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Research Article

THE BIOLOGICAL DEVELOPMENT CYCLE AND THE DAMAGE OF THE PEST OF THE SLIDERWORM (LEMA MELANOPUS L) IN THE CONDITIONS OF OUR REPUBLIC

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ABSTRACT

In this article, the dependence of temperature and relative humidity on the developmental phenology of Lema melanopus, a serious pest of wheat, is studied. As a result of the increase in the number of Lema melanopus, the level of damage to the leaves increases, the yield of wheat decreases.

KEYWORDS

Wheat, pest, egg, larva, imago, biological development cycle, level of damage.

INTRODUCTION

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All over the world, wheat (Triticum aestivum L.) plays an important role in ensuring the food security of the population [1]. Climate change, abiotic factors increase the number of pests and increase their harmful effects [2;3].

Among cereal pests, especially leaf-feeding pests, the impact on yield and grain quality is significant. One such pest is the specialized phytophagous slimy worm (Lema melanopus), which is considered a serious pest of wheat in many grain-growing countries [5;16].

According to scientists, there are about 100 types of slimy worm Lema spp, which live mainly in temperate and tropical countries and are found in plants belonging to the Amaranthacae, Commelinaceae, Compositae, Cyperaceae, Gramineae, Leguminosae families [18]. Among these families, it was noted that the Gramineae family is highly harmful to many wild and domesticated plants [4;8].

In the spring, when the weather conditions exceed 10-120C, the slimy worm beetle (imago) comes out of the field and causes damage by gnawing the leaves of spiked grain crops, creating narrow and elongated holes [20]. Egg-laying period can last 2-3 weeks depending on weather conditions. Under favorable conditions (warm, dry and sunny weather), one female can lay 200 to 300 eggs. In late April and early May, the larvae feed on the leaves and cause damage. The larvae gnaw the upper epidermis of the leaves and eat the parenchymal tissue, and after a while, the lower leaf layer dries up and turns white. Cereal leaf beetle larvae reduce the metabolism of flag and lower leaves up to 50%, and sometimes up to 80% [16;20]. If the pest control measures are not taken, the grain yield is reduced by 30-40%, and in the years with favorable climatic conditions for its development, it is reduced by 60% [14].

In addition, as a result of larvae feeding, wheat leaves are contaminated with sticky substances and droppings. Control of this pest is usually carried out when the size of the first hatched larvae reaches 4 mm and large numbers of hatched larvae are observed [15;19].

In the territories of the republic, this pest spreads and damages grain from the first half of March to the first decade of June. Harkunda reproduces once a year. The productivity of the female pest is from 50 to 275 eggs (single or in clusters on the upper surfaces of the leaves). The egg-laying period lasts up to 30 days. The larvae molt 4 times and turn into a mushroom [7;9].

Adult beetles leave the mushroom during the ripening period of the grain and go to the village [21;22].

METHODS

"TCT Agrocluster" LLC, located in the 2.6 and 4.2-hectare grain field of the "Sevara Brand Stilli" farm, planted in the hills near the mountainous region of Qibray district of Tashkent region, and located in the plain of Lower Chirchik district, Uzbekistan-2 region. We conducted experiments to determine the biological development cycle of Lema melanopus and the level of harmfulness in 4.5 and 9.4 hectares of fields and grain fields.

The first estimate of the number of adults, eggs and larvae of the slimy worm beetle in nature was carried out on April 8, 2024. Larval development was then assessed at weekly intervals and every 2–3 days from the tillering stage of winter wheat.

The time of appearance of pests, population calculation is generally accepted Polyakov I et al., (1984); Osmolovsky G.E., Bondarenko N.V., (1980), performed according to methods [10;11].

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In an area of 1 m2, pest larvae were counted by sampling 50 leaves (flag leaf and the second and third leaves from the top) randomly collected from 25 plants growing in 10 places diagonally at an equal distance from each other depending on the density. The leaves of plants in the samples are carefully examined and the number of eggs and larvae of the pest is counted.

The number of mealybug larvae and eggs was counted during the beginning of the tuber phase of grain crops. The scale of logarithms was used to determine the number of pests in one bush and the population density in a wheat field [6]. Their density was determined using the following formula (Lowe, 1984):

$$S = \frac{LxC)}{T}$$

Here: S- the number of pests;

L- degree of damage to crops (in points);

C- the number of damaged plants in this score;

T is the number of plants in the sample.

Determining the degree of damage to the leaves of grain crops with Piyavisa was carried out using the 0-5 scale of Stamenkov, S and Pankov, L. (1991) and the methods of Rouag N et al., (2012) [12;13].

Phenological observations and records of pests and diseases were carried out using generally accepted methods. To determine the level of damage, the scale of eaten bugs was used:

0 - plants are not damaged;

1 - score (traces of damage) - less losses 5% leaf surface;

2 - point (weak damage) - loss from 5 to -25%;

3 - point (average damage) - loss from 25 to 50%;

4 - point (strong damage) - losses from 50 to 75%;

5 - point (very severe damage) - loss of 75 to 100% of the leaf surface.

RESULTS AND DISCUSSION

In 2024, we studied Lema melanopus biological and ecological development characteristics and the level of harmfulness, starting from the tuber phase of wheat, until the earing and wax ripening phase.

In the territory of "TCT Agrocluster" LLC Uzbekistan-2, located in the Lower Chirchik district of the Tashkent region, we observed that the slime worm imago (beetle) hatched from the first 10 days of March to the third 10 days, and they mated with the female until the second decade of April. . The egg-laying period started from the first 10 days of April and lasted until the first 10 days of May. The development of larvae from eggs continued from the second half of April to the end of May

(See Figure 1). A temperature of 22-25 °C and a relative humidity of 60-70% were observed for the development of slimy worm eggs and larvae. The transition to the mushroom stage began in early May and lasted until the end of 10 days, then the beetles that passed from the mushroom stage to the adult imago phase remained in the soil for wintering in early June. According to the results of the observation carried out at the farm "Sevara Brand Stilly" located in Kibrai district, the above indicators differed from 6-7 days to 8-10 days and passed later. The reason for this is that the climate is relatively cool.

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Figure 1. Lema melanopus imago (beetle) and larva.

So, in the grain fields located in the hilly lowlands close to the mountainous regions, the development indicators of the slimy worm are 6-10 days later than in the grain fields in the flat areas. (Table 1).

Table 1.

The phenological development cycle of wheat mealybug (Lema melonopus L) in 2024.

Year/month	March			April			May			June			July	
	1	2	3	1	2	3	1	2	3	1	2	3	1	2
	(+)	+	+	+	+									
				•	•	•	•							
						-	-	-	-	-				
2024									+	+	+			
											(+)	(+)	(+)	(+)
*	**VI**	**VI**	**VI**	**VII**	**VII**	**VIII**	**IX**	**X**	**XI**	**XI**	**XII**	**Harvest**		

Conditional signs: (+) Rural period; + mature breed; • egg; - larva.

*Development phases of wheat: VI - germination; VII – tube feeding; VIII – spike;

IX - flowering; X – milk ripening; XI – wax ripening; XII - full ripening.

In order to determine the level of damage caused by slime beetles and their larvae on the leaves during the tuber phase of grain and the average number of eggs and larvae of the pest, when we monitored the 2.6-hectare field of the "Sevara Brand Stilli" farm, 22.4 per 1m2 eggs, L1+2 -1.8 pieces and L3+4 -3.3 pieces of larvae

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were detected, and it was found that the level of leaf damage was 1.8 points or 9.0%. In a 4.2-hectare grain field, 26.8 eggs, L1+2 -2.2 and L3+4 -4.3 larvae were found, the damage level was 2.1 points or 10.5%.

"TCT Agrocluster" LLC located in the Lower Chirchik district of the 4.5-hectare territory of Uzbekistan-2, when samples were taken, 36.8 eggs per 1 m2, L1+2 -2.2 eggs and L3+4 -3.8 eggs larvae were detected, the degree of damage to the leaves was 2.8 points or 16.8%. 10.2 eggs, L1+2 -3.3 and L3+4 -5.0 larvae were found in the 1.4-hectare grain field of this district (+), the damage level was 3.1 points or 25.8 % flag bugs were found to be infected

(See Table 2).

Table 2.

The number of slime beetles (Lema melonopus L) in grain crops is affected, and the degree of damage to flag leaves.

T/r	Territory and farms	hectare	1m2 in grain fields The number (density) of the pest.			Damage level (point) % of leaves per 1m2 in grain fields.					
			egg	larva		1-2	%	2-3	%	3-4	%
				L_{1+2}	L_{3+4}						
1.	Sevara Brand Stilley	2,6	22,4	1,8	3,3	1,8	9,0				
		4,2	26,8	2,2	4,3			2,1	10,5		
2.	"TCT Agroklaster" MChJ	4,5	36,8	2,2	3,8			2,8	16,8		
		1,4	40,2	3,3	5,0					3,1	25,8

CONCLUSION

So, according to our observations, the development of Lema melanopus depends on temperature and relative humidity from biotic factors. Because of this, the development of the slime worm in mountainous and sub-mountain regions differs by 6-7 days compared to plain regions. The more larvae of the pest per 1 m2, the higher the level of damage to the leaves, which leads to a decrease in the yield of wheat.

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