



**NEW BIO PREPARATIONS
TO CONTROL
THE OLIVE FLY**

**NATIONAL CATALOGUE OF INNOVATIONS
IN ALBANIA**

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INTRODUCTION

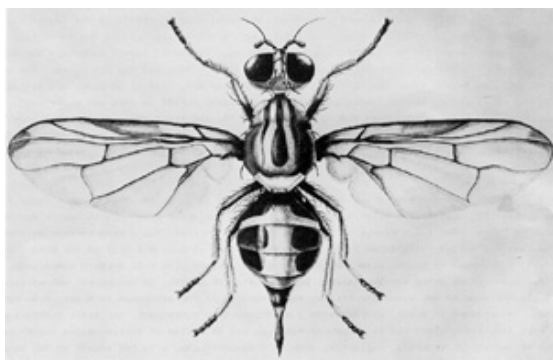
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Albania is one of the important olive cultivation countries, because it lies on the Mediterranean sea, where this culture finds an optimal climatic-land condition. Currently, the production capacity in the country is around 56 000 tons of olives per year and 6 000 tones of olive oil. Olives occupy about 50 000 hectares, having about 8,000,000 roots. Value of agricultural production in olive sector is about 60 million.

As a result of population migration and failed agronomic interventions, a good part of farms harvest the product every few years. However, there is an emerging need for this product, due to the very small number of olive roots in the farm sector and the relatively high prices of this product. The prices are high as a result of low level compared to the market needs.



A study was conducted by Agricultural Technologies Transfer Center (CTTA) South (Ministry of Agriculture) in order to restore the profitability of existing olive groves. In addition to the rehabilitation of degraded olive wreaths, priority was given to the implementation of modern methods, pest and disease management and agro-ecosystem impact assessment, with the aim to decrease the negative impact on the environment.



Olive fly (*Bactrocera oleae* Gmelin) is a common pest of olive and perhaps the most problematic pest in Albanian agriculture. This problem becomes even more significant in biological agriculture, where preparations that may be used are limited. Another very common problem is the eye of a peacock (*Spilocaea oleagina*) and tuberculosis (*Pseudomonas syringae* pv. *Savastanoi*), against which the preventive measures, clean multiplication material (seedlings) and disinfection of agricultural tools pruners, remain the only methods to maintain the olive clean. Other olive damaging pests are: black turtles (*Saissetia oleae*) and moth (*Prays oleae*), which are encountered mostly in olive groves where the necessary normal agronomic practices

are not followed.

Olive specialists and experts in key positions in important institutions carried out tests, processed the results and promoted their implementation in practice. However, other specialists from ATTC Vlora, agronomists, different workers and farmers interested in new methods of olive phytosanitary control, have been present during the tests. They are familiar with the methodology now.

In particular, in 2010, the Institute of Quality for Integration (IQI) started a two- year-program for testing several biopreparates and new traps for management of main olive pests and diseases in orchards located in typical areas of olive in Albania and the main cultivars used. This program aimed also in building up an integrated strategy of impact evaluation on agroecosystems with main goal to reduce the chemical inputs.



The main impact of these innovative methods is on preserving the environment and improving the quality of life of our customers with quality products, without harmful effects on the body. One of the other important aspects is the preservation of bio-diversity and the development of organic agriculture as a key element of healthy agriculture.

The project was implemented by Agricultural Technologies Transfer Center (CTTA) involving the Ministry of Agriculture.

WHAT PROBLEM DOES IT SOLVE

Olive production is one of the most important sectors in Albania's agriculture, while the last development in supporting farmers have influenced in returning the farmers' interest for new plantations and for introducing new methods of production as organic production in order to have a more competitive quality of extra virgin olive oil in regional market. While Bio products represent a good possibility for market, production lacks organic inputs that are allowed and registered for use in this method of production.



Results associated with the peacock eye and the black turtle even though they were in the program due to low infection during the year it's hard to see the difference between the various theses and need confirmation in time and other areas where the problem may be more actual.

These tests can go parallel with the further development of the above products that are recommended, as well as promoting evidence of results and organization of field days with olives in pilot farms in key areas Albanian olives as for example in Tirana, Fier, Berat, Elbasan, Shkodra, Lezha, etc.

Olive fly (*Bactrocera oleae* Gmelin) is the key pest of olives in Albania. It is developed in most cultivars, each year, in high population, and the infection level reaches up to 99%.

The Olive fly remains a serious problem for olive and in 2010 has achieved a high population that exceeds 95% infection in evidence (thesis without interference). Frantoio and Kalinjot cultivars have not shown significant differences in terms of infestation rate by pest (near the harvest time). Consequently this kind of infestation causes great problems of productivity in small Albanian farms and an increase of the environmental pollution due to the treatments with chemical pests.

OLIVE traps have shown very good results comparable and better than the "Attract and Kill" method used in some plots during 2004-2008. Nevertheless, this method should be integrated with other agronomical and chemical techniques since in years where fly population is high by favorable factors, infestation overcomes the economic threshold for this pest. Early harvest, also, should present a key method in harvesting high quality olives and assuring the raw material for a high quality extra virgin olive oil.

However, in years where the population of pests is expected to be high or in very susceptible cultivars, in irrigated conditions and for those extra-virgin oil quality producers who emerge in the market with significant quantities, the implementation of both these methods (bio preparates + traps) would be the best strategy that will ensure maximum results, comparable to those of synthesis preparations (products) such as dimethoate.

Natrons II, Policid, Sinat, Neobordolez are bio-preparations prepared with getter with natural bases, locally produced, without adverse effects on the environment and without affecting the quality of extra virgin olive oil. Their cost is borne by farmers group and furthermore, based on the positive results, preparations are ready to be launched. Tests have shown that the oil produced from olives treated with these new bio preparations has been qualitative, from a physic-chemical and organoleptic point of view (analyzes performed at the reference laboratory in ISUV, and international laboratories for exported oil).

The use of these innovative methodologies can also allow:

- The establishment of a regional and national strategy as an effective solution evidenced in the practice for development of quality and bio production of olive in Albania;
- an important growth of competitive capacity for Albanian product in local market and beyond.

NEW BIO METOD, IN PRACTICE

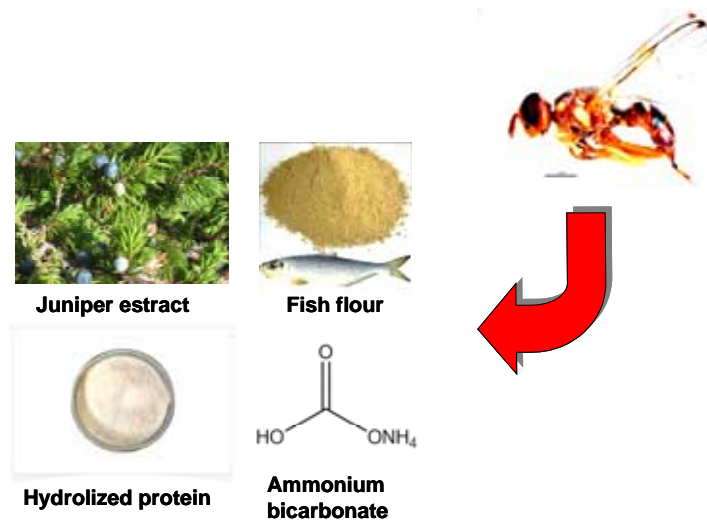
The method developed consists in two phases: application and evaluation (Scheme 1 and 2). Tests were conducted at the experimental plot of ATTC Vlora in Shamogjin. The plot where the experiment was conducted occupies an area of about 5 hectares and is surrounded by olive trees hills.

OLIFE traps with 4 different types of attractive in four group of plants were tested:

- juniper extract (Group 1)
- fish flour (Group 2)
- Hydrolyzed protein (Group 3)
- Ammonium bicarbonate (Group 4)

Hydrolyzed protein and Ammonia bicarbonate were used to monitor the efficacy against olive fly. The parcel consists of two cultivars, FRANTOIO and KALINJOT with normal production. The entire cultivation is constantly monitored every week. The samples were taken at about 50 olive plants per group and specifically 2 grains per tree (total 100 grains) by avoiding plants that are located in the borders (the outside) of the group.

Analysis of samples was carried out at the Laboratory of Plant Protection in the UBT by laboratory specialist of the Agricultural University of Tirana.



Scheme 1

For each sample were recorded all pests stages: egg, sterile drilling, larva of age I, II and III alive and dead, pupa and fly exit, which provided active infection (AI) and total (TI).

New Bio products

In addition to evaluating the effectiveness of traps, 4 new bio preparation (Natron II, Sina (tail Horse), Policid and Neobordolez (improved bordolez juice) were tested. Their impact on the peacock eye as the treatment carried out coinciding with the optimum moment of intervention against this pathogen, was also observed.

NATRON

Chemical-origin food (baking soda + trepel / clay). Aluminosilikatet found in some areas in Albania and their production technology is not complicated. Have a wide use against fungal and bacterial

diseases in different cultures. Natron-s production cost is relatively low compared to similar preparations in the EU as Armicarb (potassium bicarbonate).

The possibility of using biological farming as one of the few cases allowed can push knowledge and use of this group of products. Limiting the amount of copper allowed in integrated biological agriculture but it is an opportunity to increase the use of these substances having a similar effect. Natronet consist of raw materials and effective bi-alkaline and aluminosilikate. It Have a wide use against fungal and bacterial diseases (rust, ashes, etc.) in different cultures and are synergistic and adhesion important. Preparations of this composition and active subjects were tested in the EU with satisfactory results. Currently, we are testing the effectiveness in the olive. Natron production yields bentonite needed plastic able mealines , which are triturate up to 5-10 microns and mixed mechanically with bi alkaline. Natron-s own preparations, but clay and bi are the basis for many other bio where are synergistic or additives.

POLICID

Is a bio-pesticide known in Albanian agriculture, and is widely used in the past. Has been previously registered at the Ministry of Agriculture in the list of pesticides that may be used in Albania, so registration should not present problems. There is a wide spectrum of action against some pests / diseases and treatments used in the winter considerable amount leading to a decrease in their populations during the vegetative season.



Support for Bio products and other quality production systems with low impact on the environment could lead to an increase in demand for this bio-pesticide with wide spectrum of action. Policid is composed of sulfur and lime (CaO). It is probably the pesticide with broad spectrum of action against many pests / diseases and treatments used in significant quantities in winter bringing their populations decrease during the vegetative and early spring. Eg apple flowers scarcity is also a very interesting use field. Policid has a satisfactory efficiency, known from the literature and partly proven in tests conducted in ATTC-Vlorë. Policid iron is produced in simple reactors and capacitor electric mixing or circulation pump. There is a need for ventilated environment and gas containers.

MIX NEO BORDOLEZE

It is a well-known product from farmers, like sulfur, are among the oldest products known to mankind and have persisted. There is wide range of action both in culture and different pests. Preparation prepared by prof. Nevruz Maluka has quality improved, with the addition of clay as well as in the reduction of copper calcium carbonate located in the milk of lime. Let us less product waste than similar compounds that are in the market. The program is evidenced olive effectiveness against the olive fly and the eye of a peacock, which brings a verification of the potential of using this product more widely.

Mixing bordoleze consists of copper sulphate and lime water. Bio-preparation has improved properties by adding bentonite (clay) up to 2% and contains a% lower copper hl.

It is a well-known product from farmers, like sulfur, are among the oldest products known to mankind and have persisted. Broad spectrum of action both in culture (vegetables, fruit trees), as well as various pests (fungal and bacterial diseases).

The preparation of N. Maluka has quality improved, with the addition of clay as well as in the reduction of copper calcium carbonate located in the milk of lime. Leaves less residue in the product than similar compounds that are in the market.

Is testing the evidence in the olive, however, the differences are minimal in market preparations. Lime water (saturated solution of lime) is thrown into the water, then added copper sulphate to slightly basic reaction. Then added to 2% clay and mixed intensively.

SINAT

Sinat is a bio preparation that can be widely used on agricultural crops in all types of agriculture after stimulating effect of photosynthesis, repellent for different

pests and strengthens the epidermis of different fruits making them more resistant. Cost of production of this product is low. Preparation consists of fine Sinat extract. It is a bio-preparate that can be widely used on agricultural crops in all types of agriculture having stimulant effect of photosynthesis, repellent for different pests and strengthens the epidermis of the fruit making them more resistant. Efficacy was studied in literature and is testing in olives. Aqueous extract was weaned field (horse tail). Shredders and grinding equipment is needed. Production cost of the product is low since there is no special technology and raw materials easily found in wet places.

Method Evaluation

CTTA Vlora and field specialists, conducted a study to evaluate the effectiveness of OLIFE traps (similar for the way of action with Ecotrap) and some bio preparation produced for the olive fly management in terms of biological cultivation (see scheme 1). This study was conducted during 2010 and subsequently, after a long research work.

Tests carried out are as follows:

- Evaluation of the effectiveness of OLIFE traps in the management of the olive fly;
- Management of the olive fly through some new bio preparation: Natron II; Policid; Sinat; Neobordolez;
- Assessment of the impact of new bio preparation peacock eye management;
- Evaluation of the sensitivity and / or resistance of cv. native olive to the main pests.

RESULTS

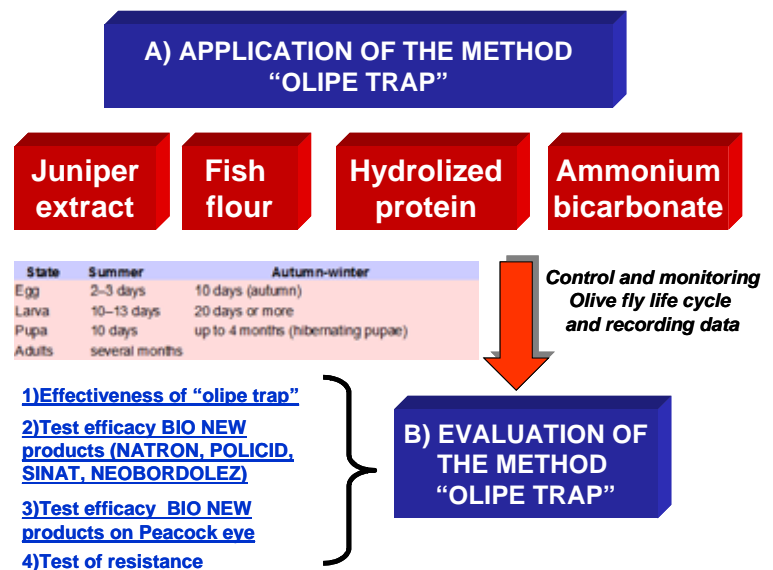
Tests performed in 2010 in the olive, showed a satisfactory efficiency new bio-preparation and OLIFE traps on the olive fly control as a key olive pest. The most effective traps are those with attractive juniper extract and ammonium bicarbonate, which we think are ready for production and extensive application recommendation. Among the tested bio-preparations, Neobordolez was the one that gave better results, compared to the market products that are permitted for use in biological production conditions.

However, in years when the population of pests is expected to be too high or in susceptible cultivars in irrigated conditions, and for those extra-Virgin quality oil manufacturers, the application of these two methods (bio + traps) would be the best strategy. It would ensure maximum results, comparable to those of synthesis preparations as dimethoate, rogor (Aragol), etc. Furthermore, bio preparations Natron II, Policid and Sinat (horse tail) are significantly efficient and provide a valuable alternative to be included in a management program, where bio preparations are alternated and are aimed to control the health and prevent the diseases of plants, making them less susceptible to pests., Policid, known for its effect on ticks, should also be part of the olive interventions calendar.

Experimental results

Two cultivars of olive, FRANTOIO, and KALINJOT do not show significant difference in the proportion affected by the polluter (near the moment of harvest). The olive fly management methods through the use of OLIFE traps have given good results, significantly higher than Attract & Kill methods (traps Ecotrap) used in the same plot during the period 2004-2005.

However, this method needs to be integrated with other agronomic and chemical techniques (through the use of bio-products allowed in biological agriculture), because in years when the population of pests appears high, the damage caused affects the economic situation. Early harvest, too, must continue to be a key method in maintaining the quality of production necessary for the production of biological quality extra virgin oil.



Scheme 2

Test of efficacy of OLIVE traps

Summarized test results of efficiency evaluation OLIVE traps expressed in active infection (AI) and total infection (TI) are given in Table 1.

Cultivar	Thesis	Affect	Sampling dates					
			22/09/10	28/09/10	5/10/10	13/10/10	17/10/10	27/10/10
Frantoio	Indicators	AI	3	3	25	42		
		TI	8	3	30	47		
	Trap 1: Fish Flour	AI	1	2	12	37		
		TI	1	3	13	43		
	Trap 2: Juniper extract	AI	0	1	3	22		
		TI	0	2	4	26		
Kalinjot	Indicators	AI	1	4	11	14	38	98
		TI	2	6	21	14	69	99
	Trap 3: Hydrolyzed protein	AI	1	2	8	8	22	78
		TI	1	4	12	8	38	90
	Trap 4: Ammonium bicarbonate	AI	1	0	3	3	20	49
		TI	1	0	3	3	26	62

Tab.1 Efficiency evaluation of OLIVE traps. CTTA Vlora, Shamogjin 2010.

Table 1 presents the results of last month before harvest, the time in which the infection is increased at high levels and sees the difference between the various cultivation groups (1, 2, 3, and 4).

Proof of new bio preparation efficiency evaluation has also provided very significant results on the possibility that these bio preparations offer to include control strategy/management of the olive fly populations, especially in years when the population of pests present at high levels and also in biological cultivation conditions where only an interference with copper preparations will do to achieve the allowed amount of copper preparations.

The results consider the total and active infection in all groups. In total, higher efficiency gives bio preparation

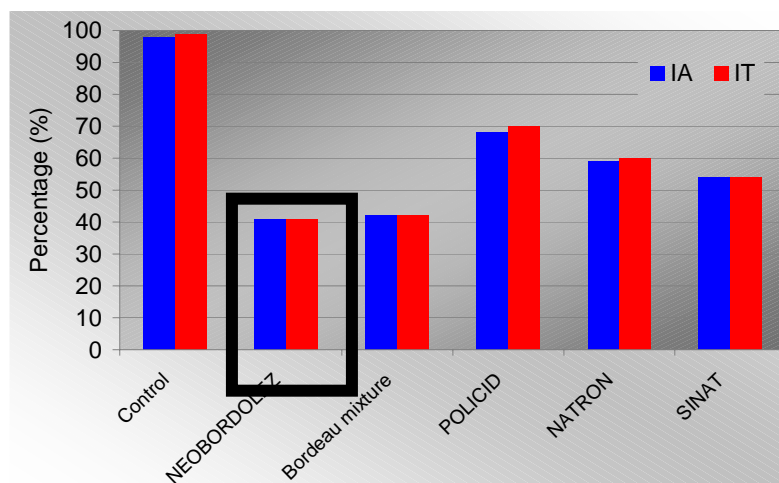


Fig. 1 Infestation percentage (IA dhe IT) of olive fruit fly (*Bactrocera oleae* Gmelin) in Kalinjot cultivar. ACTT Vlora (Shamogjin, 2010).

quantities allowed for use are limited. Figure 1 shows data of infestation in all the treated plots. During 2010, NEOBORDOLEZ product gave the best results in both olive cultivars.

In 2011, a year characterized by low production and high infestation by olive fruit fly in general olive growing areas in Albania, tests focused in evaluating the efficacy of the combination OLIVE traps and NEOBORDOLEZ product that in 2010 give the best result among biopreparates. Also, OLIVE trap and NEOBORDOLEZ alone were sampled in order to compare the result with the combined strategy. Result shown that the combined effect of traps and spraying treatment gives a very high control of the infestation compared with the control plot, while traps and biopreparat alone give some similar result in terms of percentage. For the high quality olives and extra virgin olive oil of high quality the combined method of management justifies considering the cost and the long term sustainability of the grove. As example figure 2 shows Active (IA) and total (IT) infestation (%) of Frantoio olives (ACTT Vlora, Shamogjin 2011) and analogous results are registered in Kaljnriot.

These tests showed a satisfactory efficacy of OLIVE traps used and biopreparates on the olive fly control as a key pest of olive. The most effective traps were those with juniper extract attractive and ammonium bicarbonate, which we think are ready for recommendation for production and wide application. Among the tested Bio-products (preparates), Neobordolez gave better results as compared to the untreated trees (control) and other market products (preparates), which are permitted for use in biological production conditions.

Also, biopreparates Natron, Policid and Sinat represent a significant efficiency, and also a valuable alternative to be included in a management program where Bio-products are alternated and are not intended only in direct control but also in preventing and controlling plant health, making them less susceptible to pests. Policid is known for its effect on *Saissetia oleae* in overall and *Aceria oleae* and should take part in the interventions in the olive calendar.

Results on *Spilocaea oleagina* and *Saisetia oleae*, even though they were in the program due to low during infection is difficult to see differences between different theses and need confirmation in time and other areas where the problem can be more current. These tests can go in parallel with the further development of the above products that are recommended, and the promotion of evidence of results and organizing field days on pilot farms with olive growers in the main Albanian olive orchards areas. The preliminary results showed that fruit infestation levels were significantly reduced on BIO-treated trees compared with untreated trees and the BIO treatment unaffected the nutritional and sensory quality parameters of the corresponding virgin olive oils obtained by a laboratory scale olive mill (ISUV-National laboratory of olive oil testing), thus satisfying the present quality requirements.

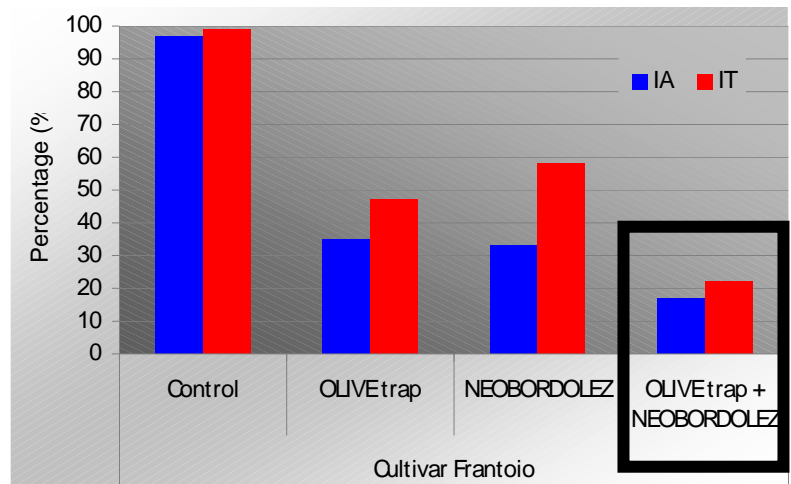


Fig. 2

Promotion of these 4 new preparations is conducted in seminars, workshops and field days organized by the Ministry of Agriculture, Food and Consumer Protection (CTTA Vlora), with the participation of interested businesses, farmers, olive oil producers, etc. where the expressed interest in using them has been the maximum and the demand for these preparations came from organized farmers group in organic olives from Vlora, Shkodra, etc. Among the interested stakeholders can be mentioned private businesses in the field, as well as the Albanian Agribusiness Council (AAC).

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INTERNATIONAL INTEREST

The international interest about our innovation is witnessed by Activities performer in the frame of this project as:

- Workshop in collaboration with COI -in Tirana on 2010/ 2012 for the promotion of olive oil, from the field to the table.
- Workshop in collaboration with INTERREG-III 2010.
- Workshop in collaboration with IVALSA Firenze, Italy. 2011-2012.

TO KNOW MORE

Specific documents from which is possible to better understand the basis from which our innovation was developed, are listed below:

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CONTACTS

The CTTA of Vlora is available to provide technical support and innovation transfer to the interested countries. In order to establish collaborations, contact:

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