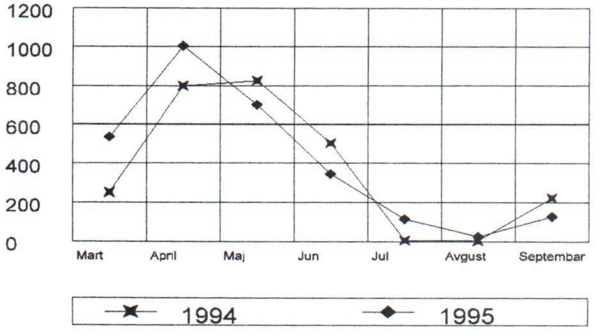

Fig. 5. Interaction Effects of the Year and Month (interaction AxC) on Dynamics of Nymph Population

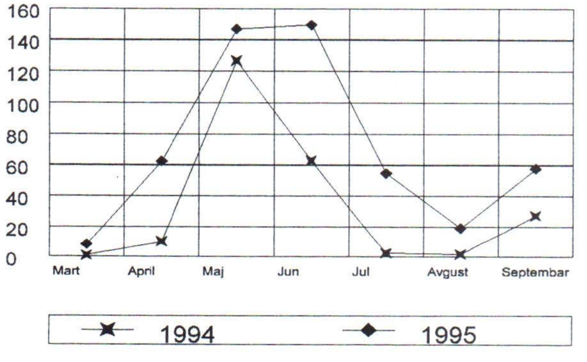

Fig. 6. Interaction Effects of the Year and Month (interaction AxC) on Dynamics of Adult Psylla Population

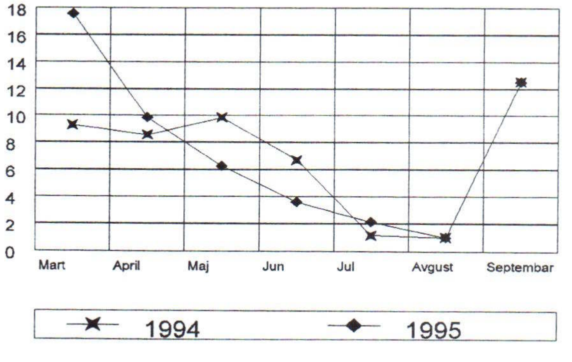

Fig. 7. Interaction Effects of the Cultivar and Month (interaction BxC) on Dynamics of Egg Population

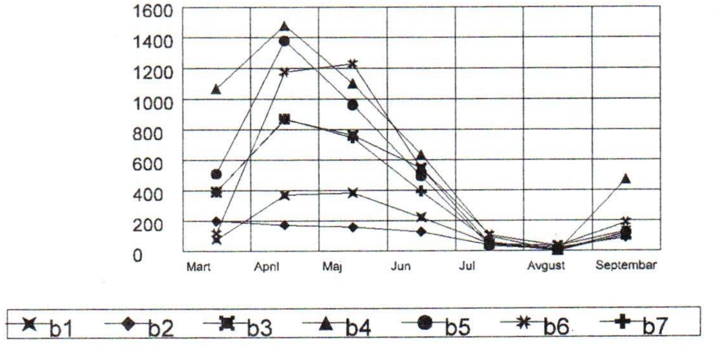

Fig. 8. Interaction Effects of the Cultivar and Month (interaction BxC) on Dynamics of Nymph Population

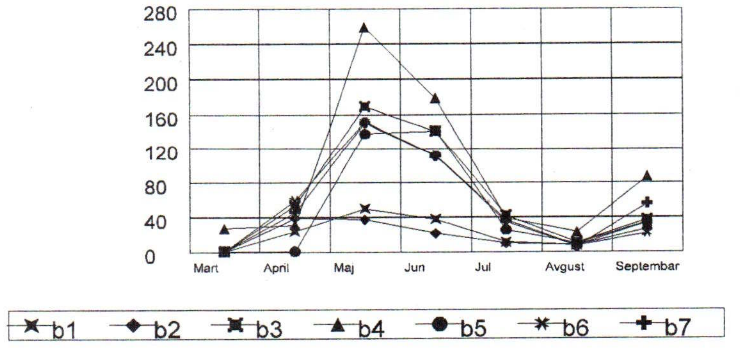

Fig. 9. Interaction Effects of the Cultivar and Month (interaction BxC) on Dynamics of Adult Psylla Population