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MAIN TRENDS OF THE PESTS MANAGEMENT IN AGROECOSYSTEMS OF GRAPEVINE PLANTATIONS

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Abstract

Viticulture represents an important part of agriculture in Romania, both from the economic and social point of view. The total area under vines is about 189.7 thousands ha, being an intensive culture, the area of grapevine has 2% of the agricultural area and income from viticulture is 10% from the value of the agriculture production. It is analyzes the situation of the main pests from grapevine plantations of Romania in the light of problems related to the emergence of new or modifications of the importance of harmful pests. European regulations are the main pest management of vine plantations, as well as national regulations it is analysed. Given the increasing use of pesticides is emphasized as a comparison of European and national legislation on the approval of pesticides used in plantations of vines, is also comparing the European and national legislation on the marketing and use of pesticides in plantations vines. The impact of exotic pests varies considerably depending on the species and the area being invaded. Some species are able to rapidly colonize an area and become serious pests, often because they are no longer under control of predators or diseases that limited their numbers in their native habitat. Species that rapidly colonize an area are often called exotic invasive pests. Once established, invasive species are extremely difficult to eradicate and can cause not only ecological disruption, but economic problems as well. Everyone has a part to play to keep exotic and invasive species from coming into Romania and spreading throughout the state. All known grapevine pests, in Romania, include about more than 20 pests and one xylem bacteria transmitted by insects. .

Keywords **:** *grapevine, quarantine, pesticide registration*

INTRODUCTION

According to the Food and Agriculture Organization (FAO), 75,866 square kilometres of the world and in Romania 2,480 km^2 are dedicated to grapes. Approximately 71% of world grape production is used for wine, 27% as fresh fruit, and 2% as dried fruit. A portion of grape production goes to producing grape juice to be reconstituted for fruits canned "with no added sugar" and "100% natural". The area dedicated to vineyards is increasing by about 2% per year. Farmers in Romania depend entirely on the use of chemical pesticides to control arthropod pests from grapevine agroecosystems. This situation may create problems in pest control and to human health as well as environment. Therefore, due to these problems, man started to look for new control programs where he finally focused on Integrated Pest Management (IPM) However, many people erroneously understand that IPM means the use of non-chemical control measures. If used correctly, and despite of their side effects, pesticides remain an important component of IPM [1]. The concept of IPM depends on several components, among these, understands the agroecosystem [2].

MATERIAL AND METHODS

Based on legislative framework that governs the agriculture activity it is presented the main problems which appear in grapevine plantations in Romania, how to manage them and new concept of Plant Protection Products Regulation and possible impacts on agricultural practice in Romania regarding using of pesticides in grapevine plantations.

RESULTS AND DISCUSSIONS

The In Romania, as anywhere in the world, numerous pests attack grapevines, their relative importance varies with zone of

vineyard, Phylloxera (*Dactylosphaera vitifoliae*) which has determined an huge losses of European vineyards at the end of nineteenth century, is controlled now by use of resistant rootstocks that rejected the pest from grapevines plantations, the grape bud moth (*Eupoecilia ambiguella*), the vine moth (*Lobesia botrana*) are in the present the most serious problems for grapevine because they attack the fruit, but now it is possible to control them by using of pheromones traps for warning. Despite the necessity for the pheromone traps to indicate the start of the flight period, the experiments confirmed the lack of a correlation between the population dynamics and the level of damage by the pest. Pheromone trapping can offer very useful indications regarding the start of the flight period of each generation and its duration but not on the severity and incidence of the pest. Discoloring of leaves in grapevine is done by different species of mites as the fruit tree red spider mite (*Panonychus ulmi*), the two-spotted spider mite (*Tetranychus urticae*), the (*Calepitrimerus vitis*), etc., or spotting on the leaves is determined by the vine leafhopper (*Empoasca vitis*) and thrips species *Drepanothrips reuteri*. Sometime, in Banat and Oltenia long-palped tortrix (Sparganothis pilleriana) attack the leaves, and in some areas of Dobroudja erosions of vineyard buds attributed to overwintering larvae of the geometrid willow beauty (*Peribatodes rhomboidaria*) have been observed, creating some problems and necessity of chemical control measures. The new pesticide legislation has changed the principles and rules for using of pesticides in EU, based on Plant Protection Products Regulation 1107/2009 and the Sustainable Use Directive 2009/128/EC.

Many types of insects cause damage to grapevines. The damage is often only cosmetic and does not hurt the vine. A central theme to the insect and mite control is scouting. Scouting is the systematic evaluation of foliage and fruit on a timely basis. This allows identification of the pest, an assessment of the damage and will help in deciding whether treatment is warranted. Recognizing insect or mite damage is relatively easy with a basic understanding of each potential pest.

I. Scouting and applying control measures connected with ETL

In spring has to be done the first survey in grapevine plantation searching for: *Calepitrimerus vitis* - grape rust mite and *Colomerus vitis* (Eriophyes vitis) - grape erineum mite or vine leaf blister mite are principals acari pest (Acari – Eriophyidae) for them the first survey is done in pre-blossoming phenophase, at the beginning of April when 100 eye collected from vine stock in different parts of the plantation are examined and ETL (Economic Treasure Level)=5-6 mites/bud during bud swelling, the second survey is done at post-budding phenophase examining at least 100 leaflet/plot and ETL= 5-6 mites/leaf in post-budding phenophase or 30% leaves with symptoms (treatments are not applied if predators are present in 20% of the samples at their raport, in these samples, is 1 predator/20 pests. Tetranychidae - *Panonychus ulmi*, - European red mite and *Tetranychus urticae* - Two spotted spider mite, are those mites for which, in each year are applied chemical control in grapevine agroecosystem, for *Panonychus ulmi* ETL= more than 30 eggs / bud during bud swelling, or when mite eggs are found in 70% of buds or ETL= 5-6 mobile forms/leaf or leaves 60% with symptoms attack before flowering or ETL= 3-5 mites/leaf, or 30% leaves with symptoms of attack during the summer, in the same time for *Tetranychus urticae* ETL=5-6 mites/leaf, or 20% of leaves with symptoms of attack, in 2-3 leaflet phase or ETL=6-7 specimens/leaf, or 50% leaves with symptoms in summer. For *Daktulosphaera vitifoliae* - Grape Phylloxera, in spring and also in summer, ETL is 5% leaf with galls in the moment of the buds opening during the releasing of first 2-3 leaves. *Parthenolecanium corni* - Brown Elm Scale or European Fruit Lecanium, has an ETL=10 female /cm^2. For Grape Moths (*Lobesia botrana* - European Grapevine Moth and *Eupoecilia ambiguella* - Vine Moth, family Tortricidae), in the first generation, ETL=2-3 specimens larve/30 plant during the buds

inflation or 30 clusters (inflorescence wrapped with white silk thread in the form of nests)/100 bunches in vegetation time. *Sparganothis pilleriana* - Grape Leafroller or Vine Tortrix Moth or Long-Palpi Tortrix or Leaf-Rolling Tortrix has ETL=15-20 larvae/plant, in areas where there has been an attack in the previous year. *Peribatodes rhomboidaria* - Willow Beauty has an ETL=5-7 living larvae/30 plants/30 ha. *Byctiscus betulae* - Hazel Leaf-roller has an ETL=5 adults/plant. *Melolontha melolontha* - European cockchafers has an ETL=0.1 to 0.5 adults/1m^3 of leaf sheath or 1-3 larve/m^2, in soil. *Anoxia villosa* has an ETL=0,2 larve/ m^2 in soil. *Anomala solida* - Scarab beetle has an ETL=2-4 adults/plant. ***In summer*** has to be done the second survey in grapevine plantation searching for: *Calepitrimerus vitis*, ETL=10 mites/leaf or 40% leaves with symptoms and *Colomerus vitis* ETL=10 mites/new branches with attack symptoms. *Panonychus ulmi* has an ETL= 3-5 mobile forms/leaf or 30% leaves with attack symptoms, *Tetranychus urticae* and *Eotetranychus carpini* - Hornbeam mites, ETL=6-7 mites/leaf, or 50% of leaves with symptoms of attack, in summer time. *Empoasca vitis* - Grape Leafhopper has an ETL=2-3 larvae/leaf. For *Daktulosphaera vitifoliae* in summer, ETL is 5% leaf with galls. Cottony Grape Scale (Pulvinaria vitis), Mealybugs (*Pseudococcus*) and Soft scales or unarmored scales (*Lecanium corni* - European Fruit Lecanium) have an ETL=2 larvae/ cm^2. Vine leaf thrips (*Anaphotrips vitis* and *Drepanothrips reuteri*) have an ETL=5 exmplars/branch. For Grape Moths (*Lobesia botrana* and *Eupoecilia ambiguella*), for the second generation, in July, has to be done a scouting of 20-25 bunch of grapes from 10 different areas of plantation and ETL=5 viable eggs/100 bunch of grapes or 10 larvae/100 bunch of grapes or 100 adults/pheromone trap/week. ***In autumn*** has to be done the third survey in grapevine plantation searching for: *Empoasca vitis* - Grape Leafhopper, ETL=25 larvae/25 scouted leaves. For Grape Moths (*Lobesia botrana* and *Eupoecilia ambiguella*), for the third generation, ETL=2 perforation (holes) of grapes/25% from analyzed bunch of grapes which it is supposed to determine a 8% losses. [3]

II. Ensure freedom from viral disease, Flavescence Dorée or Bois Noir phytoplasmas.

EPPO (OEPP/EPPO, 1990) recommends, to ensure freedom from disease, that grapevine nurseries should be established in, and propagating material should be collected from, areas where flavescence dorée does not occur. Alternatively, mother plants should be inspected during the growing season and be particularly well protected against the vector. Control of the vector is achieved by: (i) eliminating eggs through burning pruning wood and treating before bud burst with parathion-activated oils; (ii) one or two chemical applications against instars 30 and 45 days after first hatching, followed by another treatment against adults [4] Like all phytoplasmas, the causal agent of flavescence dorée (Grapevine flavescence dorée phytoplasma) is localized in the phloem of infected grapevines from where it is acquired by the vector for subsequent transmission. The principal vector, the cicadellid *Scaphoideus titanus*, was introduced into Europe from North America [5] Bois noir (Grapevine bois noir phytoplasma) is not transmitted by *S. titanus*, Vidano et al., in 1989 found *S. titanus* to be abundant in affected vineyards in Piemonte; they also found *Hyalesthes obsoletus* transmitting phytoplasmas to various wild plants and weeds [6]. The insects in Auchenorrhyncha group identified in the investigated vine plots showing leaf yellowing phenomena in Romania belong to 21 species, 9 subfamilies and 6 families. The leafhopper *Scaphoideus titanus*, the well-known vector of *Flavescence Dorée* phytoplasma was detected in two of the commercial vine plots from Murfatlar and Blaj vineyards and in an uncultivated vine plot in Bucharest; The planthopper *Hyalesthes obsoletus*, vector of Bois Noir phytoplasma was identified in samples from both commercial vine plots in Murfatlar. Some other Auchenorrhyncha insects considered by the entomological literature as potential vectors of the grape yellow phytoplasmas e.g.

Reptalus panzeri (Löw), *Fieberiella florii* (Stall), *Neoaliturus fenestratus* (H-S), *Stictocephala bisonia* (K&Y), *Dictyophara europaea* (L.), and *Euscelidius variegatus* (Kirsch) were captured on vineyard in Romania [7]

III. Biological compatibility between the entomopathogenic fungus Beauveria bassiana and fertilizers products used in organic viticulture

Assuming that the use of organic fertilizers and biological control agents make to increase the soil's repressive effect against the development of phylloxera and other pests in the vineyard, it was conducted laboratory experiments, in order to assess the effect of farm manure and compost on biological parameters of some Beauveria bassiana strains selected for obtaining biological insecticides. It was tested three B. bassiana strains belonging to the entomopathogenic microorganisms collection of the Romanian Research-Development Institute for Plant Protection. Barkley kernels colonised by fungal strains was incorporated in soil fertilizers; after a six months incubation period at 240 C, the fungal strains were re-isolated from test fertilizers and it was quantified the following biological parameters of single-conidium isolates: vegetative growth, conidiogenesis, viability and virulence. To test the virulence, aqueous spray of conidia were applied on Plodia interpunctella larva, used as test insect. B. bassiana strains colonized organic substrates, the saprophytic development was abundant, the vegetative multiplication and the sporulation were not inhibited in any of the experimental variants. The average size of fungal colonies and their daily average growth rates were close to the control variants. Estimated conidia viability showed a mean percent germination up to 91%. The conidia was high virulent, it was registered 89-93% P. interpunctella mortality. This study shows that the organic fertilizers farm manure and compost are compatible with B. bassiana, the romanian fungal strains can be used for a B. bassiana inoculum conservation strategy in organic viticulture based on preliminary trials with good results in control of phylloxera. [8]

IV. Sustainable Use Directive 2009/128/EC (SUD)

The Sustainable Use of Pesticides Directive requires Member States to develop a national legislative framework to transpose the EU Directive provisions and implement through national action plans its objectives.

The Directive states that reducing the risk associated with pesticide use is one of the most important elements of sustainability. The focus for the national authorities is therefore on the reduction of risks. National Action Plans (NAP) are the tools that transform EU policy, into an organized set of national actions.

In transposing the provisions of the Directive into national law, MSs will have to align the legislation with the country's specifications, political needs, and existing legislation. Member States (MS's) are requested to transpose the Directive into national legislation within two years from the entry into force, effectively by the end of 2011.

CONCLUSIONS

1. The There is a necessity to apply insecticides treatments at a certain ETL.
2. There is a necessity to avoid spreading of flavescence dorée (Grapevine flavescence dorée phytoplasma).
3. It has to be done more studies referring biological control of pests.

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