



The Elements of Integrated Plant Management (IPM) in Potato Breeding

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Abstract

Demand on potato harvest is high at the moment. But experiments show that it is impossible to grow high and qualitative harvest without to organize protection of plant. Since many years method chemical protection created many discords and it is still creating. This protection method against harmful organism is not only useful but also creates a lot of problems and difficulties at the result ecological balance are disturbed. Disturbing of ecological balance damaged biosphere. That is why natural objective law forced and cause natural calamity and abnormal developing. Accidentally using pesticides and agrochemical remedy is caused pollution of environment gathered poison remainders the harvest, decreases of harvest and etc.

Keywords: *potato, ecological factors, loss of harvest, integrate growing technology, methods of control*

Introduction

Nowadays the agrosenose of potato is used some elements of IPM for the purpose to high the harvest. Modern condition the system of integrate is regulate measure among the population, in the population and environment in the agrosenose. The superiority of integrated measures are under mentioned below:

- 1) To diminish pesticides and agrochemical matters gather poison remainder in the harvest;
- 2) To regulate the population density of fauna in agrosenose;
- 3) To protect and raise in artificial form entomofags and microbe-antagonists density of population;
- 4) Not to form durability against pesticides in harmful organism;
- 5) To prevent from pollution of environment ;
- 6) To regulate relations of human and nature ;
- 7) To form healthy human generation.

Potato is used as decorative plant, food-staff, raw material for industry , the object of investigation and etc. The harmful organisms which damaged the potato plant must be in the centre of attention. It is necessary to take into account the plant- fitofag- entomofages (microbe- antagonist) mutual connections, the influence of pesticides or agrochemical matters mustn't break these connections.

The investigations show that every year in the potato sowing each hectare lost till 70 % harvest. The study of the factors which caused the loss of harvests show those different factors caused the loss of harvest. Farmers prefer against harmful organisms. Sometimes is caused treat with a mordant addition to expenses, the pollution of environment, diminishing of harvest, gather poison remainder and etc.

Materials and Methods

The factors which cause the loss of harvest are below:

Abiotic Factors

- 1) Loss observing in the reason of the damage of plants from the effect of the abiotic factors (temperature, humidity, rain, frost etc.);
- 2) Loss creating in the reason of pathological process.

Biotic Factors

- 1) Physiological loss;
- 2) Loss observing from the effect of harmful organisms;
- 3) Loss observing in the reason of development of barren scion;
- 4) Loss observing when vegetative plant material doesn't germinate;
- 5) Insects make harvest loss when flowers pollinate;
- 6) Loss observing in the reason of harvest size (big or small);

Hidro-edaphic Factors

- 1) Loss observing when rock water is near the surface;

- 2) Loss observing in the reason of salted;
- 3) Loss observing in the reason of lack of nutrition;
- 4) Loss observing from the harmful effect of different elements;
- 5) Loss observing from the effect of organoleptic, physical, chemical structure of the arable layer;
- 6) Loss observing from the effect of unsatisfactory watering.

Anthropogenic Factors

- 1) Loss observing from the application of monoculture;
- 2) Loss creating by the creation of feed base for harmful organism;
- 3) Loss observing from the effect of the pesticide;
- 4) Loss creating from undoing profitable fauna;
- 5) Loss creating according to the time of planting;
- 6) Loss observing in the reason when fertilizer doesn't apply correctly;
- 7) Loss observing from the effect when agro-technical events doesn't apply in the optimal time and correctly;
- 8) Loss observing in the reason when farmers don't have practice;
- 9) Loss observing during the keeping;
- 10) Loss observing seasonal planting isn't done;
- 11) Loss observing during the plants damage;
- 12) Loss observing during the harvest time and its transport;
- 13) Loss creating in the reason of pollution of environment.

Heliophysical Factors

- 1) Loss observing from the photoperiodism;
- 2) Loss observing from the effect of season (spring, summer, autumn and winter).

Geographical factor

- 1) Observing loss according to the relief where potato agrosenose is placed.

Discussions and Results

Scientifically and technical development requires to improve (to perfect) IPM. This system application must provide to maintain balance in the environment, not to collect poison residue in the agricultural crops. It must provide normal life condition of living organism in the biosenose and biotope. Lately IPM sometimes is called "the control of population". It shows that it consist of to protect biosphere, it's purpose not to undo harmful organism. That's why IPM must be fulfilled systematically on the base coordinating of prognosis, quarantine, agrotechnical, genetic, biological, mechanical, physical and chemical methods. This system must improve year by year.

IPM consists of different methods and means. The superiority of IPM is connecting with the coordinate application of such method. We must notice that it doesn't give an opportunity to find the advantage of IPM. We haven't paid attention to the differences between simple and IPM for a long time. We looked them in the same way and results were unsatisfactory. That's why methods and its goals which include IPM technology in the potato growing must be specified (Table 1).

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But it needs to remember that showing measure must apply suitable to the local condition. When we use this method of control we must take into account land- climate condition and geographical position. If it needs some additions refusals. For this purpose technological maps have to compile.

Sometimes the sowing area which made the highest agrotechnical rules can be unsuitable for any crops. Organic or inorganic matters of sowing thick, the water regime and other measures can't be suitable for any plants. That's why making the sowing area first of all it must define growing plants. Even in shift sowing the area has to made suitable for the demand of any crops.

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Annexure

Table 1
Integrated Plant Management (IPM)

Components of technology	Sphere of action	Goals	
1	2	3	
The base of information	To collect theoretical knowledge	About species content spreading harmful organisms About harmful organisms making negative impression	
	To detect factors which reason harvest loss	The organization of struggle To prevent pollution	
	To collect information about quarantine organisms and about control of methods against of them	Guarantine pests, disease and weeds	
	To learn ecological condition	Application of plant area The definition of ecological factors indicator in the existents area	
	To organize technological map	To remove additional costs To maintain ecological balance	
	Prognosis	Warning about manifestation of indicator of ecological factors	Preparation to the control methods
Warning about development method of harmful organisms		To prepare development plan of prognosis	
To detect microbial antagonists and entomophags (predators and parasite)		To detect opportunity of natural infected of harmful organisms To determine the efficiency of biological control	
To learn physiological condition of harmful organisms		To learn egg harvest and density of population	
To learn wintering reserve of harmful organisms		Organization of being provided with remedy	
Prognosis about uninfection deaseas		Study ecological (abiotic, biotic, antropogen, hidro- edafic, heliophysical, geogeographical) factors	
Quarantine	The monitoring of seed material	Take out damaged and infected materials To prevent from spreading new harmful	
	To isolate planting area from sky	To prevent spreading pests, disease and weeds	
	To observe regular in the agrosenose	To undo plants infecting with virus To find out control time against harmful organisms To mark plants which do not belong to sort and to collect separately harvest To undo intermediate insects	
	To disinsection and disinfection using technique and technique maens	To prevent spreading harmful from one area to another	
	Agrotechnical control	Crop rotation	To increase fertility in the arable land The protection from harmful organisms Guaranteeing the use of the arable land during of year
			To undo reap (xora- məhsul yığıldıqdan sonra sahədə həmin məhsuldan bitən bitkilər)
To undo source of harmful organisms To create unsuitable condition for harmful organisms			

	Collecting the water of rain or snow in the area	To provide humidity in the arable land
		To prevent erosion
		To create unsuitable condition for the winter reserve of harmful organisms
	Applying mixed planting	Repellent for harmful organisms
		To organize control between harmful organisms
	To keep seed material in optimal condition	To prevent physiological grow old (aging)
		To prevent damaging crops with harmful organisms
	To clean arable land from stone and plant remains	Improving the structure of arable land
		To undo wintering reserve of harmful organisms
		To improve watering regime
	To smooth of arable land	Regulating the temperature of arable land
		To provide the grow warmer of arable land in the equivalent level
		To provide humidity of arable land in the equivalent level
		To provide being the same deep seed materials
	The main tillage	To provide growing shoot of the young growth in the same time
		To undo wintering reserve of harmful organisms
		To provide airing on the arable land
		To provide humidity on the arable land
	Re-tillage	The speed of decaying plant remains
		To undo weeds
		To friable on the arable land
	Liming	To protect humidity on the arable land
		To regulate pH of the arable land
	Fertilization	To create unsuitable condition for the harmful organisms
To increase of fertility		
To increase of the temperature of the arable land for development of the seed		
To improve airing in the arable land		
Agrotechnical control	The determining of planting time, deeping and scheme	To provide friable of the arable land
		To protect from the harmful effect of ecological factors and harmful organisms
		To provide the need of water, nutrition element and sun energy
	Seed planting	To choose optimal condition for agrotechnical measures
		Correctly placing of the tubers on the hole
	To plow or to spade row distance Earth up	To provide growing
		To improve airing
		To undo different development stage of the harmful organisms
		To prevent of evaporation
	To clean watering canals from weeds To destroy weeds around of the arable land	To regulate the process forming of tubers
		The protect of the different effects (mechanical effect, the effect of the sun, damaging from harmful organisms) of the tubers
		To undo the source of harmful organisms
Winter watering	To destroy infection source, pest and weeds	
	To destroy of the harmful organisms	
Watering	Gathering dampness in the arable land	
	To prevent physiological process in the plant	

	Drop watering	Regulate pH of water To prevent washing reserve of the food matter	
	Feeding the edge of the root	Restoration the food insufficiency Photosynthesis, the process of breathing, reduce chlorophyll To prevent for developing of the harmful organisms	
		Forming of drainage	To remove water out of sowing area Prevent from becoming of salted of the arable land
			Forming of the being carried
	Sowing scheme	Not to loss of the arable land and protect moisture Not to injure of the tubers in the earth up and harvest time	
		To gather of harvest, assorted and drying in optimal period and shot time	To prevent from injured
	Before keeping to dry potato seeds	To protect from the harmful organisms	
	Agrotechnical control	To clean unfit tubers in the area	To destroy infection sources To destroy wintering sources of the harmful organisms
			To repair and clean of the storage
		To cut chopped straw (straw- kartofun yaşıl kütləsi) for the compost	
Mechanical control			The application of trap
	Forming of safety stripes	Protection from ecological factors and harmful organisms Prevent from erosion	
		To gather rain water and snow	Provide dampness for the development of plants To create unsuitable condition for the harmful fauna
	Set fires on the night		Protection the plants from the frost
	To shake the plants	For destroy pests Plant protection from the frost	
		To destroy unnormal plants in sowing area during the season	Prevent from disease Prevent from undesirable dusty
	To gather the different stage of the pests with exauster (vacuum cleaner)		To reduce density of population of pests
	The application the smok of plant remainders	Protection from spring and autumn frost	
	Physical control	To enrich the seed material with the oxygen	To speed the process of germinate Durability against the harmful organisms
			The solarisation of the land
Yarovizasion		To provide begin developing of the all bud (eyes) To become more active the energy of germinate of seed To find out disease tubers	
		To turn green the seed material	To improve stability against the harmful organisms
		To dry the harvest	Protection from the harmful organisms in the storage To lengthen of the keeping period
To organize air regime in the storage			To improve the condition of keeping

Biology control	Using the entomophags and microb-antagonist	Protection from the harmful organisms
		Restoration and protection the ecological balance
	Using insectivora	To reduce density of population of pests
Biology control	Using the plants which involve or repulsive of harmful organisms	Protection from the harmful organisms
	Using from feromons	Providing the sufficiency male individual
		Providing the dezorientasion
	Using the hemosterilization	Providing the sterility
	Using the kairomone	Attraction of the entomophages
	Organize safety stripes	Involving the harmful organisms
	Application of fitonsids	To destroy harmful organisms in different stages
	Antihormone (juvenoid)	To destroy harmful organisms in different stages
Genetical control	Sorts of region	Durable against the ecological factors
		Durable against harmful organisms
	Choosing seed materials	Suitable for demand
	Durable sorts	Durable against ecological factors
		Durable against harmful organisms
	For the special purposes	
Chemical control	Processing tubers before keeping	Increasing durability against harmful organisms
	Processing tubers before sowing	Protection from harmful organisms
	Using of selective pesticides	Using of pesticides by Economic Injury Level (EIL)
	Application of bait (lure) before and after sowing	Protection from soil harmful organisms
	Fumigation of storage	Destroying harmful organisms in the storage
	Application of the pesticides to arable land	Destroying harmful organisms in the arable land