

Portable biosensor-based device for mapping the risk of grape infection by *Botrytis cinerea* in the vineyard (WINBIOTOOL)

Phase 3/2022

The third phase of the project aimed to validate the integrated portable device for the determination of infection with *Botrytis cinerea*, laccase activity and for the application concerning the management of the risk of fungal attack in the vineyards.

In order to achieve this objective, ICDVV Valea Călugărească carried out three activities (continuation of the activities carried out during stage 2):

2. Operational decision process of phytosanitary treatments based on monitoring of the laccase activity in the vineyards (continuation Phase 2);

3. The analysis of environment and technological factors that determine the occurrence and development of gray mould in the vineyards (continuation Phase 2);

4. Working visits, scientific events and dissemination of results.

RESULTS

1. Operational decision process of phytosanitary treatments based on monitoring of the laccase activity in the vineyards

Operational decision process of phytosanitary treatments based on monitoring of the laccase activity in the vineyards can be achieved by the following procedures:

-by using the integrated portable device made by the partners in the project, International Center of Biodynamics and Epi Sistem SRL.

In order to make available to the collaboartor the spores produced by different strains of *Botrytis cinerea*, ICDVV Valea Calugareasca, isolated and purified several strains of *Botrytis cinerea* using as source infected grapes and performed artificial infections using two of these strains, marked 1C and 8C.

The correlation between the level of infection of the infected must and the lacasse activity by using the spectrophotometric method was also performed.

- based on a program developed in excel which takes into account, in addition to the climatic elements, other factors involved in the appearance and evolution of gray mould, namely, the genetic predisposition of the varieties, the location, density and the general condition of the plantation, the phenophases in which the incidence of disease can be high.

Depending of the obtained results, possible interventions can be suggested, respectively, prophylactic or control measures, measures for partial restoration of the vines affected by the fungal attack, the schedule of phytosanitary treatments with the indication of the moment of application.

2. The analysis of environment and technological factors that determine the occurrence and development of gray mould in the vineyards

The analysis of the ecological factors (climatic and edaphic) involved in the occurrence and development of gray mould (*Botrytis cinerea*) in the vineyards was performed in Valea Călugărească viticultural centre, during 2020 – 2021, using as biological material, two grapevine varieties, Cabernet Sauvignon with medium resistance to Botrytis infection, and Chardonnay with high susceptibility.

Taking into account the average temperature during the wetting of the foliage and the duration of the leaf moisture, favorable conditions for the manifestation of gray mould, during 2020 – 2021 period were during „flowering” (112 hours) and „berry setting,” (98 hours) phenophases, the periods in which the temperature had optimal values for the development of Botrytis, 21.1°C and 22.6°C respectively.

From the point of view of edaphic factors, favorable conditions for the development of gray mould were registered during July, at the beginning of the berry setting, the average frequency of attack being 12% for Cabernet Sauvignon and 10% for Chardonnay. At harvesting the average frequency of attack reached 17% for Cabernet Sauvignon and 13% for Chardonnay.

3. Working visits, scientific events and dissemination of results

PROJECT MEETINGS

Online “Kick-off meeting” of WINBIOTOOL via Microsoft teams was organized on 25th February by ENKOA SYSTEM, S.L. during which an analysis concerning the accomplishment of the activity carried out inside the project was analysed.

ICDVV Valea Călugărească organized on 24 February, 2022, a workshop in which there were presented the main results obtained inside the project.

The event was attended by 16 people, project partners, researches working in the field, representatives of the producers from Valea Călugărească viticultural area and from ASAS Bucharest.

DISSEMINATION OF RESULTS

Article under evaluation

Andreea Catalina Lulea, Robert Ruginescu, Roberta Maria Banciu, Catalina Pantazi, Elena Brinduse, Marian Ion, Silvia Quintela, Edurne Elejalde, Laura Fernández-de-Castro, Maria Carmen Villarán Zuria Ruiz-de-Vergara, Cristobal Ruíz, Petru Epure, Cristina Purcarea, Alina Vasilescu,, “Fast electrochemical measurement of laccase activity for monitoring grapes’ infection with *Botrytis cinerea*”, Processes (Q2, IF 2.8).

Conferences

Oral presentation accepted

Alina Vasilescu, Elena Brinduse, Szilvester Gaspar, Monica Potara, Andreea Catalina Lulea, Roberta Maria Banciu, Robert Ruginescu, Cristina Purcarea, „Screening grapes for infection by *Botrytis cinerea*: detection of spores versus the evaluation of laccase activity”, 6th International Conference - New Trends on Sensing- Monitoring₁ Telediagnosis for Life Sciences – NT SMT-LS 2022, Romania, Sept. 8-10, 2022

Poster – under evaluation

Andreea Catalina Lulea, Robert Ruginescu, Roberta Maria Banciu, Elena Brinduse, Petru Epure, Cristina Purcarea, Alina Vasilescu, Fast electrochemical measurement of laccase activity for monitoring grapes' infection with Botrytis cinerea Sixth Edition of International Conference on Analytical and Nanoanalytical Methods for Biomedical and Environmental Sciences, "IC-ANMBES 2022".