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The integration pestle against of Colorado Beetle in the condition of Ganja-Gazakh region of Azerbaijan

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Abstract

There have been found out ecological factor that influences development of the Colorado beetle. Dynamics of the development from point of view vertical zone have been learnt. One of the factor of reducing potato droving is a pest and it' s serious injury. Sometimes it cause to harvest loss. Even there are 40- 45 percent harvest loss in some places where pests develop.

Keywords: Potato, dynamics of the development, vertical zone, ecological factors, ecological plasticity, the number of the generations, phonological calendar, integration pest and so on.

Introduction

Potato growinq takes an important place in the agriculture and this simple vegetable provides people with nutrition products. Chemical composition of potato tuber once more proves that some elements which specially made from potato assimilate by people which need to every people organisms. In the system of gastroenteroes to my for providing of peristaltic sick people are advised meals made by potato tubers.

In the cattle breedinq potato tubers are used as feed. In other point of view potato growinq assumes special strategy importance. Because starch alcohol, caoutchouc and etc. are producted by potato. So production of potato assumes both economic and strategy importance. From this point of view potato growing is occupied in the whole regions of our republic.

Potato vegetable is brought to Azerbaijan by Russian moved to the Caucasus. At the end of the XVIII century and spreaded in the mountainous regions. Nowadays potato vegetable is grown in the individual and farmer agriculture minus 26 meters above sea level. But In Ganja- Gazakh region potato is grown till 1480 –meters above sea level (in Gadabay) (Diagrams 1) [1; 2].

Materials and Methods

The first time pest are observed in Azerbaijan in the seed of potato which is brought by Lvov region (Ukraine) in 1972. Nowadays pests spread in all region our country. Colorado beetle (Leptinotarsa desemleneata Say) – a dangerous beetle injures not only potato growing but also other agriculture vegetables such as tomato, eggplant, pepper and etc. [3; 4; 5]. We study biological, ecological and other features of Colorado beetle according to methods of Bey- Bienko , Bryansev B.A. We used methods for excavations by Shegolev V.A., Ushatinskaya R.S. and Fasulati K.K. It was work out integration measures on sowing of potato.

Results and Discussions

Bio-ecology nature. In the condition of Ganja - Gazakh region pests wintering in imago stage. We see insects in lowland and foothills regions in the deep of 28-70 sm, and in upland and highland regions in the deep of 0,60-1,2 meters of the soil. The reason of their wintering in the different deep of layer of earth depend on the sort and structure of the earth ground.

When temperature is above 14-15 ^{o}C in the layer of the soil insects seem on the upper layer of soil. Beetles that come from wintering looks for water immediately. That 's why beetles wintered in early sprinq are often seem in the side of arks, in the hollow cavity, in the side of lake let. Wintered insects can live without food till 38 days. After 3- 4 days wintering time we observe the process of coupling. Some days (3- 7 days) from coupling (when temperature above 17-18 ^{o}C) we meet their putting eggs. Insects put eggs hill under leaf. There are from 3 to 30 eggs in this hill. The eggs of wintered insects can be till 400-600 numbers. But other eggs of insects can be till 800 numbers. The development of embryonic depending on the temperature continue 4- 5 or 7-12 days (Embryos grows above 12-18 ^{0}C till 12-7 days, above 18- 22 ^{o}C 5- 4 days). When temperature rises above 38 ^{o}C embryos dies [6; 7; 8; 9; 10; 11].

Formulated larvae are nourished with remnants of eggs and with eggs in early times. There are few larval and it effects the press of population. After some days larval spread under and on the leaves and nourishes with leaves.

The development of larval complete depends on temperature 22- 26 days. We cleared that larval can live without nutrition 3- 4 days. Larval that completing development drove in 5-12 sm deep according to the structure of the soil. According to weather condition the forms of beetles complete till 10-12 days. Pests give 2 or 3 generations depending on vertical zona (Diagrams 2 and 3).

Geographical distribution. We cleared factors which limits spreading of pests and their giving generation. Researchs showed that Colorado beetle had spread only north part of the equator. Investigators explain that pests are origin of the north. 2003-2015 years research shows that colorado beetle spreads in mild climate zone in the north and in regions subtropical zone in mild climate zone (Map1).

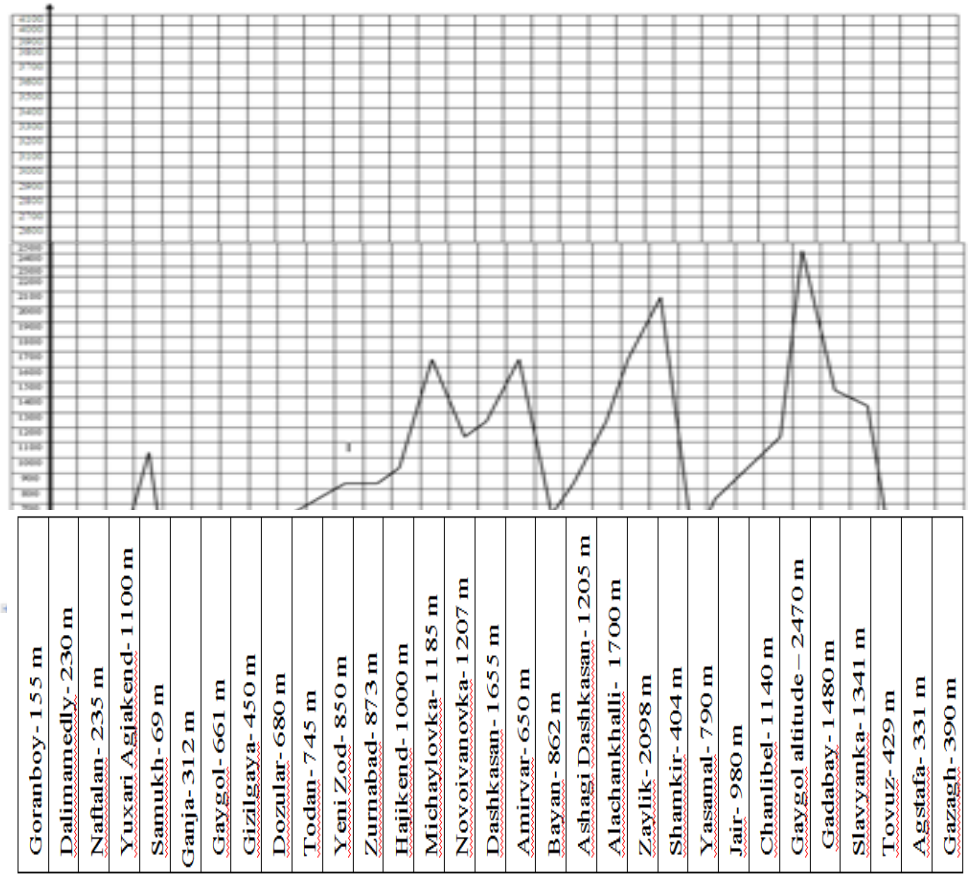
It shows that changeable and unchangeable ecological factors of mild zone suitable for the development of Colorado beetle. In this tempered changeable factors (temperature, antrpogen development, relative wetness number of rainfall, the direction of wind, atmosphere prescription, PH- of structure of land, the wetness of ground, isolation type, lighting, radiation etc.) and unchangeable factors (the direction of the sun 's movement, seasons, climate tempered, landscape tempered, the alternate of day and night, biological rhythms, the above of sea level and etc.) regulated of the development of insect and its spreading.

Diagrams 1

Effects of spreading of pests in potato field of vertical zone and landscape zone in the condition of Ganja- Gazakh region

Landscape zone:

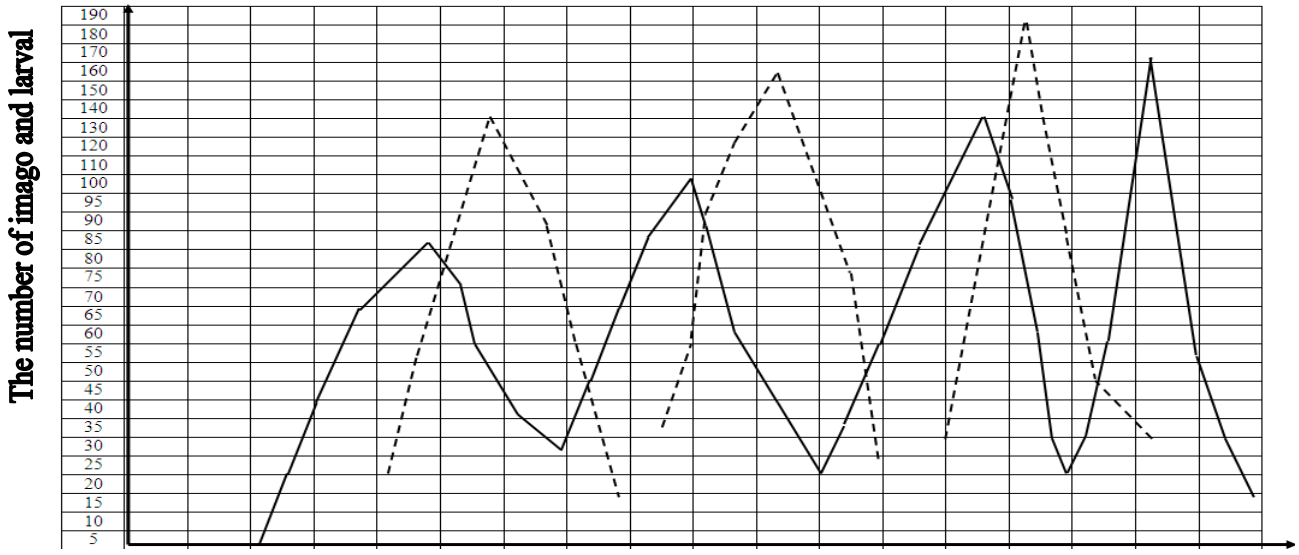
1. Glacier (above 3800-3900 m)
2. Nival (from 3000 to 3800-3900 meters)
3. Alp (from 2300- 2400 to 3000 m.)
4. Subalp (from 2000-2200 to 2300-2400 m.)
5. Middle mountainous forests (from 1000 to 1800-2000-2200 m.)
6. Middle mountainous semifeild (from 1000 to 2000 m.)
7. Low mountainous forests (from 500 to 1000-1200 m.)
8. Low mountainous semifeild (from 500 to 1000 m.)
9. Low mountainous semidesert (from 800 to 1000 m.)
10. Foothills, partly low mountainous forest- field (from 500 to 800-1000 m.)
11. Foothills forest (from 200 to 500-600 m.)
12. Foothills semifeild (from 200 to 500-600 m.)
13. Foothills semidesert (from 200 to 500 m.)
14. Lowland, partly foothills semidesert (from minus 28 to 200-400 m.)



The investigation of southern hemisphere shows that mild climate tempered environs the water of oceans and seas.

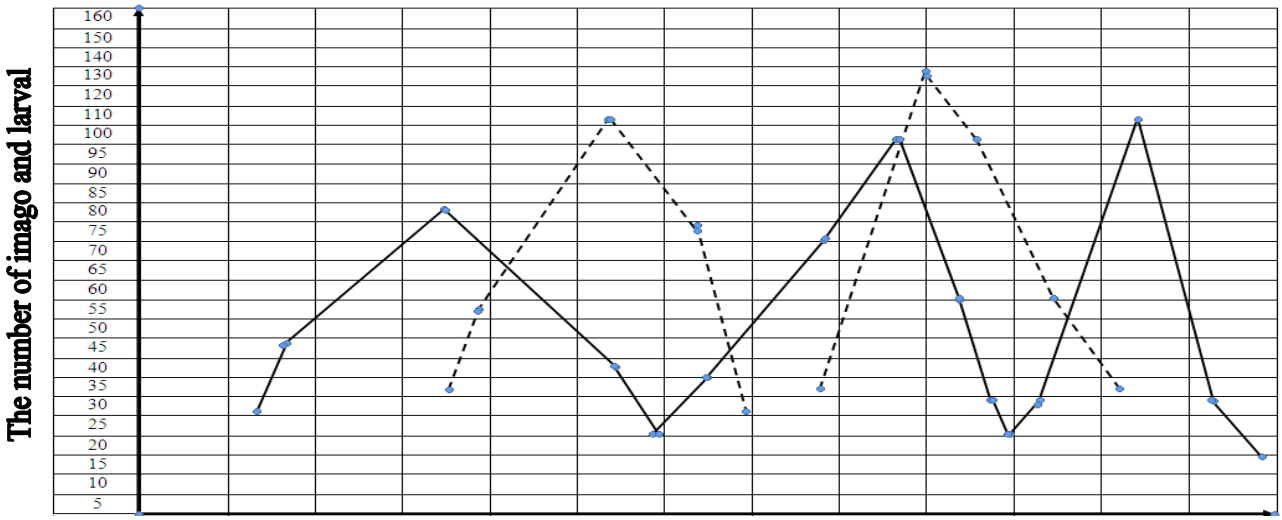
Diagrams 2

Dynamics of the development of Colorado beetle in Gaygol region
(Till 900- 1000 meters of sea level)



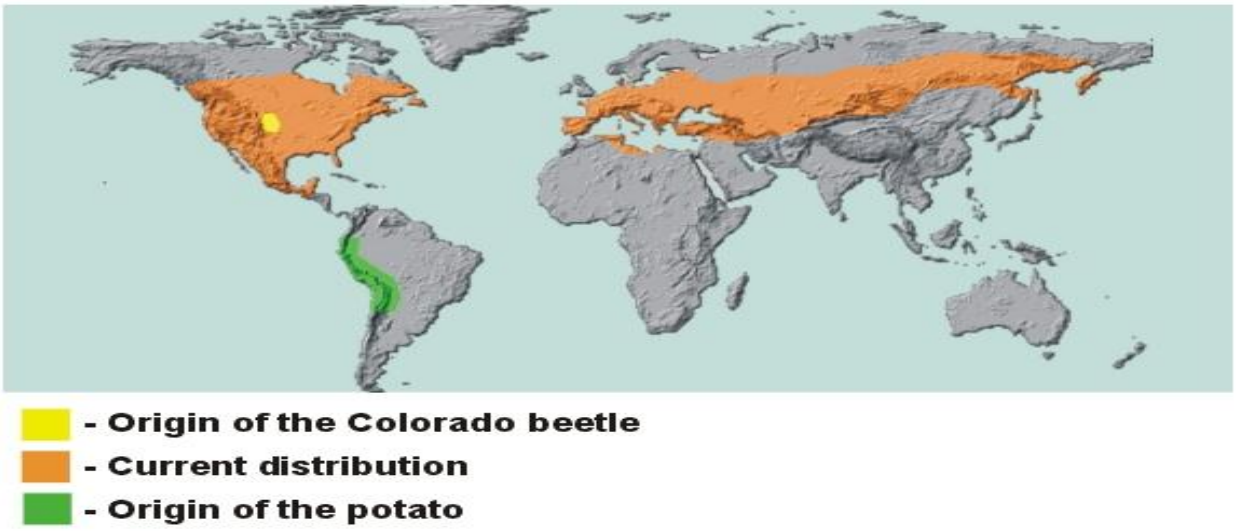
Diagrams 3.

Dynamics of the development of Colorado beetle in Gadabay region
(1000 meters above sea level)



Transcription: + imago; larval.

Map 1.



In southern hemisphere the mild climate tempered on the ground came across only in South America and New Zealand. The spreading of Colorado beetle in this regions cause the area of mountains. In South America encircled of mild tempered dry areas above sea level 6000 the and mountain, the top of Aconcagua but in New Zealand 3764 (the top of Kuku) in this areas are unsuitable for spreading of Colorado beetle. It is shown that the factor of the areal which diminished the insect is different.

Colorado beetle in Ganja- Gazakh region investigation shows that the factors of diminished of Colorado beetle cannot develop their generation above sea 900-1000 m sea level. The investigations show that to climb above sea level young individual of the Colorado beetle spread wintering more layer of the earth. But in spring the layer of the earth is getting warmer day by day and its cause to late the rise of beetle (Diagramme 4).

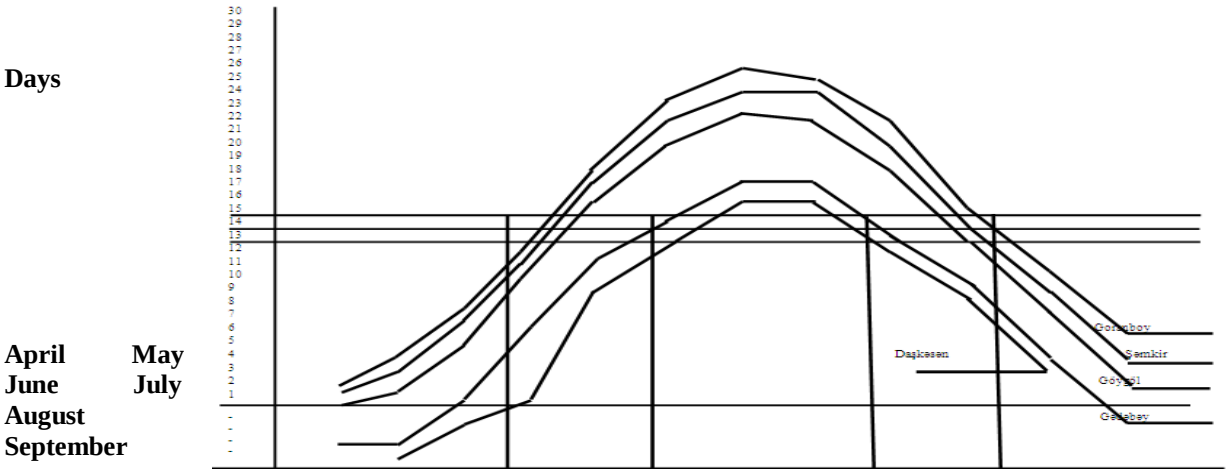
As shown in Diagramme 4 Gay-gol, Shamkir and Goranboy regions from above sea level to 900-1000 m areas Colorado beetle for go out wintering it needs temperature (14-16 ^{o}C) in April, observation that Gay-gol, Shamkir and Goranboy regions from 1000 m above sea level areas in this way Goranboy, Dashkasan regions came across in the first half of June. It is reason that till the raisen highless above sea level the temperature of air come down 0,6 ^{o}C (Graphic 1).

The ability of increase of generation of Colorado beetle is depended on ecological factors and bioklimagrams evidence it. To above 900-1000 m sea level in the areas where growing potato the developing of colorado beetle depending of ecological factors are shown at bioklimogramme (Diagramme 5).

The bioklimogramme of Colorado beetle in Gadabay region Slavyaka village. The fields where the area of growing potatoes more than highless 1000 m above sea level. The development of pest which growing potato fields in Slavyanka village of Gadabay district (up 1000 meters above sea level) seriously differ from the development of pests in Gizilgaya village.

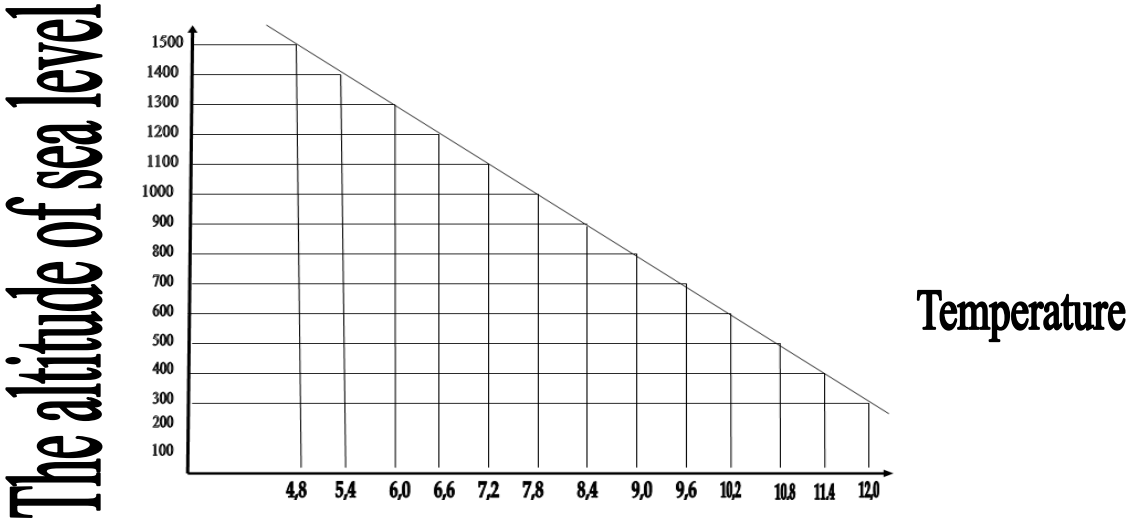
Diaqramme 4.

The ability of giving generation of colorado beetle depending on temperature according to regions



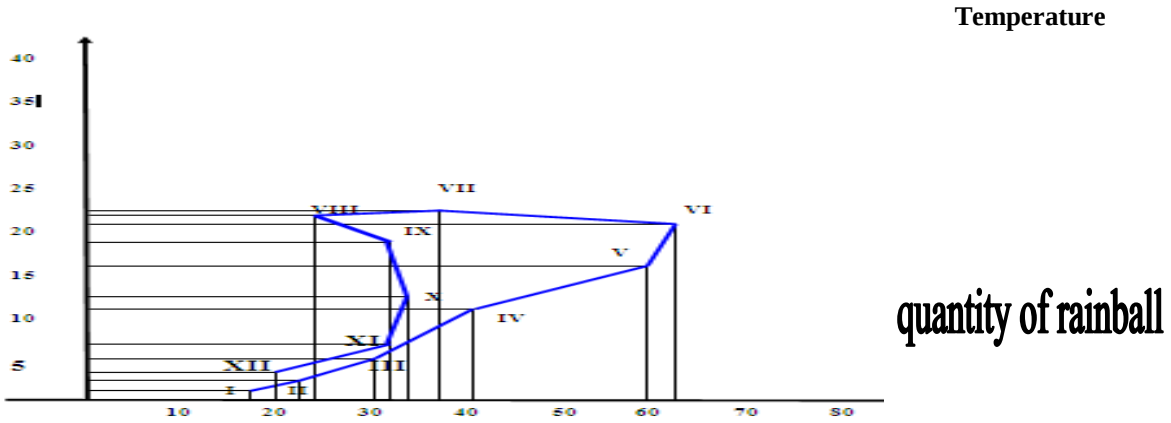
Graphic 1

Changing of temperature depending on above sea level



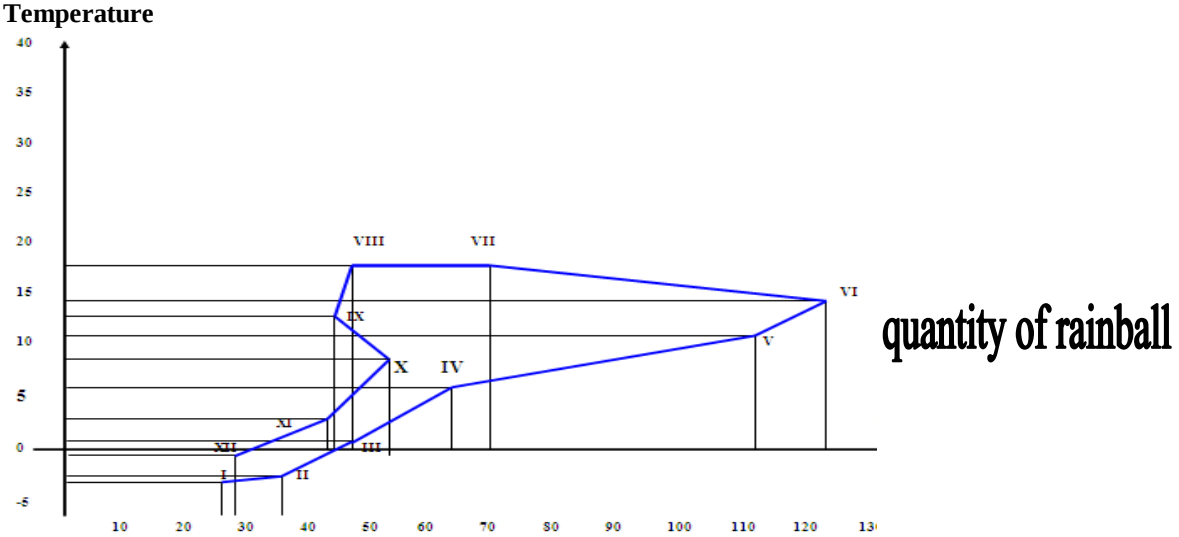
Diaqramme 5

Bioklimogram of colorado beetles in potato growing in region till 900- 1000 m above sea level (Gaygol district, Gizilgaya village)



Diaqramme 6

Bioklimogram of colorado beetles in potato growing in region from 1000 m above sea level (Gadabay district, Slavyanka village)



Conclusion

Investigations show that the spreading area development, the number of generation of Colorado beetle is depending on both changeable and unchangeable factors. The Colorado beetle spread lot and influeuce negative to economy and that is why it needs to combating agrotechnical, biological and chemical against it.

The ecological factors which influenced the growing of potato show that this plant grows on the temperature 17- 21 ^{o}C and gives rich harvest. In this temperature the green part of the plant grow feeble, the tubers growth rapidly. From this point of view the geographical situation and climate condition of the area is suitable for the plaut of potato in sprinq and in summer period . Sowing period is coordinated to the local condition diminish influence of damage of pest. Investigations show that early sowing Colorado beetle grows 1,0-1,5 generations, in spring sowing- 2 generations, in summer sowing- 0,5-1,0 generation.

That is why in this area pay attention of specially the period of sowing the potato. But it needs to pay attention above sea level, must selected the sowing period which suitable the ecological condition (Time-table 1). The area where above to 400 m sea level it is need prefer the early and summer sowing of the potato plant. To above 500- 700 m sea level areas of this region which growing early and spring (april) sowings the process of the being potato tuber. It comes across on hot weather and it is cause the diminished of the harvest. It the weather is more than 28- 32 ^{o}C it is caused to more the height and growth of the plant, but the process that being potato tuber steps. It obsewed grow the wild and anormal in the potato tuber. In this regions must carry the summer sowing.

Time table 1

According to above sea level the sowing period of potato

Early sowing	**Spring sowing**	**Summer sowing**
100 meter-febrary	800 meter-april	100 meter-august
200 meter- febrary	900 meter- april	200 meter- august
300 meter- febrary	1000 meter- april	300 meter- august
400 meter- febrary, march	1100 meter- april	400 meter- august
	1200 meter- april	500 meter-june
	1300 meter- may	600 meter- june
	1400 meter- may	700 meter- june
	1500 meter- may	
	1600 meter- may	
	1700 meter- may	

As it is shown separing sowing period of seed for potato tuber fitting for local condition is suitable both liminished the value of struggle measures and suitable.

In time –table it must pay attention of struggle the vegetative sowing of sowing time and shift sowing. In early and spring sowing ecological-damaged limit must do with medicine –chemical struggle piretroid (we see 25% damaged plant when 15-16 larval nourish on 10 plants but in second and third generation we see 50% damaged plant when 29-30 larval nourish on the plants (Time –table 2).

Time –table 2

Integration measures on sowing of potato

Months	febru ary	march			april			may			june			july			august			september			october			november	
Ten-day period	III	I	II	III	I	II	III	I	II	III	I	I	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II
Early sowing	Tuber sowing			The growth of the strip		The growth of the leavs		Starting to buc		Flowering			Technical ripen															
Spring sowing				Tuber sowing			The growth of the strip		The growth of the leavs		Starting to bud		Flowering			Technical ripen												
Summer sowing															Tuber sowing			The growth of the strip		The growth of the leaves			Technical ripen				
Colorado beetle						I generation the colorado beetle					II generation the colorado beetle						III generation the colorado beetle										
Fencricket						Larval of Fencricket					Imago of fencricket									Larval of Fencricket							
					Imago of elateridae																						
Wireworm					Wireworm.....												Imago of elateridae			Wireworm.....							
Early sowing									Pest of control																		
						Pest of control																					
	Potato- legumes- vegetables- potato-onion																										
Spring sowing					Pest of control				Pest of control				Pest of control														
	Potato - vegetables - onion - potato – root-crops																										
Summer sowing	Legumes + potato- vegetables + potato - onion+ potato - melons+ potato - garlic+ potato																										

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