Scanning report (EIP format for practice abstracts)

***Project title (native language):** **EUFRUIT: Rețeaua Europeană de Pomicultură**

***Project title (English):** **EUFRUIT: European Fruit Network**

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Section A. Summary for EIP dissemination

***Keywords:** soil activity, organic orchard, jam rose, useful fauna, artificial nests, prey birds,

***Main geographical location:** RO321 București

Other geographical locations: RO111 Bihor, RO112 Bistrița-Năsăud, RO113 Cluj, RO114 Maramureș, RO115 Satu Mare, RO116 Sălaj, RO121 Alba, RO122 Brașov, RO123 Covasna, RO124 Harghita, RO125 Mureș, RO126 Sibiu, RO211 Bacău, RO212 Botoșani, RO213 Iași, RO214 Neamț, RO215 Suceava, RO216 Vaslui, RO221 Brăila, RO222 Buzău, RO223 Constanța, RO224 Galați, RO225 Tulcea, RO226 Vrancea, RO311 Argeș, RO312 Călărași, RO313 Dâmbovița, RO314 Giurgiu, RO315 Ialomița, RO316 Prahova, RO317 Teleorman, RO321 București, RO322 Ilfov, RO411 Dolj, RO412 Gorj, RO413 Mehedinți, RO414 Olt, RO415 Vâlcea, RO421 Arad, RO422 Caraș-Severin, RO423 Hunedoara, RO424 Timiș

***Summary (native language):**

Sunt prezentate metode de ameliorare a stării de fertilitate a solului, înainte și după înființarea unei livezi, în pomicultura ecologică. Prin semănarea a trei specii de plante amelioratoare: muștar (*Sinapis alba*), crăițe (*Tagetes patula) și* facelia *(Phacelia tanacetifolia*) pe un teren pregătit pentru plantare și pe intervalele dintre rânduri, după plantarea unei culturi de trandafiri de dulceață, s-a observat o îmbunătățire substanțială a caracteristicilor fizice, agrochimice și biologice ale solului. S-a constatat o creștere a conținutului solului în N, P, K și humus. Prin mulcirea suplimentară a solului după plantare, cu lână și talaș, valorile analizate au crescut, cele mai bune rezultate obținându-se la varianta Sinapis + lână. Activitatea microbiană a solului a crescut la variantele semănate cu *Tagetes* și *Sinapis* și a fost observată o creștere a densității de bacterii și ciuperci benefice pe suprafețele mulcite cu lână și talaș.

Pentru protecția fitosanitară a trandafirilor de dulceață într-o livadă ecologică, pe lângă tratamentele pe bază de sulf, cupru și extractul de Neem, o serie de biostimulatori și laptele proaspăt de vacă au dat rezultate foarte bine în prevenirea și combaterea bolilor și dăunătorilor.

Protecția și monitorizarea păsărilor răpitoare în Ferma didactică a scos în evidență faptul că ciuful de pădure (*Asio otus*) iernează în grupuri mari în arbori rășinoși cu coroană deasă (*Thuja orientalis*) care îi protejează de atacul altor păsări. Prin analiza ingluviilor la sfârșitul iernii s-a observat că acești consumă un mare număr de rozătoare (șoareci de câmp și de casă și șobolani negri) cu o pondere de 89% din total, aducând beneficii importante ecosistemelor horticole.

Amplasarea cuiburilor artificiale este necesară pentru protecția și ajutorarea păsărilor insectivore în livezi și alte ecosisteme horticole. Monitorizarea cuiburilor artificiale a evidențiat faptul că în 3 din 13 zone studiate, 9 din 13 cuiburi au fost vandalizate de ciocănitoarea mare (*Dendrocopos major*) care a mâncat ouăle și puii păsărilor insectivore. Acest lucru e posibil să se datoreze faptului că tratamentele fitosanitare reduc numărul de insecte care formează în mod normal dieta speciilor de ciocănitoare. Este necesar să se construiască cuiburi artificiale cu orificiile protejate cu plăci metalice pentru a preveni lărgirea acestora și studierea mai atentă a etologiei ciocănitorilor, care în general, sunt considerate păsări utile în livezi, grădini și parcuri.

Summary (English):

Two methods for enhancing the soil fertility before and after the organic orchard planting are presented. By sowing three ameliorative plants: *Sinapis alba*, *Tagetes patula and Phacelia tanacetifolia* in a terrain prepared for planting and between rows after the planting of jam rose orchard, a substantial enhancement of the soil physical, agrochemical and biological characteristic of the soil were observed. An increase of soil content in N, P, K and humus was measured. By supplementary mulching after planting with wool and wood chips, the mentioned parameters increased, the best results being registered at Sinapis + wool

variant. The soil microbial activity increased at *Tagetes* and *Sinapis* variants and an increase of the useful Bacteria and Fungi density was observed on the wool and wood chips mulched variants.

For the jam rose phytosanitary protection in an organic orchard, besides the treatments based on sulphur, copper and Neem extract, different bio stimulators and raw milk cow gave very good results top prevent and fight the pests and diseases.

The Pray Birds protection and monitoring at our Didactic farm showed that the Long-Eared Owls (*Asio otus*) is wintering (roosting) in large groups in big conifer trees with dense canopy (*Thuja orientalis*) that protect them against the attack of other birds. By analysing the pellets at the end of the winter season it has been observed that, Long-Eared Owls, eat a large number of rodents as Common Dormouse (*Muscardinus avellanarius*), House Mouse (*Mus musculus*) and Brown Rat (*Rattus norvegicus*), representing 89% of their total diet, and bringing important benefits to the horticulture ecosystems.

Installation of artificial nests is necessary for the insectivore birds' protection and support in orchards and other horticultural ecosystems. By monitoring the artificial nests, it was observed that in 3 of 13 studied zones, 9 of 13 nest were attacked by the Great Spotted Woodpecker (*Dendrocopos major*) that eight the eggs and the chicks of insectivore birds. This phenomenon might be possible because of the reductions of insects' population that normally form the woodpeckers' diet, due to the phytosanitary treatments. The artificial nests have to be built with the holes protected by metal sheets in order to prevent the woodpecker attacks and in the same, it is necessary the detailed study of the woodpeckers' ethology, that are generally considered useful birds for orchards, gardens and parks.

Section B. Project information

***Project coordinator:** Michelle H. Williams; Aarhus University, Department of Food, Kirstinebjergvej 10, 5792 Aarslev, Denmark; mw@food.au.dk; +45 25170049

***Project period:** 2016 – 2019

***Project status:** Ongoing

***Funded by:** Horizon 2020

***Total budget:** €1.8m

***Geographical regions:** DK011 Copenhagen, DK012 Copenhagen and its environs, DK013 North Zealand, DK014 Bornholm, DK021 East Zealand, DK022 West- and South Zealand, DK031 Funen, DK032 South Jutland, DK041 West Jutland, DK042 East Jutland, DK050 North Jutland, BE211 (Arrondissement. Antwerpen), BE212 (Mechelen), BE213 (Turnhout), BE221 (Hasselt), BE222 (Arr. Maaseik), BE223 (Tongeren), BE231 (Aalst), BE232 (Dendermonde), BE233 (Eeklo), BE234 (Gent), BE235 (Oudenaarde), BE236 (Sint-Niklaas), BE241 (Halle-Vilvoorde), BE242 (Leuven), BE251 (Brugge), BE253 (Ieper), BE254 (Kortrijk), BE255 (Arr. Oostende), BE256 (Arr. Roeselare), BE257 (Tielt), BE258 (Veurne), BE310 (Nivelles-Nijvel), BE331 (Huy-Hoei), BE332 (Liège- Luik), BE334 (Waremme-Borgworm), BE335 (Verviers), FR8 Méditerranée; FR81 Languedoc-Roussillon, FR6 SUD-OUEST, FR512 Maine et Loire, FR611 Dordogne, FR812 Gard, DE6 (Hamburg), DE8 (Mecklenburg-Vorpommern), DE9 (Niedersachsen), DEF0 (Schleswig-Holstein), DEE0 (Sachsen-Anhalt), DEA (Nordrhein-Westfalen), DE111, DE112, DE113, DE114, DE115, DE116, DE117, DE118, DE119, E11A, DE11B , DE11C, DE11D, DE121, DE122, DE123, DE124, DE125, DE126, DE127,DE 128, DE129, DE12A, DE12B, DE12C, DE131, DE132, DE133, DE134, DE135, DE136, DE137, DE138, DE139, DE13A, DE141, DE142, DE143, DE144, DE145, DE146, DE147, DE148, DE149, DE600 Hamburg, DE932 Cuxhaven, DE933 Harburg, DE939 Stade, DEF09 Pinneberg, NL1-NL4 + NLZ Holland; NL 224 zuidwest Gelderland, NL 226 Arnhem/Nijmegen, NL230 Flevoland, NL310 Utrecht, NL321 Kop van Noord-Holland, Nl322 Alkmaar en omgeving, NL338 oost Zuid-Holland, NL33A zuidoost Zuid-Holland, NL341 Zeeuws-Vlaanderen, NL342 overig Zeeland, Nl411 west Noord-Brabant, NL413 noordoost Noord-Brabant, NL414 zuidoost Noord-Brabant, NL421 noord Limburg, NL422 Midden-Limburg, NL423 zuid Limburg, ES620 Murcia, UKG11 Herefordshire, UKG12, Worcestershire, UKH12 Cambridgeshire, UKH16 North and West Norfolk, UKH17 Breckland and South Norfolk, UKJ22 East Sussex, UKJ35 South Hampshire, UKJ36 Central Hampshire, UKJ37 North Hamphshire, UKJ41 Medway, UKJ42 Kent, UKJ43 Kent Thames Gateway, UKJ44 East Kent, UKJ45 Mid Kent, UKJ46 West Kent, ES618 Sevilla, ES511 Barcelona, ES512 Gerona, ES513 Lérida, ES514 Tarragona, CH0 Schweiz/Suisse/Svizzera, ITH51-59 Emilia Romagna region, ITH10 Bolzano-Bozen, HU101 Budapest, HU102 Pest, RO111, RO112, RO113, RO114, RO115, RO121, RO122, RO123, RO124, RO125, RO126, RO211, RO212, RO213, RO214, RO215, RO216, RO221, RO222, RO223, RO224, RO225, RO226, RO311, RO312, RO313, RO314, RO315, RO316, RO317, RO321, RO322 RO411, RO412, RO413, RO414, RO415, RO421, RO422, RO423, RO424. HU101, HU102, LT001 Alytaus apskritis, LT002 Kauno apskritis, LT003 Klaipėdos apskritis, LT004 Marijampolės apskritis, LT005 Panevėžio apskritis, LT006 Šiaulių apskritis, LT007 Tauragės apskritis, LT008 Telšių apskritis, LT009 Utenos apskritis, LT00A Vilniaus apskritis.

Project web page: http://www.eufrin.org/index.php?id=55

***Project Objectives (native language):**

[Please translate project objectives, below, to native language]

1. Realizarea unei rețele europene în sectorul pomicol
2. Dezvoltarea și implementarea unei abordări sistematice pentru scanarea și sintetizarea cunoștințelor practice și științifice existente
3. Stabilirea unui dialog continuu cu organisme recunoscute de politici europene, naționale și regionale
4. Identificarea și sprijinirea unor noi domenii prioritare de cercetare prin monitorizarea continuă și analiza activităților existente și viitoare de cercetare-inovare.

Project Objectives (English):

1. Establish a European network focused on the fruit sector.
2. Develop and implement a systematic approach for scanning and synthesizing existing scientific and practical knowledge.
3. Establish an ongoing dialogue with relevant EU, national and regional policy bodies.
4. Identify and support new priority areas of research by continually monitoring and analysing existing and upcoming research and innovation activities.

***Project partners:**

1. Aarhus University, Department of Food Science (Denmark) • AU
2. Research Station for Fruit npo (Belgium) • Pcfruit
3. Centre Technique Interprofessionnel des Fruits et Légumes (France) • CTIFL
4. Obstbauversuchsanstalt Jork (Germany) • OVA
5. Stichting Wageningen Research (Netherlands) • WR
6. ~~East Malling Research (United Kingdom) • EMR~~ (terminated 08-02-2016)
7. Institut de Recerca i Tecnologia Agroalimentàries (Spain) • IRTA
8. Federal Department of Economic Affairs, Education and Research (EAER), acting through Agroscope Institute of Plant Sciences (Switzerland) • Agroscope
9. Laimburg Research Centre for Agriculture and Forestry (Italy) • Laimburg
10. University of Agronomic Sciences and Veterinary Medicine of Bucharest (Romania) • USAMV
11. National Agricultural Research and Innovation Centre Fruitculture Research Institute (Hungary) • NARIC
12. Lithuanian Research Centre for Agriculture and Forestry (Lithuania) • LRCAF
13. Assemblée des Régions Européennes Fruitières, Légumières et Horticoles (France) • AREFHL
14. Variety Innovation Consortium South Tyrol (Italy) • SKST
15. Freshfel Europe (Belgium) • FRESHFEL
16. Elbe-Obst Erzeugerorganisation r.V. (Germany) • EO
17. Fruitconsult BV (Netherlands) • FC
18. University of Greenwich (United Kingdom) • UoG
19. University of Hohenheim (Germany) • UHOH
20. Università di Bologna (Italy) • UNIBO
21. Institut National de la Recherche Agronomique (France) • INRA
22. NIAB EMR (new 09-02-2016)

Section C. Annex: Scanning report[1]

Scanning report
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Country: [Romania]

NUTS 3 region(s)[2]: NUTS 3 REGION(s): RO111 Bihor, RO112 Bistrița-Năsăud, RO113 Cluj, RO114 Maramureș, RO115 Satu Mare, RO116 Sălaj, RO121 Alba, RO122 Brașov, RO123 Covasna, RO124 Harghita, RO125 Mureș, RO126 Sibiu, RO211 Bacău, RO212 Botoșani, RO213 Iași, RO214 Neamț, RO215 Suceava, RO216 Vaslui, RO221 Brăila, RO222 Buzău, RO223 Constanța, RO224 Galați, RO225 Tulcea, RO226 Vrancea, RO311 Argeș, RO312 Călărași, RO313 Dâmbovița, RO314 Giurgiu, RO315 Ialomița, RO316 Prahova, RO317 Teleorman, RO321 București, RO322 Ilfov, RO411 Dolj, RO412 Gorj, RO413 Mehedinți, RO414 Olt, RO415 Vâlcea, RO421 Arad, RO422 Caraș-Severin, RO423 Hunedoara, RO424 Timiș

WP no. and title: WP5 Sustainable fruit production

Date: [01-05-2017]

Source materials and methodology

The main knowledge is gathered from researches made in USAMV Bucharest in didactic field trials, Istrița Research Station, Moara Domnească Didactic Farm, etc. within two PhD programs. One is focused in the organic jam rose culture and the second on the protection of useful avifauna within the horticultural ecosystems including the organic orchards.

Selected literature:

Butcaru A.C., Stănică F., Madjar R., 2017, Influence of ameliorative plants and mulch on some soil agrochemical characteristics in an organic edible rose crop (in press) Faculty of Horticulture, USAMV București.

Butcaru A.C., Stănică F., Matei G. M., Matei S., 2017. Soil microbial activity in an organic edible rose crop (in press)

Butcaru A. C., Stănică F., Matei G. M., Matei S., 2017. Influences of Soil Ameliorative Plant Species on the Organic Edible Rose Culture, (in press)

Butcaru A.C., Stănică F., Matei G. M., Matei S., 2016. Alternative methods to improve soil activity before planting an organic edible rose crop, Journal of Horticulture, Forestry and Biotechnology, Volume 20(4): 12-17, ISSN: 2066-1797

Mihai C.A., Stănică F., 2017. Observations Related the Long-Eared Owl (*Asio otus*) Feeding in Two Horticultural Ecosystems (in press). Faculty of Horticulture, USAMV Bucuresti.

Mihai C.A., Stănică F., Ionescu-Stănică M.R. 2015. Monitoring of Artificial Nests in Horticultural Ecosystems - Observation of Woodpeckers Ethology. 2nd International Conference on Sustainable Agriculture and Food Security: A Comprehensive Approach, ICSAFS 2015. Univ. Padjdjaran. Indonesia. (in press.).

Best practice findings

1. Soil preparation for establish an organic orchard.

Since 2015 at the USAMV București researches were conducted with the main objective to increase the soil fertility prior to orchard planting and to monitor its biological activity and agrochemical parameters. Three ameliorative species: *Sinapis alba*, *Tagetes patula*, *Phacelia tanacetifolia* were sown in seven different combinations (V1-V7) and a control plot was kept without seeding (V8).

[1] Equivalent to 'final report' in EIP-AGRI format.

[2] Please see ec.europa.eu/eurostat/ramon/nomenclatures/ for details on NUTS regions, level 3

After the jam rose orchard planting, two mulching variants were applied for each initial variant (Vn): Vn.1. wood chips and Vn.2. sheep wool, while the control Vn.3., was represented by unmulched soil.

The results show important changes on soil characteristics due to the influence of ameliorative species and mulching systems. In all the wool variants (Vn.2.) there was an important increase of mineral N, from an initial average content of 3.38 ppm to 51.38 ppm at V1.2. - Sinapis, compared to 23.125 at V8.2. - Control. The P content increased from 192 ppm to 398 ppm in V4.3. – Sinapis + Tagetes variant. The K content increased from 274.56 ppm in the initial stage, to a maximum of 800 ppm in the V1.2. – Sinapis variant on wool mulched row. The humus content modified from 2.37% to 3.12% in many variants (V1.2., V2.3., V2.2., V6.1.). V1.2. - Sinapis with wool mulched variant presents the highest improvement of agrochemical parameters (pH 7.09; mineral N - 51.375 ppm; K - 800 ppm and humus - 3.12%) compared with the other variants.

Microbial activity was stimulated especially in variants with two ameliorative plant species. The highest potential of soil respiration was registered for combinations including *Tagetes* but also in the variant with *Sinapis* alone that stimulated the bacterial activity in microbial communities. Generally, the bacteria and fungi species number and their density was higher in V1-V7 variants than in the V8 control variant.

Microbial species identified included ubiquitous bacteria and fungi with high metabolic capabilities to degrade various substrates such as cellulose from vegetal wastes or keratin from sheep wool added, due to efficient production of cellulase and keratinolytic protease enzymes. Bacteria from genera *Bacillus, Xanthomonas, Actinomycetes* and fungi from genera *Trichoderma, Aspergillus, Penicillium, Cladosporium, Paecilomyces, Myrothecium*, have a contribution to the biological control of potential plant pathogens and nematodes in cultures.

2. Phytosanitary protection in organic jam rose culture

In the organic jam rose orchard, a special phytosanitary protection treatment scheme was applied. To control main pest and diseases, organic certified products based on sulphur, copper, neem extract but also bio stimulators and fresh cow milk have been used with good results.

3. Protection and monitoring the activity of useful orchard fauna

Prey birds can be a useful help to control the rodent population in the orchard and other horticultural ecosystems.

Their protection and monitoring is an important activity at Moara Domnească, USAMV's didactic farm in Ilfov county. The farm has 500 hectares, with agricultural land, lake, orchard, dendrologic nursery, livestock and plenty of green spaces. Between other pray birds, almost 15 copies of Long-Eared Owls (*Asio otus*) have been found in two eight-meter tall Chinese Arbovitae (*Thuja orientalis*) plants used as roosting site. The place seems to be the ideal hiding place from magpies (*Pica pica*), which used to attack the owls during daylight. From the roosting site, 167 pellets were collected on 10th of February and in 70 pellets, 84 preys were identified, as follows:

a) Rodents: 1% Common Dormouse (*Muscardinus avellanarius*), 30% Brown Rat (*Rattus norvegicus*), 58% House Mouse (*Mus musculus*). Total: 89% rodents.
b) Insectivorous mammals: 3% Common Shrew (*Sorex araneus*), 2% Bi-Coloured-Trothed White Shrew (*Crocidura leucodon*). Total: 5% insectivorous mammals.
c) Insectivorous birds: 1% Tit (*Parus sp*.). In total 1% insectivorous birds.
d) Granivorous birds: 4% Sparrow (*Passer sp*.)1% Goldfinch (*Carduelis Carduelis*). 5% granivorous birds, in total.

The roosting sites can be used for a very long period, as is the case of the Long-Eared Owls from Moara Domnească, that have come at the same place every winter, for 29 years. That is why it is necessary to maintain the tree species that owls prefer to build their shelter during winter time. Trees trimming winter should be banned in the Long-Eared Owl roosting sites. Any disturbance may negatively influence their roosting.

4. Bird Artificial Nests Monitoring in Horticultural Ecosystems - Observation of Woodpeckers Ethology

In order to increase the organic and integrated protection of horticultural ecosystems by using the biological fight, the installation of artificial nests, is an important measure to help the insectivore birds. A number of 166 artificial nets for Passeriformes birds were installed in different ecosystems as orchards, gardens, parks, botanical gardens in the South-Eastern part of Romania.

During the nests monitoring period an interesting, but in the same time warring phenomenon, was noticed: a certain number of artificial nets were prayed by woodpeckers, especially by *Dendrocopos major* (Great Spotted Woodpecker). In Romania, all the ten European woodpecker species are nesting, nine being sedentary and one (*Jynx torquilla*) migratory. Woodpeckers in general, are very useful in woody plant biological protection, having a predominant insectivore nutrition and being the only one to keep under control the insects that are leaving on, inside and under the trees bark.

Our researches came out with some interesting data regarding the woodpecker's ethology in the studied ecosystems. Some preliminary conclusions are presented as follows:

- Woodpeckers are specialized in finding insects that live on/inside branches and trunks of woody plants.
- It seems that woodpeckers eat eggs and chicks of other bird species during the nesting period (June).
- The Great Spotted Woodpecker (*Dendrocopos major*) prayed 9 of 13 occupied artificial nests (Chart 1). Attacks were registered in 3 of 16 studied areas.

- In order to protect the artificial wood nests against the woodpecker's attack, the entrance hole has to be reinforced with a metal layer.
- When the food source of Great Spotted Woodpecker, that normally is insects, decrease, it is searching for other protein food source, by eating other birds' eggs and chicks.
- The insects decreasing – in number and diversity – in an anthropic ecosystem may be influenced by the applied chemical pesticides for plant protection.
- Bird artificial nests build for dedicated species, can be occupied also by insects as European hornet (*Vespa crabro)* or even mammals as Hazel dormouse (*Muscardinus avellanarius*)

Further studies are needed to better understand the Woodpeckers ethology in order to prevent and limit the damage and pray of useful bird nests.