Due to the tolerance of Frantoi cultivar to olive leaf spot disease there were no infection from this disease in the experimental area. But, during the period of cultivation a high level of infection from cercospora disease was observed. For that reason, two treatments with copper hydroxide products were done to reduce the infection of this disease.

Impact

In general, the results indicated that mulching and cover crop application can effectively minimize weed density in olive groves and can promote significantly higher yield. Since straw mulch is abundant and cheap, farmers can use it to obtain greater profits from olive crop cultivation. Application of the non-selective herbicide glyphosate showed good efficacy in weed control in the olive orchard. Use of the selective herbicide diuron reduced the amount of weed germination in olive orchard. Results from these studies allowed to incorporate new practices into the integrated management strategy of weed control for a short and long term.

BT was identified as a product with an acceptable efficacy for olive moth control under field conditions. The bio-pesticide can be considered useful for farmers in the control of one of the key pest on olive crops. It has been shown too that the bait treatment with natural pyrethrum can be viable alternative to chemical insecticide use for controlling of olive fruit fly in organic olive groves. As results the market quality of their olive production will be greatly enhanced by their low insecticide residue level.

Networking Activities

Participation in two workshops (in Dhermi and Elbasan districts) and in one field day in Vlora with olive growers, extension officers, olive specialists, etc. In those meetings the new techniques of weed control were explained and the possibilities of using new alternatives to control olive moth and olive fruit fly were discussed and demonstrated.
Two papers describing results of IPM CRSP studies on vegetation management and olive pest management in organic groves were presented at the Iterreg II Italy-Albania Workshop, held on September 11-12, at Tirana and Vlora. In collaboration with Organic Agriculture Association, a brochure was prepared for the management of organic olive groves.

Project highlights

Straw mulch, which is abundant and cheap, can be used by the farmers to control with efficacy the weed and to increase the olive production, too.
The study identified low impact products for potential use against the key pests of olive crop. Such compounds are very much of interest as they have low toxicity. BT and natural pyrethrum products are a potential alternative to insecticides for managing the olive moth and olive fruit fly, respectively.
In general the technology applied in this study may be practiced in other areas were olive is intensively cultivated.

Effect of Pruning on Olive Production, Infestation by Black Scale and the Incidence of Olive Knot and Timing of Copper Sprays to Control Leaf Spot and Olive Knot

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Abstract

Three levels of pruning severity (non pruned, lightly pruned and heavily pruned) were tested. On heavily pruned treatment the olive trees have a good linear vegetative growth and the number of fruit produced is much higher compared with the non pruned and lightly pruning treatments. On the other side water sensitive papers attached to branches have demonstrated that spray penetration can be improved in trees with more open canopies.

Another experiment was carried out applying treatments with copper fungicides every month (October-May) to determine the best moment of spraying to control leaf spot and olive knot. The results of this year show that the treatments during spring (March, April) and autumn (October, November) are more protective. The control strategies developed were sufficient to effectively manage the leaf spot disease.
This project will allow greater implementation of a non-chemical tactic and organically-acceptable products into olive IPM.

Objectives

To determine the effect of pruning on olive knot incidence
To determine the optimal timing of copper sprays to control olive leaf spot and olive knot diseases.

Research methods

The experiment is carried out in 15 trees. Three levels of pruning severity, 0 % (non pruned), 10-20 % (light) and 40 – 50 % (heavy) were tested. Each treatment had five replications. Annual maintenance pruning are done to take a normal shape of canopy. This process is done during February and observations for vegetative growth and fruit set were made.

Vegetative growth
In each tree 20 shoots were chosen in different directions. Two measurements were made, first at in the beginning of vegetation and second one during the most intensive growth period. The volume of the canopy was estimated.

The dynamics of fruit set
The shoots were chosen in four different points and the counting was made in four olive inflorescences. Considering the average number of flowers per inflorescence, the number of flowers per sample was estimated. At the end of June and August, the fruits were counted. The last count will be made before harvesting to know the percentage of fruits in trees.

Spray penetration assessment
In order to know the penetration of spray material, applications were made to olive tree canopies in the experiment described above. Water sensitive paper was applied to measure the number of drops/ cm^2. The water sensitive paper was suspended at three heights in the plant canopy (an the base, an the middle and an the top of the tree canopy). The water sensitive papers were set up around and inside of tree (three sensitive papers inside the tree and three others outside). Five trees for each treatment were selected. The treatment was made with air -blast pump with water not using insecticide. About 10 liters of water were used per tree. Immediately after treatment, the water sensitive papers were taken from the trees. Each paper was collected in separate paper bags and the assessment was made according this scale.
Very good > 250 drops/cm^2
Good 150 – 250 drops/cm^2
Low < 150 drops/cm^2

Disease Control
Olive trees, about 40 years old of Kalinjot cultivar located at the experimental field of the Fruit Tree Research Institute in Shamogjin, Vlora were placed in an randomised block design. There were 10 treatments in four single-tree replications. Each treatment presents a different time of copper application:

Treatment: 1 = One application in October.
Treatment: 2 = One application in November
Treatment: 3 = One application in December
Treatment: 4 = One application in January
Treatment: 5 = One application in February
Treatment: 6 = One application in March
Treatment: 7 = One application in April
Treatment: 8 = One application in May
Treatment: 9 = Two applications; one in October and the second in March.
The treatment: 10 = Untreated control.

The sprays were carried out with Champion 50 (copper hydroxide 50 % a.i.) 0,16 % using 8-10 liters solution/tree. Five one-year-old shoots / tree around the canopy were marked before each spraying in all the trees in the experiment (including the control). Every month the new selected shoots were market with a stripe flag of different color. In each of these marked shoots, ten pairs of leaves were removed every month causing a leaf scar wound. Evaluation of the leaf spot infection level was carried out in early summer counting the spotted leaves in a 100 leaves sample collected from each tree and for olive knot in September, counting the galls formed in the 100 leaf scar wounds/tree.

Results

During the year 2001 on the treatments 1 (unpruned) and 2 (pruned 20%) the technique of pruning was directed to remove the damaged twigs and old dead branches, and to maintain the equilibrium of the main branches without changing the parameters of the canopy. On the treatment 3 (50% pruned) the interventions consisted to maintain the equilibrium of the main branches, to remove or shorten the shoots with a high vertical growth, etc.

Vegetative growth Vegetative growth was assessed during the most intensive growth period. The linear vegetative growth of shoots exhibited differences among the treatments. The total linear vegetative growth of shoots as shown in Tab 1 was higher in the treatment 3 (pruned 50%). The value of growth was about twice that of the unpruned treatment. A positive effect on the vegetative growth was also recorded for treatment 2 (pruned 20%).

Table 1. Dynamics of vegetative growth (mean of each treatment), Shamogjin 2001

Treatments	Vegetative growth cm					Treatment mean
	R1	R2	R3	R4	R5	
1 (unpruned)	13	12.5	13	18.7	15.9	14.6
2 (pruned 20%)	16	19.55	18.2	27.6	23.1	20.2
3 (pruned 50%)	34.7	40.25	27.6	42.2	37.2	36.5

Regarding fruit set the results after the analysis during June and August are shown in Table 2.

Data presented there revealed that on the treatment 3 (50% pruned), % of fruit set and counted fruits before harvesting were higher compared with other treatments.

Table 2. Effect of treatments on flowering and fruit set, Shamogjin 2001

Treatments	No of flowers	Fruit set			
		June 2001		August 2001	
		No of fruits	%	No of fruits	%
1 (unpruned)	1610	113.7	7	52.4	3.6
2 (20 % pruned)	1980	138	6.8	76	3.4
3 (50 % pruned)	1685	150.9	8.9	98.2	4.5

Water sensitive papers assessment

Figures 1 - 7 present results of droplet distribution at different levels of tree canopy. The greatest penetration of spray material was in heavily pruned trees. In this treatment, the number of the drops on the periphery of trees, and also in the interior of the canopy were much higher compared with the unpruned trees. Differences were also observed between two other treatments (20% pruned and unpruned)

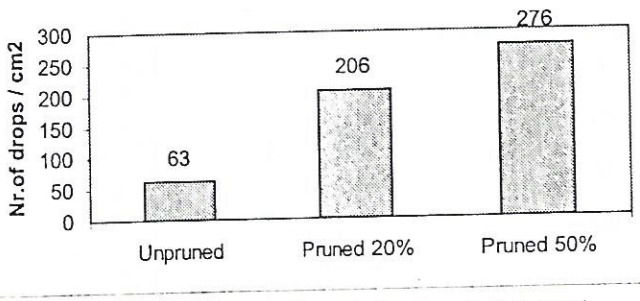

Fig 1. Penetration of treatment solution, 26 June 2001, Upper part of canopy (periphery).

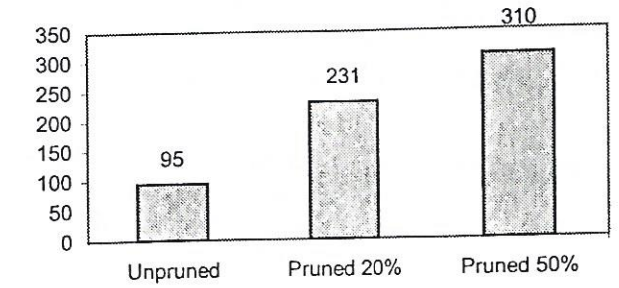

Fig 2. Penetration of treatment solution, 26 June 2001, Middle part of canopy (periphery).

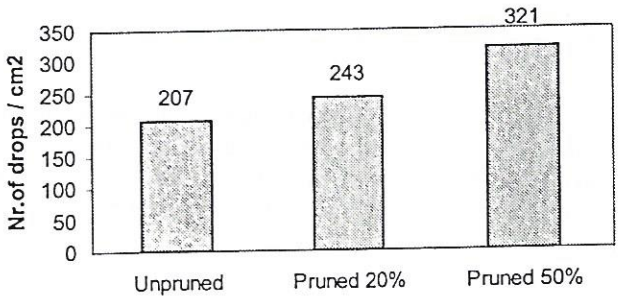

Fig 3. Penetration of treatment solution 26 June 2001, Lower part of canopy (periphery).

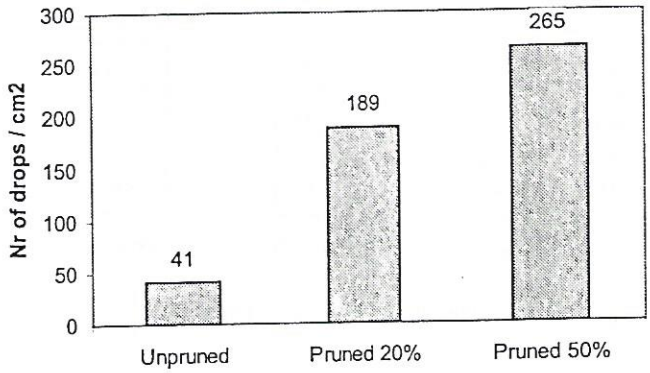

Fig 4. Penetration of treatment solution 26 June 2001, Upper part of canopy (interior)

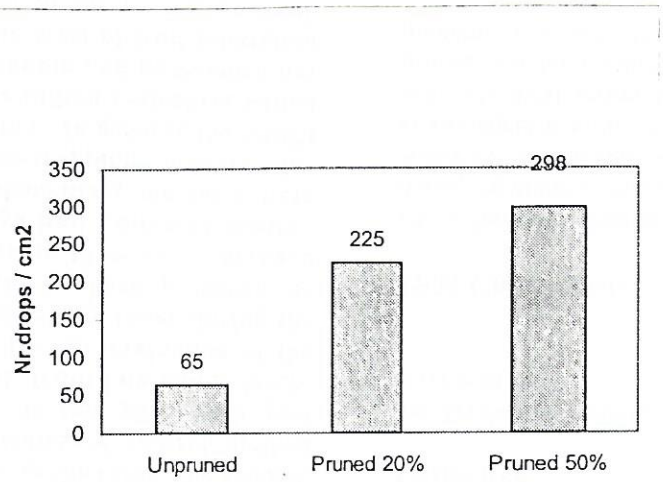

Fig 5. Penetration of treatment solution 26 June 2001, Middle part of canopy (interior).

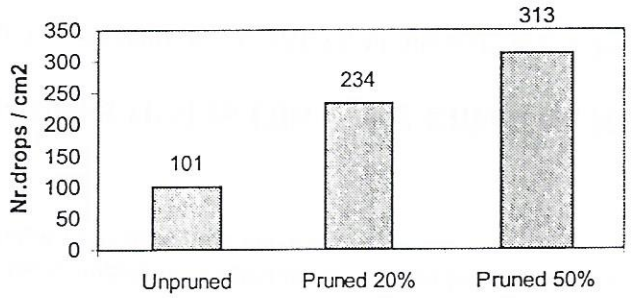

Fig 6. Penetration of treatment solution 26 June 2001, Lower part of canopy (interior).

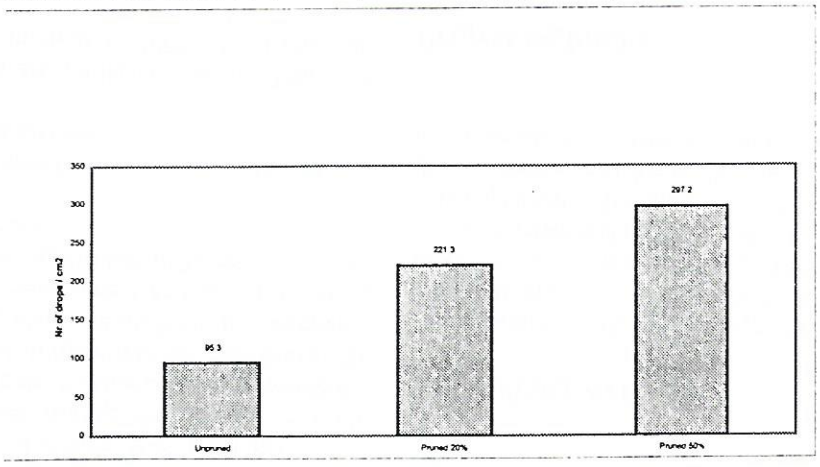

Fig. 7. Penetration of treatment solution (Water sensitive paper assessment) 26 June 2001, Average of drops in the upper, middle and lower parts of the canopy.

Regarding the effect of pruning in decreasing the population level of black scale due to low level of infestations the results are not sufficient to draw conclusions.

Disease Control

The efficacy of the fungicide spray regimes in the control of leaf spot and olive knot diseases was evaluated on a susceptible cultivar Kalinjot during the season of olive cultivation. Different fungicide frequencies were evaluated. Fungicide sprays, in general, reduce leaf spot incidence. As shown in Tab 3 best results were obtain from the treatments done in autumn (October, November) and spring (March, April) and also there were no significant differences with the treatment 9 (March + October).

The control strategies developed were sufficient to effectively manage leaf spot disease.

Data for olive knot control are collected and the definitive results should be available in January 2002 after discussion between plant pathologists.

Impacts

Leaf spot disease is one the most important constraints to olive cultivation. Control strategies developed are currently implemented and used by some growers. The introduction of the new practice of control would contribute greatly to the integrated management of this disease. Spray penetration is improved in trees with more open canopies. The vegetative growth and the fruit set is clearly higher in heavily pruned olive trees compared with unpruned trees.

Networking Activities

Participation in three meetings (in Dhermi, Elbasan and Vlora districts) with specialists, farmers and growers of olive. In those meetings the possibility of controlling in a timely manner leaf spot and olive knot by copper fungicides was explained. Also some aspects of our study to determine the optimal time of fungicide application to protect the olive tree from these diseases were presented.

Project highlight

Based on data (obtained this year) we should say that the April and March during spring and October -November in autumn, are optimal times of copper treatments to control olive leaf spot disease.

Pheromone-Based IPM in Olive and Effects on Non-Target Species

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Abstract

The efficacy of an improved form of mass trapping method (Attract and kill method) for control of Olive Fruit Fly, *Bactrocera oleae* (Gmelin) was tested during 2001 at Shamogjin experimental orchard in Vlora. The method was compared to bait sprays applied from the ground, which constitutes the standard control method today for the control of this pest. Both pest population density and fruit infestation levels, main parameters used for the evaluation of the two methods were considerably lower during the season cultivation in the orchard protected by mass trapping compared to those in the orchard protected by bait sprays and untreated control. Furthermore, no complementary measures were required in the mass-trapping orchard for acceptable crop protection. In general, the results indicated that using one killing device/tree baited with ammonium bicarbonate and pheromone has the potential to keep the level of fruit infestation similar to that obtained in the control orchard, treated at least five times by ground spray of protein hydrolyzate- dimethoate. The result showed that the attract-and-kill method could progressively replace the use of insecticide for the control of the olive fruit fly.

Objective

To develop a selective attractant-based control system for olive fruit fly

IPM Constraints

Olive fruit fly (*Bactrocera oleae* Gmelin) is the key pest damaging olives in Albania. To protect the olive fruits heavy doses of insecticides which are hazardous to health and environment have been used in the past. During the recent years chemical sprays have not been widely used and most groves now have viable populations of scale parasites and predators, a resource that should be conserved.