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SEASONAL VARIABILITY AND POPULATION DENSITY OF APHIDS OF GYMNOSPERM PLANTS IN THE FERGANA VALLEY

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Abstract:

In the article is spoken about regression analysis of seasonal variability and population density of aphids of gymnosperm plants. Statistical analysis shows that the seasonal change in the number of aphids of gymnosperm plants is within the norm and below the standard indicator (t_{st}) according to the criterion of agreement x^2 Pearson's square.

Keywords: Aphids, Regression Analysis, Seasonal Variability, Population Density, Gymnosperm Plants, Fergana Valley.

INTRODUCTION

In the seasonal development and changes in the number of aphids, modification factors are of particular importance. The choice of feeding places and the size of the colonies of insects depend not only on environmental factors but also on the behaviour of these insects, the ethological relationship between them and others [1, 3, 4, 5, 6, 8, 9, 14].

It has been established that during seasonal changes in the aphid population, the spring, spring-summer, summer-autumn and autumn-winter periods are observed [2, 7, 10, 11, 13].

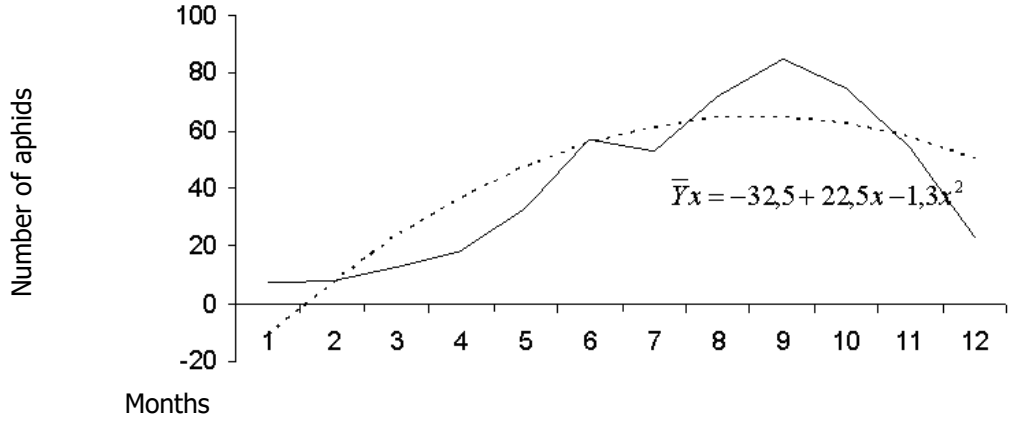
MATERIAL AND METHODS

During the study period, we selected the average ten-day and monthly empirical indicators of the density of aphids and they were approximated. The accuracy of the degree of regression analysis was tested by Pearson's null hypothesis and Fisher's test [12].

RESULTS AND DISCUSS

The increase in population density of *Cinara tujafilina* del Guercio occurs in the second half of the flying season and reaches a high level in late September and early October.

The seasonal change in the number of *Cinara tujafilina* corresponds to the summer-autumn type of development ($y_x=-32.5+22.5x-1.3x^2$; $t_ф$=14,94; t_{st}=16,92 and P=0,05; fig. 1).



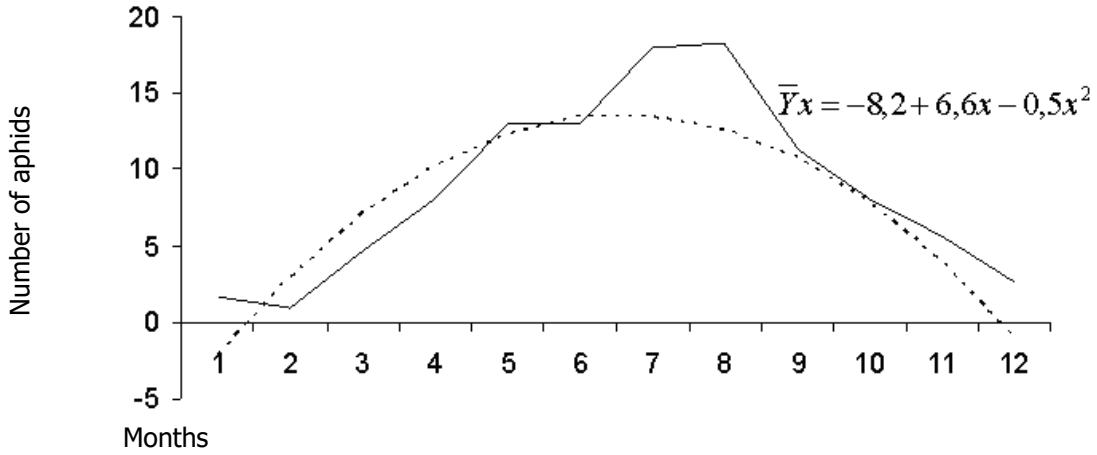
Pic. 1. Seasonal changes in the number of *Cinara tujafilina* (n = 12).

In the summer-autumn period, Cinara tujafilina intensively emits honeydew, as a result of which not only fodder plants, but also the surrounding area, are heavily contaminated.

The degree of reliability of the approximation line of *Cinara tujafilina*

Months	**Empirical results** ***(f)***	**Approximated results,** ***(f')***	***f-f'=d***	***d^2***	***d^2/f'***
1(I)	7	-11,3	18,3	334,89	-29,64
2(II)	8	7,3	0,7	0,49	0,07
3(III)	13	23,3	-10,3	106,09	4,55
4(IV)	18	36,7	-18,7	349,69	9,53
5(V)	33	47,5	-14,5	210,25	4,43
6(VI)	57	55,7	1,3	1,69	0,03
7(VII)	53	61,3	-8,3	68,89	1,12
8(VIII)	72	64,3	7,7	59,29	0,92
9(IX)	85	64,7	20,3	412,09	6,37
10(X)	75	62,5	12,5	156,25	2,50
11(XI)	54	57,7	-3,7	13,69	0,24
12(XII)	23	50,3	-27,3	745,29	14,82
tф=					14,94
				t_{st}=16,92 (k=9)	
				P=0,05	

Eulachnus alticola (Born.) Lives on the needles of the Crimean pine throughout the whole season of the year, multiplies intensively in the summer, and by the end of the season its number gradually decreases. Under the influence of aphids, pine needles turn yellow and fall off. (y_x=*-8.2+6.6x-0.5x^2*; $t_ф$=12,95; t_{st}=16,92 and P=0,05; fig. 2).



Pic. 2. Seasonal changes in the abundance of *Eulachnus alticola* (n = 12).

The *Tuberolachnus salignus* Gmelin is one of the most serious pests of willows in Uzbekistan. In the first half of the year, the number of aphids is very low, they live mainly in the root part or lower tiers of the growth of the fodder plant. A high abundance is observed starting from the second half of July, increases further in the autumn-winter period and covers the trunks and branches of willows.

Tuberolachnus salignus overwinters in the wingless virgin stage on the root part of willow stands.

Under the influence of aphids, metabolism is disturbed, the decorativeness of the fodder plant changes, the branches dry out. In October and November, aphids intensively emit large quantities of a yellow sugary substance that pollutes the environment and solidifies in lumps on the trunks and thick branches of willow.

In Uzbekistan, the species is distributed everywhere where willow grows, both in valley and mountain zones (y_x=*2.7+1.4x+0.1x^2*; $t_ф$=14,92; t_{st}=16,92; P=0,05; fig. 3).

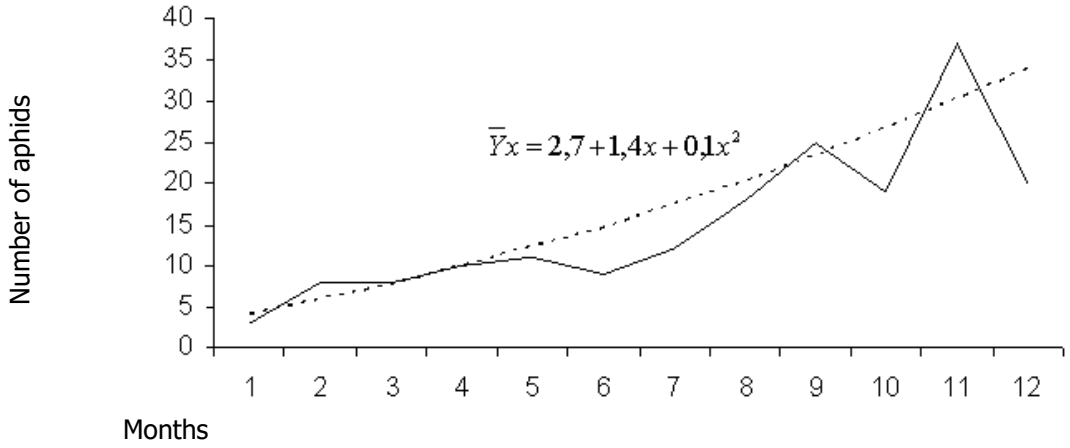


Fig. 3. Seasonal changes in the abundance of *Tuberolachnus salignus* (n = 12).

Pterochloroides persicae (Chol.) lives on the bark of the trunks and thick branches of peaches and almonds, and is found in large colonies on the shady side of the trunk or on the underside of the branches.

The increase in the number of the species occurs in the spring-summer and summer-autumn periods. The first - the spring-summer rise in numbers occurs in late April and early May (y_x=*-8.77+11.77x+1.02x²*; $t_ф$=12,58; t_{st}=14,07 and P=0,05; Fig. 4).

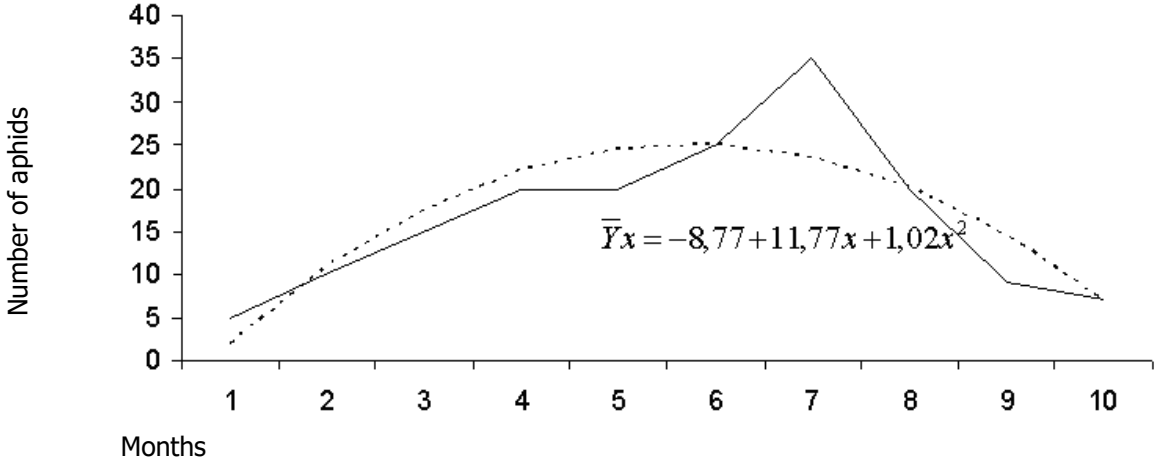


Fig. 4. Seasonal changes in the abundance of *Pterochloroides persicae* (n = 12). (spring-summer period, 9-18 decades).

The second period of increase in the number of aphids begins in the second half of July and lasts until the end of November. The results of their regression analysis correspond to the seasonal indicators of the density of the species (y_x=*-0.17+8.51x+0.54x²*; $t_ф$=7,93; t_{st}=22,36 and P=0,05) (fig. 5)

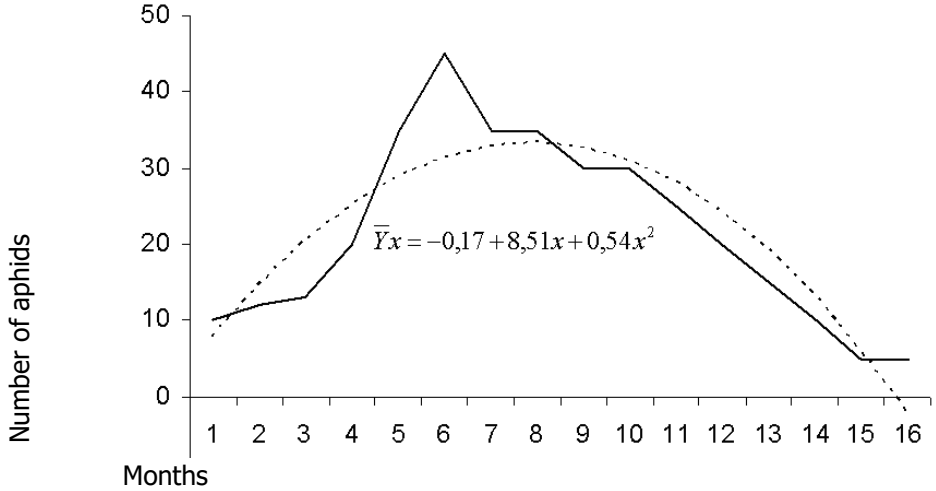


Fig. 5. Seasonal changes in the abundance of *Pterochloroides persicae* (n = 12). (summer-autumn period, 19-34 decades).

The black peach aphid is a very serious pest of peach and almond trees, because 30,000 individuals of the species during 150 days of life on one peach tree secrete about 135 kg of excrement containing 30-35 kg of dry sugar (Tumanyan, 1944).

CONCLUTION

Statistical analysis shows that the seasonal change in the number of aphids of gymnosperm plants is within the norm and below the standard indicator (t_{st}) according to the criterion of agreement x^2 Pearson's square.

Simultaneously, the seasonal change in the abundance of aphids was investigated by the method of correlation analysis, and the reliability of the results obtained was checked by the Fisher's "Z" method. Reliable correlations were obtained on the basis of the development of the abundance of aphids over decades of months. According to *Cinara tujafilina* – n=166,0; r=0,6659; S_r=0,043; Z=10,3565, P=0.001*, Eulachnus alticola* – n=105,1; r=0,24; S_r=0,095; Z=2,4745, P=0,05; *Tuberolachnus salignus* – n=206,6; r=0,9937; S_r=0,008; Z=37,7462, P=0,001.

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