

CEEX Project
Contract no. 4 dated 3rd of October 2005/IFGAL

TITLE: Exploiting vineyards on Moldavian hills by means of a sustainable agriculture / Improving Vine-Growing Lands in the Hilly Area of Moldavia While Applying a Sustainable Agriculture

Acronym: **IFGAL**

Contract: **nr. 4 as of 3.10.2005**

Financing: State budget – **Ministry of Education and Research**

Program: „Excellence research” – National Authority for Scientific Research

Project category: **<module I> <project type P-CD>**

Contract value (source: state budget): **1,500,000 lei**

Contract period: **36 months**

Contractor: **Bujoru Viticulture and Vinification Research and Development Center (SCDVV Bujoru)**

Project Manager: **Ph. D. Eng. Viorica Enache**

Thematic fields S/T: **2.3 Life sciences and biotechnologies for sustainable non-food products and processes**

2.1 Production and sustainable management of biological resources of soil, woods and aquatic environment

Technological platform: INTEGRATED SYSTEMS

Partners

- 1. Project Coordinator / 1st Partner - Bujoru Viticulture and Vinification Research and Development Center (SCDVV Bujoru)**
- 2. 2nd Partner – SCDVV Iasi**
- 3. 3rd Partner – SCDVV Odobesti**
- 4. 4th Partner – USAMV Iasi**

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| Name | VITICULTURE AND VINIFICATION RESEARCH AND DEVELOPMENT CENTER OF IASI (SCDVV Iasi) |
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| Phone / fax | 004 0232219500 / 004 0232218774 |
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| Name | UNIVERSITY OF AGRICULTURAL SCIENCES AND VETERINARY MEDICINE “ION IONESCU DE LA BRAD” IASI (USAMV Iasi) |
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PURPOSE:

Developing „Viticultural technology for exploiting hilly lands by means of a sustainable agriculture”

ABSTRACTS

Ascending agricultural lands stand for 43% of the agricultural area in the country. The main degradation phenomenon affecting ascending lands is the soil erosion which damages agricultural lands by dislocating, carrying away and depositing the eroded matter, sometimes leading to their exclusion from the agricultural system. The erosion process is determined and influenced by a series of erosional agents and factors. Considering the area of the ascending lands where grapevines are cultivated, soil erosion averages 1.7 million tons yearly. The most significant effect of erosion is the decrease in production capacity as eroded soil contains by 3 to 5 times more fertilizers than the primary soil considering that erosion is a selective process. The general objective pursued within the project regarding the sustainable exploitation of hilly lands is *making the use of natural resources more efficient and developing the sustainable cultivation of hilly lands*, while the project's specific objectives are the following:

- a) evaluating the natural resources of soil in the hilly region of Moldavia;
- b) reestablishing soil functions;
- c) determining the role of grapevine in soil preservation process if a sustainable cultivation technology is applied;
- d) promoting and disseminating results concerning the exploitation of vineries in the hilly region by means of a sustainable viticulture;

Within the hilly lands exploitation process there shall be considered soil conditioning and improving techniques complying with EU's requirements on environmental protection generally and on soil protection in particular.

The project pursues to determine the technical and scientific solutions critical to the exploitation of hilly lands by means of a sustainable agriculture. The politics in recent years aiming to extend the agricultural area by all means resulted in vast lands created by terracing and cultivated with grapevine, disconsidering both the slope and the risks the rentability of that culture is subject to. Part of the lands which had been terraced for cultivation have been abandoned because of the high plantation costs.

The methodologies to be tested in order to efficiently exploit vineries are based on biological principles and entirely comply with the European and international standards and regulations on sustainable viticultural development as a condition for joining the European Union.

The methodology to be used in viticulture is potentially viable since rugged, less fertile lands are usually used. An argument is that the best results are obtained on poor soils when cultivated with grapevine rather than on the nutrient-rich ones (organic matter possibly inhibits the fixation of atmospherical nitrogen; nodosities remain white, neutral instead of reddish as they should normally be).

Objectives

General objective: Making the use of natural resources more efficient and sustainably cultivating hilly lands

Project specific objective:

- evaluating the natural resources of soil in the hilly region of Moldavia;
- reestablishing soil functions;
- determining the role of grapevine in soil preservation process if a sustainable cultivation technology is applied;
- promoting and disseminating results concerning the exploitation of vineries in the hilly region by means of a sustainable viticulture.

IMPACT

Technical impact: developing technology for efficiently exploiting the hilly lands of Moldavia (rehabilitation, protection and preservation) by sustainably using the natural resources and creating a soil environment favourable to obtaining viticultural products. The technology thus benefits both the present and the future generations by maintaining soil characteristics within the optimum parameters.

Economical impact: attiring owners of viticultural lands who wish to make their grapevine cultures more efficient and are receptive to change.

Social impact: preserving biodiversity, positive impact on people's health condition, increasing general confidence in technologies able to recover unprofitable viticultural lands, maintaining the cultivation of viticultural plantations in regions with under-developed industry and hence assuring new employment potential for the local communities.

New work positions shall be created by attiring young farmers, stopping workforce migration from the countryside to cities, and developing rural areas.

Activities

| Phase / Deadline / Activities |
|---|
| Phase I / Evaluating natural resources of soil in the hilly region of Moldavia / 30.12.2005 |
| I.1 Determining the stationary state |
| I.2 Research evaluating the natural resources of soil in the hilly region at the beginning of the experiment |
| I.3 Agro-climatic monitoring |
| Phase II / Reestablishing soil functions and determining the role of grapevine in soil preservation process if a sustainable cultivation technology is applied / 15.07.2006 |
| II.1 Agro-climatic monitoring |
| II.2 Drawing up the work plan |
| II.3 Planning the experimental model (EM) |
| II.4 Developing the EM |
| II.5 Testing the EM |
| Phase III / Reestablishing soil functions and determining the role of grapevine in soil preservation process if a sustainable cultivation technology is applied /30.12.2006 |
| III.1 Agro-climatic monitoring |
| III.2 Testing the EM |
| III.3 Planning and preparing the documentation for technical and economical analysis |
| III.4 Revising the technical documentation required for developing the model |
| Phase IV / Reestablishing soil functions and determining the role of grapevine in soil preservation process if a sustainable cultivation technology is applied. Promoting and disseminating the results / 15.07.2007 |
| IV.1 Agro-climatic monitoring |
| IV.2 Completing the technical documentation for the model |
| IV.3 Testing the functional model |
| IV.4 Attending technical and scientific events in the field |
| Phase V Evaluating natural resources of soil in the hilly region of Moldavia, reestablishing soil functions, determining the role of grapevine in soil preservation process if a sustainable cultivation technology is applied, and promoting and disseminating the results / 31.10.2007 |
| V.1 Agro-climatic monitoring |
| V.2 Research evaluating the natural resources of soil in the hilly region at the end of the experiment |
| V.3 Planning and preparing the documentation for the technical analysis regarding the land exploitation in the hilly region |
| V.4 Consultancy and technical assistance to partners |
| V.5 Large scale dissemination of results by public communication and publishing methods |
| V.6 Attending specific events in the field |
| V.7 Elaborating the reference system |
| Phase VI / Evaluating natural resources of soil in the hilly region of Moldavia, and promoting and disseminating the results / 15.09.2008 |
| VI.1 Large scale dissemination of results by publishing, for extra coverage |
| VI.2 Elaborating the reference system |
| VI.3 Elaborating the technical documentation required for land exploitation in the hilly region |

Results

| Phase | Phase result | Activity | Results | Stage |
|---|---------------------|--|---|--------------|
| Etapa I / Evaluating natural resources of soil in the hilly region of Moldavia | Research report | I.1 Determining the stationary state | Studies, documentation, experimental model, analyses, research equipment, computing systems | completed |
| | | I.2 Research evaluating the natural resources of soil in the hilly region at the beginning of the experiment | | |
| | | I.3 Agro-climatic monitoring | | |
| Etapa II / Reestablishing soil functions and determining the role of grapevine in soil preservation process if a sustainable cultivation technology is applied | Research report | II.1 Agro-climatic monitoring | Modern technologies, research equipment, scientific communication, research networks integrated by thematic areas | completed |
| | | II.2 Drawing up the work plan | | |
| | | II.3 Planning the EM | | |
| | | II.4 Developing the EM | | |
| | | II.5 Testing the EM | | |
| Etapa III / Reestablishing soil functions and determining the role of grapevine in soil preservation process if a sustainable cultivation technology is applied | Research report | III.1 Agro-climatic monitoring | Modern technologies, research equipment, scientific communication, partnerships, research networks integrated by thematic areas, market and feasibility research, business plan | completed |
| | | III.2 Testing the EM | | |
| | | III.3 Planning and preparing the documentation for technical and economical analysis | | |
| | | III.4 Revising the technical documentation required for developing the model | | |
| Etapa IV / Reestablishing soil functions and determining the role of grapevine in soil preservation process if a sustainable cultivation technology is applied. Promoting and disseminating the results | Research report | IV.1 Agro-climatic monitoring | Modern technologies, research equipment, articles, technical documentation | completed |
| | | IV.2 Completing the technical documentation for the model | | |
| | | IV.3 Testing the functional model | | |
| | | IV.4 Attending technical and scientific events in the field | | |
| Etapa V Evaluating | Research | V.1 Agro-climatic monitoring | Modern technologies, research | completed |

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| natural resources of soil in the hilly region of Moldavia, reestablishing soil functions, determining the role of grapevine in soil preservation process if a sustainable cultivation technology is applied, and promoting and disseminating the results | report | V.2 Research evaluating the natural resources of soil in the hilly region at the end of the experiment | equipment, posters, national exhibition stand, initial task book, control reports | |
| | | V.3 Planning and preparing the documentation for the technical analysis regarding the land exploitation in the hilly region | | |
| | | V.4 Consultancy and technical assistance to partners | | |
| | | V.5 Large scale dissemination of results by public communication and publishing methods | | |
| | | V.6 Attending specific events in the field | | |
| | | V.7 Elaborating the reference system | | |
| Etapa VI / Evaluating natural resources of soil in the hilly region of Moldavia, and promoting and disseminating the results | Research report | VI.1 Large scale dissemination of results by publishing, for extra coverage | Final task book, articles, leaflets, technical documentation brochures. Viticultural technology for exploiting the lands in the hilly region while applying a sustainable agriculture | completed |
| | | VI.2 Elaborating the reference system | | |
| | | VI.3 Elaborating the technical documentation required for land exploitation in the hilly region | | |

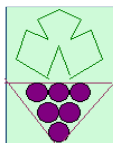
CONTACT INFORMATION

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CLOSING POSTER

Project title: **Exploiting viticultural lands on Moldavian hills by means of a sustainable agriculture**

Project number: 251

Module I – Complex research and development projects

Project authors

| Contractor (1 st Partner) | 2 nd Partner | 3 rd Partner | 4 th Partner |
|--------------------------------------|--------------------------|--------------------------|------------------------------------|
| SCDVV Bujoru | SCDVV Iasi | SCDVV Odobesti | USAMV Iasi |
| Legal representative | | | |
| Director | Director | Director | Rector |
| Ph.D. Eng. Cristina Simion | Ph.D. Eng. Costica Savin | Ph.D. Eng. Miha Ghica | Univ. Prof. Ph.D. Gerard Jitareanu |
| Project manager | Scientific coordinator | Scientific coordinator | Scientific coordinator |
| Ph.D. Eng. Viorica Enache | Ph.D. Eng. Doina Damian | Ph.D. Eng. Ileana Stoian | Univ. Prof. Valeriu V. Cotea |
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Contract no.4 dated 3rd of October 2005

Contract period: 3.10.2005-15.09.2008

General objective:

Making the use of natural resources more efficient and developing the sustainable cultivation of hilly lands

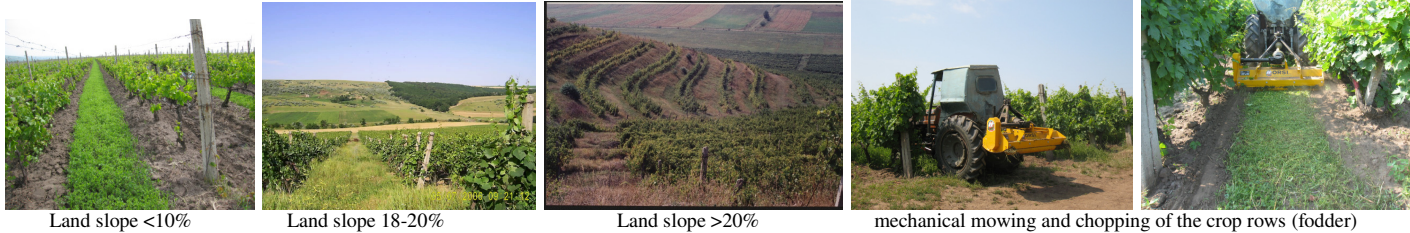
Specific objectives:

- Evaluating natural resources of soil in the hilly region of Moldavia
- Reestablishing soil functions;
- Determining the role of grapevine in soil preservation process if a sustainable cultivation technology is applied;
- Promoting and disseminating results concerning the exploitation of vineries in the hilly region by means of a sustainable viticulture.

Fields of usage: agriculture, food safety and security

Beneficiaries: development divisions of partners, public and private organizations owning viticultural lands in hilly regions

Viticultural technology for exploiting hilly lands by means of a sustainable agriculture



Technology varies according to the climatic region and the emplacement of the vine plantations – the land slope:

For the dry region:

- land slope $\leq 10\%$, green manure (fodder composed of vetch - 120 kg/ha and oats – 60 kg/ha) sown on every other interval.
- land slope 18-20%, broad terraces with 5-6 rows of vines, soil fertilization with grape husks compost and animal manure, and foliar fertilization (NPK) according to the needs of the vine and to the phenophase status at the moment when the treatment is being applied.
- land slope $>20\%$, narrow terraces with 1-2 rows of vines, soil fertilization with grape husks compost and animal manure, and foliar fertilization (NPK) according to the needs of the vine and to the phenophase status at the moment when the treatment is being applied.

For the sub-humid region:

- land slope $\leq 10\%$, green manure (fodder) and/or long-term natural grassing, soil fertilization with animal manure, and foliar fertilization (NPK) according to the needs of the vine and to the phenophase status at the moment when the treatment is being applied.

Soil/plant fertilization

- Green manure:

As a green manure, one uses the fodder composed of vetch (120 kg/ha) and oats (60 kg/ha), which is sown in early spring (end of March – beginning of April) on every other interval. The green manure shall be applied on the entire area after two years and mown when the vetch flourishes. Mulch remains at the surface until it dries, then it is incorporated in the soil.

- Organic manure:

Animal manure is applied in early spring, in quantity of 15-20t/ha, either before or after the spring ploughing.

- Natural manure resulting from grape processing:

Grape husks compost is applied in early spring in quantity of 4,5 t/ha, either before or after the spring ploughing.

- Foliar fertilization:

Foliar fertilizers shall be applied variably, according to the vegetation period:

- NPK (2:1:0) - when offshoots grow;

- NPK (0:1:1) - when grapes get ripe.

Superficial soil conditioning works only are allowed while reducing as much as possible their frequency. Should it be necessary, a deep soil ventilation can be done. Soil works involving a high humidity shall be avoided in order to prevent soil compaction and maintain / increase the water infiltration capacity.

Soil works shall be reduced to the necessary minimum, deep ploughing is allowed only when needed. Also, soil works shall be carried out only when the vine is physically ripe in order to preserve its structure and assure the required quality of work.

In order to assure the efficacy of phytosanitary treatments, there shall be preventively taken collateral measures such as: assuring the optimum weight on each vine eye, the vertical positioning of grapevine offshoots, carrying out in-green operations. Synthetic pheromone traps such as Atrabot shall be used in order to warn of treatments against the vine moth.

In order to reduce machine operations and hence avoid the degradation of soil structure, phytosanitary treatments are allowed only as long as they limit the economic damage.

The foliary fertilization is recommended to be carried out simultaneously with the phytosanitary treatments of that period in order to reduce machine operations.

Technically, the recommended practices solve some of the problems that viticulture deals with (the erosional process) by allowing viticultural ecosystems in the hilly region to apply the sustainable good practices.

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PARTICIPATIONS IN TECHNICAL SCIENTIFIC EVENTS IN THE FIELD

Contractor /Partner 1-SCDVV BUJORU

In order to broadly disseminate the results of the project, the team who carried it out participated in the following events:

- **The International Horticulture Scientific Symposium organized by the University Of Agricultural Sciences And Veterinary Medicine “Ion Ionescu de la Brad” Iasi, with the following works:**

- *Aspecte privind implicațiile factorului antropic asupra lucrărilor de combatere a eroziunii solului în plantații viticole în contextul unei agriculturi durabile.*
- *Cercetări privind tendința evoluției unor factori climatici în zona de sud a Moldovei cu referire la plantațiile viticole*
- *Aspecte privind implicațiile schimbărilor climatice globale asupra fenofazelor de vegetație la vița de vie în podgoria “Dealul Bujorului”.*
- *Influența unor factori climatici asupra biologiei și comportamentului moliei strugurilor (Lobesia botrana - Den. et Schiff.) în plantațiile viticole din podgoria “Dealul Bujorului”.*

- **The International Scientific Symposium „Realizări și perspective în horticultură, viticultură, vinificație și silvicultură”, 1st – 2nd of March 2007, dedicated to the celebration of 100 years since the birth of the University Professor Gherasim Rudi, and organised by the State Agricultural University of Moldova, Chișinău, Faculty of Horticulture, with the following works:**

- *Aspecte privind implicațiile factorului antropic în evoluția proceselor erozionale pe terenurile viticole din zona colinară a Moldovei - Romania în contextul unei agriculturi durabile*
- *Cercetări privind impactul economic al implementării tehnologiei modernizate de valorificare a terenurilor din zona colinară în contextul aplicării unei agriculturi durabile*

- **The international pluridisciplinary colloquium „Global warming, with potential impacts on the vineyard?”, 28th – 30th of March 2007, Centre de Recherches de climatologie (CRC) UMR CNRS 5210, University of Bourgogne, Dijon/Franta with the work:**

Des aspects concernant l'influence de l'evolution meteorologique sur le cycle vegetatif de la vigne dans le vignoble “Dealul Bujorului” Roumanie

Within the 40th Jubilee Session of research in viticulture and vinification organised by ICDVV Valea Călugărească on 10th of October 2007 the following works were presented:

- *Aspecte privind tendința evoluției unor factori climatici și influența acestora asupra plantațiilor viticole exploatare durabil*

Authors: Viorica Enache, Cristina Simion, Alina Donici, Gabriel Tabaranu

- *Regimul hidric al solurilor în plantațiile viticole ale SCDVV Iași în perioada 2000 - 2007 și influența acestuia asupra stării de vegetație*

Authors: Gabi Zaldea, Vasile Ancuța, C. Savin

- *Măsuri specifice de aplicare a tratamentelor chimice pentru combaterea bolilor și dăunătorilor adaptate condițiilor de stres fiziologic generate de seceta existentă în anul 2007 în Podgoria Odobești*

Authors: Aurelia Podosu, G. Mișu, Ileana Stoian, Lacramioara Miron, Marioara Bosoi, I. Bosoi, V. Bratu

14th of September 2007, S.C.D.V.V. Odobesti – Round table on the theme “Influența factorilor climatici asupra creșterii și dezvoltării viței de vie în anul 2007” (*Influence of climatic factors on grapevine cultivation and development in 2007*). Participants: S.C.D.V.V. Odobești, O.J.C.A. Vrancea, D.A.D.R. Vrancea, private vineyard owners.

The research team from S.C.D.V.V. Odobești presented the works below:

- *Dinamica rezervei de apă în sol în plantațiile de viță de vie și influența acesteia asupra producției de struguri în condițiile agrometeorologice specifice anului 2007 din podgoria Odobești.*
- *Influența temperaturilor ridicate cumulat cu deficitul de precipitații din anul 2007 asupra proceselor de fotosinteză la vița de vie în podgoria Odobești.*

3rd - 6th of October 2007. TIB 2007 Bucharest, The Research Hall of “Romexpo” Exhibition Center in Bucharest

The contractor SCDVV BUJORU had an exhibition stand where there were presented the results of the latest research projects, posters, leaflets, products etc.

10th of October 2007. I.C.D.V.V. Valea Călugărească; 40th Jubilee of Research in Viticulture and Vinification.

17th of October 2007. S.C.D.V.V. Odobesti - Round table regarding technologies of producing grapevine planting material and the technology of establishing grapevine plantations while applying a sustainable agriculture. Participants: S.C.D.V.V. Odobesti, O.J.C.A. Vrancea, D.A.D.R. Vrancea, private vineyard owners.

Published books:

Title: «**Valorificarea terenurilor viticole din zona colinară a moldovei în condițiile aplicării unei agriculturi durabile**»

Authors: Viorica Enache, Cristina Simion, Alina Donici, Gabriel Tabaranu

Publishing house: Academica, 2008

Articles published in Romania:

1. «Dinamica conținutului de pigmenți foliari în lăstarul viței de vie»

Authors: Liana Doina Toma, Carmen Doina Jitareanu, Bogdan Mihai Nechita, Alina Marta, Mirela Radu

Lucrări științifice, vol. 49/2006, in Horticultura series, USAMV Iasi

2. «Aspecte privind stabilitatea ecopedologică a terenurilor în pantă plantate cu viță de vie în raport cu tendințele schimbărilor climatice din ultimii ani»

Author: Viorica Enache

The annals of the Viticulture and Vinification Research and Development Institute of Valea Călugărească, vol.XVIII, Bucharest, 2006

3. «Fitoprotecția viței de vie în condițiile anului 2005»

Authors: Carmen Stoica, Gabi Zaldea, Vasile Ancuța, G. Stoica

Lucrări științifice, vol. 49/2006, in Horticultura series, USAMV Iasi

4. «Aspecte privind implicațiile factorului antropic asupra lucrărilor de combatere a eroziunii solului în plantații viticole în contextul unei agriculturi durabile»

Author: Viorica Enache

Lucrări științifice, vol. 50/2007, in Horticultura series, USAMV Iasi

5. «Cercetări privind tendința evoluției unor factori climatici în zona de Sud a Moldovei cu referire la plantațiile viticole»

Author: Viorica Enache

Lucrări științifice, vol. 50/2007, in Horticultura series, USAMV Iasi

6. «Aspecte privind implicațiile schimbărilor climatice globale asupra fenofazelor de vegetație la vița de vie în podgoria Dealu Bujorului»

Authors: Alina Donici, Viorica Enache, Cristina Simion

Lucrări științifice, vol. 50/2007, in Horticultura series, USAMV Iasi

7. «Influența unor factori climatici asupra biologiei și comportamentului moliei strugurilor (*Lobesia botrana* - Den. et Schiff.) în plantațiile viticole din podgoria Dealu Bujorului»

Authors: Gabriel Tabaranu, Viorica Enache, Cristina Simion, Alina Donici

Lucrări științifice, vol. 50/2007, in Horticultura series, USAMV Iasi

8. «The influence of climatic factors in the vineyard of NE Moldovei during 2001 – 2007»

Authors: Vasile Ancuța, Costica Savin, Doina Damian, Gabi Zaldea

Lucrări științifice, vol. 50/2007, in Horticultura series, USAMV Iasi

9. «Considerații și particularități ale tăierilor de rodire la vița de vie în podgoriile vrâncene»

Author: Marioara Bosoi

Revista Podgorenilor No. 112/February-March 2007

10. «Cercetări privind influența înnierbării anuale asupra creșterii și fructificării viței de vie în podgoria Odobești»

Authors: Ileana Stoian, Ghica Miha, Lacramioara Miron, Marioara Bosoi

Lucrări științifice, vol. 51/2007, in Horticultura series, USAMV Iasi

11. «Lucrări agrotehnice în viticultură»

Author: Aurelia Podosu

Gazeta podgorenilor No.125/April 2008

12. «Lucrări în plantațiile viticole»

Author: Aurelia Podosu

Gazeta podgorenilor No. 128/July 2008

13. «Aspects regarding the daily average consumption in the hilly area vineyards, in hydric stress condition, in the context of sustained agriculture»

Author: Viorica Enache

Lucrări științifice, vol. 51/2008 in *Horticultura* series, USAMV Iasi

14. «The monitoring of the ecophysiological groups of microorganisms from soil, through employment a lasting viticultural technology»

Authors: Doina Damian, Vasile Ancuța, Alina Mantaluța, Costica Savin, Rodica Pasa

Lucrări științifice, vol. 51/2007, in *Horticultura* series, USAMV Iasi

15. «The foliar fertilization, unconventional and nonpollutant manner of increasing the production of grapes in the durable viticulture»

Authors: M. Mustea, Geanina Birescu, L. Birescu, Liliana Rotaru, Emilia Dorneanu, A. Dorneanu

Lucrări științifice, vol. 51/2007, in *Horticultura* series, USAMV Iasi

Articles published abroad:

1. «Aspecte privind implicațiile factorului antropic în evoluția proceselor erozionale pe terenurile viticole din zona colinară a Moldovei-România în contextul unei agriculturi durabile»

Author: Viorica Enache

CD – International Scientific Symposium „Realizări și perspective în horticultură, viticultură, vinificație și silvicultură”, 1st – 2nd of March 2007, dedicated to the celebration of 100 years since the birth of the University Professor Gherasim Rudi, and organised by the State Agricultural University of Moldova, Chișinău, Faculty of Horticulture

2. «Cercetări privind impactul economic al implementării tehnologiei modernizate de valorificare a terenurilor din zona colinară în contextul aplicării unei agriculturi durabile»

Authors: Viorica Enache, Cristina Simion, Agatha Popescu, G. Tabaranu, Alina Donici

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