

Integrated Pest Management Package on protected crops



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The Integrated Pest Management (IPM) Package on protected crops is a strategy of pest control developed in Albania by the Plant Protection Institute, (now Plant Protection Laboratory in Department of Plant Protection in Agricultural University of Tirana), The IPM package gives the possibility to manage the key pest and diseases in tomato and cucumber crops in greenhouses that causes serious damage reducing the quantity and the quality of this products.

These methodologies were implemented, with [excellent results](#), to manage the Olive pest. See the [IDEASS Brochure- Integrated Pest Management Package on Olive](#)

Vegetable production in protected areas is a leading industry in Albania that contributes to local economic development and enhances the quality of life of the community. Albania is a traditional exporter of vegetables and pests and diseases are the main constraint to production. In the past, the crops were treated with heavy quantities of broad-spectrum insecticides and fungicides that are hazardous to the health and to the environment.

At present, attempts are being made in Albania to reduce the use of chemicals by introducing new approaches, such as the integrated pest control (IPM) practices. In particular, the Plant Protection Institute (PPI), founded in 1971, promotes the adoption of practices that encourage a safe and efficient use of pesticides and support farmers in the implementation of innovative strategies.



Some of the results of research activities are presented below.

Implementation of IPM scouting programs for tomato crop production in greenhouse

IPM Constraints

Current grower practice emphasizes prophylactic calendar sprays for control of pests and diseases, resulting in high pesticides input. This results in high labor and material costs, minimizes the potential for integrating other management tactics, and creates environmental, health and export constraints. Pesticides currently used against tomato pests and diseases fail to give effective control, possibly because of the lack of resistant management protocols for pesticide use.

IPM seeks to minimize pesticide use in production systems therefore effective new elements of IPM programs need to be included and adopted to this cropping system to reduce the use chemicals. Farmer empowerment through education and transfer of technology will ensure the successful implementation of new methods of crop (pest) management.



Greenhouses in Albania

Monitoring of pests with colored traps

Scouting of pests and diseases

Results

An IPM demonstration project on tomato crops cultivated in greenhouses was conducted in the main region (Lushnja) of vegetable production in Albania during the years 2007-2009. Plant protection specialists and the grower of one tomato greenhouse were responsible for pest monitoring, record-keeping, and weekly meetings to make pest management decisions based on the information collected. Comparisons were made between the IPM treatments vs. the grower's conventional pest control practices. Results indicate that the scouted greenhouse resulted in reduced pesticide usage without affecting plant quantity and quality. This was achieved at a lower overall cost, even with the increased labor for monitoring.

The benefit of scouting program was early detection of pests and diseases at low level. Additionally by specifically locating infestations, spot pesticide applications were made instead of grower's routine practice of spraying all the greenhouses. The scouting program from September to November, resulted in more than 50% fewer pesticide applications and a 66% savings (or 26971lek per01/ha) without affecting plant quality and salability.

Impacts

The use of scouting program in the production of tomato crops will facilitate an important change in the way procedures use pesticides. By carefully monitoring/scouting crops and evaluating the information collected, growers will be in a better position to make rational decisions on the appropriate control tactic. The use of scouting program will also reduce and/or eliminate the prophylactic application of pesticides on tomato crops. Greenhouse facilities use relatively large volumes of water to produce a high quality product. As a result, there is a significant potential for contamination of surface and groundwater resources from irrigation runoff. The proposed scouting program will help growers reduce the total volume of pesticides used, and subsequently decrease the potential for surface and groundwater contamination.

Soil Solarisation, a non chemical method to control root-knot nematodes (*Meloidogyne spp*) and improve the yield of greenhouse crops

IPM Constraints

Protected crops are the main source of employment of several thousands of families in Albania. More than 730 ha of greenhouses per year are cultivated with Solanaceous, Cucurbitaceous and other vegetable crops. Production is mostly in the South-Eastern part of Albania where the annual number of sunshine is highest more than 2500 hours per year. Greenhouses usually remain un-cropped during July-August and very often nematode are the major soil borne pathogens. During the years 2007-2008 several experiments were conducted to compare the effectiveness of soil solarisation in different soil types and yield increases.



Soil solarisation in greenhouse

Measurement of temperature in solarised soil

Root-knot nematode infestation on the left, uninfected tomato plants after solarisation on the right

Results

Tomato and lettuce cultivation in Albania are susceptible to infection by soil-borne diseases and severe yield losses can result. The effectiveness of solarisation, a soil disinfection technique that use passive solar heating, to control the incidence of root knot nematode under greenhouse condition was studied during the second crop of the years 2007 and 2008 in Lushnja and Tirana regions. Solarisation was accomplished by the application of 0,05-0,06mm clear polyethylene sheets to moist soil for 4-wk during the hot season. The treatment increased maximum soil temperature of more than 50°C at 20cm below the soil surface, whereas this temperature was not reached at all in unmulched soil.

In solarised soil, no galls were found on tomato roots. The treatment reduced nematode populations 87-100% on tomato and lettuce. In non-solarised plots, the infestation was present at a high density, with decrease plant growth and crop production. Tomato fruit yield was 403 to 415% higher in the solarised soil as compared with the non solarised treatment. The yield of lettuce was 175% higher in solarised soil as compared with untreated control. Based on these results, we suggest that solarisation, which prevents chemical contamination and is suitable for organic farming, is an appropriate technology where the risk of nematode infestation is high in the second crop.

Impacts

Solarisation is simple and economic in its application, and leaves no toxic residues for humans, animals and plants. These attributes make solarisation suitable for application in a wide variety of production system.

Soil solarisation should be done during the hottest period of the year. Soil solarisation offers a satisfactory and environmentally friendly solution for the control of root-knot nematode. This method is easily to be used into organic, conventional and integrated control growing system.

An alternative approach to increasing tomato production by reducing incidences of corky root by grafting in Albania

IPM Constraints

Tomato (*Lycopersicon esculentum* Mill.) is a crop of high economic importance in many regions of Albania. About 360 ha are cultivated annually in Albania in indoor areas (greenhouses, plastic houses and tunnels). Continuous cropping is inevitable in vegetable production in door areas, and this reduces the yield and quality of produce. It is reported that most of the damage from continuous cropping is caused by soil-born diseases and nematodes. Since soil sterilization can never be complete, grafting has become an essential technique for the production of repeated crops of fruit-bearing vegetables grown in indoor areas.



Israeli-type greenhouse in Albania

Roots on grafted tomatoes

Corky root damage to ungrafted tomato

Tomato production on grafted plants

Results

The soil-borne fungal disease corky root of tomato, caused by *Pyrenochaeta lycopersici* Shneider&Gerlach, is a disease of concern for many tomato-growing areas in greenhouses using soil as a growing substrate. The disease has been identified as one of the most common and economically important in Albanian tomato production. Chemical soil disinfection has been the method of choice in several farming system. This method is extremely expensive and has been increasingly restricted for environmental reasons.

The use of grafting onto resistant rootstocks was evaluated during autumn 2007 as a potential replacement of chemical control. The influence of grafting method for the control of corky root was studied in two greenhouse trials in Albania. The cultivar used as scion was cv.'665' and as rootstock 'Beaufort'.

Grafted and un-grafted plants of tomato (*Lycopersicon esculentum* Mill.) were grown in naturally infested soil in Israeli-type greenhouses in Tirana and Kruja regions. Grafting was found to be effective in reducing root disease and increasing root fresh and dry weight, fruit yield and number. The result showed that the incidence of tomato plants infected by corky root was 2.-6.7% and 40-80% in grafted and un-grafted plants, respectively. The results recorded on tomato by evaluating the marketable yield showed the significant effects of grafting. The use of grafted plants enhanced the yield (+110-147%).

Using the Hedon scale to determine the overall acceptance of the grafted tomato fruits, the fruit from the Beaufort rootstock were comparable to the fruits from un-grafted tomato plants so the quality and qualitative fruit characteristics were not affected by grafting. Grafting is thus considered an important technique for sustainable greenhouse production of fruit-bearing vegetables and represents a promising non chemical alternative for soil-borne disease control.

Impacts

The use of grafting tomato scions onto *Beaufort* rootstock could be an effective way of growing tomatoes in areas with high corky root incidence. This would reduce the need for pesticide and increase the yield of tomatoes. Several farmers became interested and they planned to try the grafted tomato on their individual farms.

For more information

[Plant Protection Institute](#)
[Integrated Pest Management \(IPM\)](#)

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