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RESEARCHES CONCERNING THE POLLUTION DECREASE IN THE
GRAPE WINE AND FRUCTIFEROUS TREES PLANTATIONS AT THE
PHYTO-SANITARY TREATMENTS EFFECTUATION.

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Abstract: Grape wine and the fructiferous trees are exposed on all time of the year to the attack of an important number of agricultural diseases and pests. For there controls are necessary 10...15 annual splashes with phito-sanitary substances, which pollutes strongly the air, the soil and the water layer from the respective plantations. The pollution is accumulated on the duration of 25...40 years (and just more) until they maintain in culture the respective plants. In the paper is presented the results obtained through the perfecting of the splashy equipments wherent they added devices for the losses recovery. They retrieved across 30 % from the substances unused by the plants, simultaneously with the improvement with 5...10% of the cover degree of leafs and trunks surfaces. If are utilized and another improvements of the technical equipment (the automatic control of the amount of substances delivered, very limitary spectrum of the drops etc.) it can obtain still more good results.

Keywords: grape wine, the environmental protection, splashing equipments.

1. INTRODUCTION

The protection of the plants hazy a series of activities wherewith is optimized in economic aims, with the help of specific middles of the chemical nature, mechanics or biologic, the development of the plants of interests for man. The biologic method for the struggle of disease and pests, which is considered feather lately an alternative to the chemical struggle its proved to be inefficient, because in the biologic control of weeds it exist many restrictions concerning the destruction of the launched control agent, the big adjustment of the improvement of control agents and the synchronization with the vegetation stage of weeds which must be eliminated [1].

Table 1.

Damage made by the weeds, diseases and pests to agricultural plants

Plant	Damage made by..., %			Total
	weeds	diseases	pests	
Grain	9,8	9,1	5,0	23,9
Barley	10,8	8,9	26,7	46,4
Corn	13,0	9,4	12,4	34,8
Other cereals	12,1	8,6	6,6	27,3
For all cereals	11,2	8,9	14,7	24,8
Potatoes	4,0	21,8	6,5	32,3
White beet	12,2	16,5	16,5	45,2
Vegetables	8,9	10,1	8,7	27,7
Grape vines and meadows	5,8	16,4	5,8	28,0
Tee , coffee	10,5	14,9	11,4	36,8
Oil plants	10,8	10,2	11,5	32,5
Textile plants	6,3	11,8	14,2	32,3
Average	9,61	10,83	11,66	32,1

The researches show is not necessary and no correct as through the measurements of protection to be eradicated the all population of pests or weeds, being sufficient there hold below control to a value characterized by an economic acceptable level. In the table 1 is presented the loss challenged of weeds, diseases and pests to agricultural plants in an acceptably value, the outrunning of these constituting reason of negligence or worry [2].

2. MATERIAL AND METHOD

The morpho - physiologically features of the grape vine correspond better to the possibility of recovery of phito-sanitary substances. On the time of the year the grape vine require a big number of phito-sanitary treatments, what drives to big pollution of the soil and environment in the zone of his culture. A correct treatment of grape vine must consider several factors, as:

- the state of the culture: the hole surface of the leafs, of the pickets, of the haulms, of the taps, of the offshoot and the clusters, in the stage of vegetation to the moment of the treatment application;
- the basic features of the culture: distance among rows, highness of dispose of vegetative mass, the thickness of the foliage mass etc.;
- the meteorological parameters: the direction and the speed of the wind, the relative humidity and the temperature of the air, the existence of water drops on the leafs etc.

Relate to the equipments destined of the phito-sanitary treatments in grape vine and orchards is consisted the realization of ramps with multiple possibility of orientation and regulate the air-hydraulic spurts to any targets, and antidrift devices, the volume of air of axial fan is adjusted with the help of the propeller with adjustable pitch. In most of the cases, the modern equipments have hydraulic pumps which realize big pressures (60 bars) for a finest pulverization. Also, they appeared equipments with axial fans horizontal (devices" bells") which avoided the turning of the portent air-mass for the liquid drops, in the moments in which this mass goes out of the nozzle. Else consisted a return to the radial fans [3].

In this moment is using two main variants of systems for solution recovery, respectively systems of tunnels types (fig. 1) and systems with panels (fig. 2).

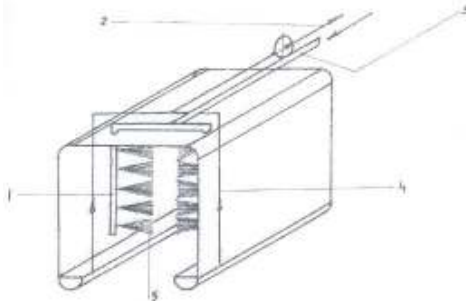


Fig. 1. System tunnel for the recovery of the solutions of splashing.

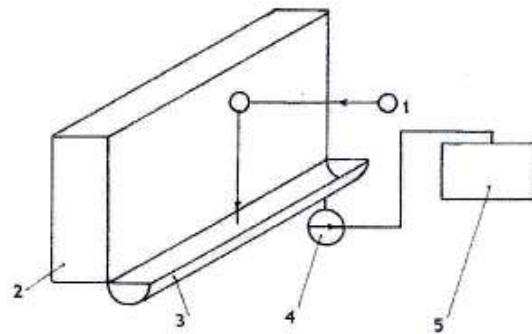


Fig. 2. System with panels for the recovery of the solutions of splashing.

To the scheme from the figure 1 the solution is brought through the ramp 3 to the heads of pulverization 1 and projected on the foliar apparatus of grape vine in the likeness of drops 5. The solution in excess from the plants or kepted on the walls of the tunnel is recover (fractionally) in the pipes of the equipment, whence he is tacked over through the pipelines 4 and drive through the ramp 2 to the recuperation reservoir. The system is insensitive to the influence of the wind and the consumption of energy for the pulverization and the recovery a one liter of solution is of 1... 4 kJoules/l.

To the system from the figure 2 the drops 1 are projected to the foliar apparatus of the plants, whence are drained into the pipe 3. The drops which don't achieves there target hit the panel 2, from rheumy pipe 3, whence they are send of the pump 4 in the basin 5, for recovery. The sensibility to wind is next to zero, and the percent of solution recovery is of 17...30%.

In the figure 3 is presented the flow-sheet of recovery of toxic solutions in the time of the splash for the pneumatic system of spread of phito-sanitary substances, without the recovery of the aerosols.

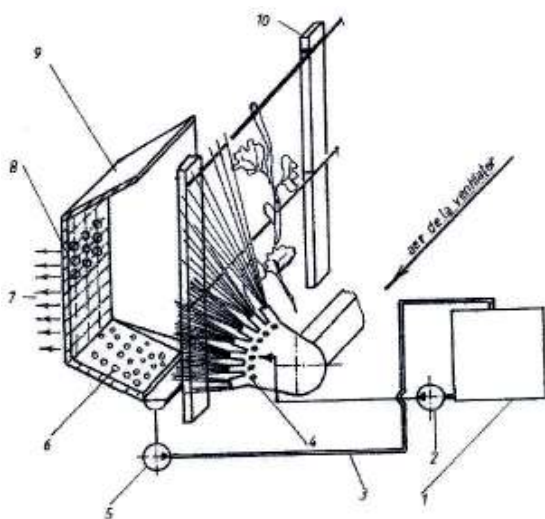


Fig. 3. System of besprinkle with the recovery of the solution, without the recovery of the aerosols.

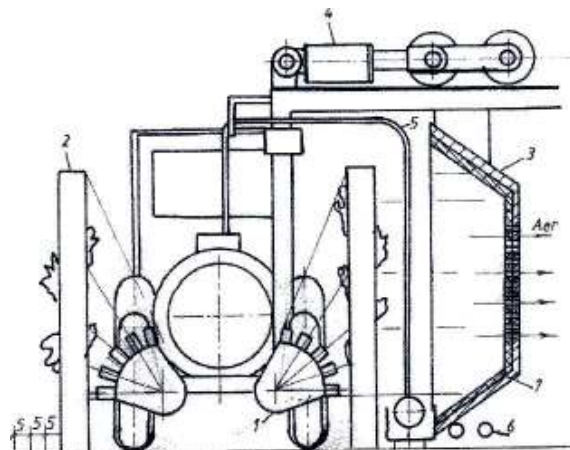


Fig. 4. Equipment for the recovery of solution at splashing.

In this cases the splash is done with the pneumatics dispersion of the solution, ensuring in this kind the condition enforced of wine-growers as the leaf is moved in current of air in the time of the splash, in order to obtain a uniform repartition of this openly and inside out the leaf. To this system the solution is good recovert, the aerosols pass through the sieve of bronze 7, which keeps the drops of phito-sanitary substances 6, which transmits them to the pipe, whence pump 5 brings them back in the reservoir 1 through the pipeline 3. Pump 2 assures the conduction of the solution to the heads of pulverization 4, and the chimney hood 9 conduces to the recovery of the solution. Through the orifices 8 of the bronze sieve pass the aerosols poverty in solutions and the picket 10 supports the cow grape vine. Is considered as the utilization of the chimney hood with the bronze sieve assure the recovery of 15...20% from solution used to splashy.

In the figure 4 is present a scheme of the technological system formed from the tractor 445 DT and a tractate machine of splashy MST - 900, whereat notations have the next significations: 1 - fan of splashy; 2 - trellis of support the culture of the grape vine (picket); 3 - the chimney hood with the bronze sieve for the recovery of phito-sanitary solution; 4 - hydraulic linear engine, which approaches or distant the chimney hood from the grape vine round; 5 - the circuit of recovered solution, from the pump to reservoir; 6 - captors of solution from filter paper put from 5 to 5 m, for the determination of the exodus; 7 - foil of the polyethylene which lining to the chimney hood, foreside with orifices in the zone of the bronze sieve.

3. RESULTS AND DISCUSSIONS

In order to compare the result of the systems of besprinkled with and without equipment for solutions recovery (445 DT + MST 900) they did the precise measurements of amounts of substances settled on different morphological parts of the grape vine, using the standardized methods with the same types of captors. In this senses, in table 2 is presented the balance of the phito-sanitary substances use (solution with concentration of 0.1% CuSO_4) in the which case it doesn't use an equipments for solution recovery, and in the table 3, for the case in which it is used a such equipments, the splashes being made in two different moments of vegetation.

Table 2.

The balance of using the phito-sanitary solution, without a recovery equipment.

The morphologic part of grape vine	The quantity of active substance on the taller, gr.	Area, ha	The quantity of active substance on the area, gr.	Percents, %
The face of the leaf	$17811 \cdot 10^{-8}$	0.7	47.42	8.35
The beak round of the leaf	$13519 \cdot 10^{-8}$	0.7	35.99	6.34
pickets, haulms taps, offshoot	$31001 \cdot 10^{-8}$	0.29	34.19	6.24
Sediments on soil in the lot	$10647 \cdot 10^{-8}$	1	404.99	71.2
Sediments on soil out of the lot	$16204 \cdot 10^{-8}$	0.73	44.9	7.91

The balance of using the phito-sanitary solution, with a recovery equipment Table 3.

The morphologic part of grape vine	The quantity of active substance on the taller, gr.	Area, ha	The quantity of active substance on the area, gr.	Percents, %
The face of the leaf	$75456 \cdot 10^{-8}$	1	283.5	31.5
The beak round of the leaf	$61308 \cdot 10^{-8}$	1	238.5	26.5
pickets, haulms taps, offshoot	$33012 \cdot 10^{-8}$	0.5	62.1	6.9
Sediments on soil in the lot	$51876 \cdot 10^{-8}$	1	198.9	22.1
Sediments on soil out of the lot	$1347 \cdot 10^{-8}$	0.73	17.10	1.9
Difference until 100%				11.1

As a result in the case of the use of equipments with substance recovery it decrease the drift from out of the lot from 1.9% to 0.51%, and total drift from 13% to 3.97%. The solution is better leaded in the case of work with equipment with solutions recovery, when is economized round 15 % phito-sanitary substance.

Comparison between the booth splashing equipments,% Table 4.

Zone Method	The face of the leaf	The back round of the leaf	pickets, haulms, taps, offshoot, clusters	Sediments on soil in the lot	Sediments on soil out of the lot	Evaporation
With out the recovery of solution	31.5	25.5	6.9	22.1	1.9	11.1
With the recovery of solution	39.5	27.5	6.01	23.0	0.51	3.47

In the table 4 is done direct balance between the situations of sprinkled grape vine, through the specification amounts of substances deposited on different morphological parts of the plant.

From this comparison result as through the utilization of a device for solution recovery are reduced the loss with 9 %, advantageous percent from economic point of view, but mostly from viewpoint of environmental pollution. It's consisted a diminution of the quantity of phito-sanitary solution from pickets, haulms, taps, offshoot and clusters with 0.8 %, the diminution drift out of lot with 1.4 % and of missed through evaporation and in air flows with 7.53%.

4. CONCLUSIONS AND FUTURE WORK

- The chemical struggle of the diseases, pests and weeds shall remain for many years in prospective the principal solution for control them and default for the assurance of a harvests capable to feed a big population.
- The principal negative aspect of the treatments with phito-sanitary substances remains the pollution of the soil, of the water and the air from the agriculture and the infestation of alimentary product with toxins that can conduce to the apparition and the development of grave complaints for peoples and animals. His diminution or his cancellation of this disadvantage represents important objective for researchers and for farmers.
- Through the realization of equipments which can retrieve a part from phito-sanitary solution unrestrained from plants (between 15...30%) is reduced the pollutant effect of these, and in can be spiked even on an economic positive effect, if the respective substances are reused.
- The equipments for the administration of phito-sanitary substances through splash foreseen with recovery equipments shall be more expensive than the ones who have no like ensembles, but constrain of the ecological nature can to justify them utilization to some plants as the grape vine or the fructiferous trees.

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