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<th>The Name of the Institution to be evaluated</th>
<th>INCDA (National Agricultural Research &amp; Development Institute), Fundulea</th>
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<td>II</td>
<td>Evaluation Period</td>
<td>29 – 30 April 2012</td>
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<td>III</td>
<td>Members of the Team</td>
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<td>1st Evaluator information</td>
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<tr>
<td>A</td>
<td>Name, Surname</td>
<td>Ladislav PAULE</td>
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<tr>
<td>B</td>
<td>Affiliation</td>
<td>Faculty of Forestry, Zvolen, Slovakia</td>
</tr>
<tr>
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<td>2nd Evaluator information</td>
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<tr>
<td>A</td>
<td>Name, Surname</td>
<td>Elena PAOLETTI</td>
</tr>
<tr>
<td>B</td>
<td>Affiliation</td>
<td>Institute Plant Protection, CNR, Firenze, Italy</td>
</tr>
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<td>3rd Evaluator information</td>
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<tr>
<td>A</td>
<td>Name, Surname</td>
<td>Serge HAMON</td>
</tr>
<tr>
<td>B</td>
<td>Affiliation</td>
<td>Institut Francais de Recherche pour le Developement, Montpellier, France</td>
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<td>4th Evaluator information</td>
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<tr>
<td>A</td>
<td>Name, Surname</td>
<td>Daniel Ioan PĂCURAR</td>
</tr>
<tr>
<td>B</td>
<td>Affiliation</td>
<td>Umeå Plant Science Center, Umeå, Sweden</td>
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<td>5th Evaluator information</td>
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<td>A</td>
<td>Name, Surname</td>
<td>Ram REIFEN</td>
</tr>
<tr>
<td>B</td>
<td>Affiliation</td>
<td>The Hebrew University of Jerusalem, Israel</td>
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CONCLUSIONS

The team has evaluated the INCDA (National Institute of Research and Development for Agriculture) on the basis of the self-evaluation documents, presentations by the scientific director and the team leaders and visits to laboratories and facilities. Two days were spent in Fundulea and Bucharest.

The main strengths of the INCDA have proved to be as follows:
- Consolidated expertise in cereal and maize breeding. This is the only reference institution of Romania;
- Internationally recognized as a research partner in the field of cereal and maize breeding;
- Expertise also in technology and breeding for barley, rice, legumes, sunflower, forage crops, aromatic and medicinal plants;
- Lots of implications for rural economy and agriculture;
- Good genetic resources, knowledge and management;
- Administrative organization is running without complaints;

The main weakness of the institute:
- Although the institute performs well it does not have enough staff and finances to carry out and develop its activities so as to assure the continuation in the future.

In details:

C1: Quality of R&D activities and their results (4.6)

- The INCDA plays an important role in breeding activities of cereals and maize and other crops and during the past years it has developed an important position in plant breeding in the international context.
- The INCDA plays an important role in dissemination of knowledge within the agricultural sector in Romania.
- The members of the institute published 208 papers in total, in 172 of them the first author being from the INCDA. Most of the papers (134) are published in two journals: Romanian Agricultural Research and Analele INCDA Fundulea. Forty-six papers were published in ISI journals (including Romanian Agricultural Research; IF 2011 = 0.5), i.e. 0.88 per researcher, only 9 with AIS with a very low number of total citations (16).
- The members of the institute have registered 20 national patents and 22 cultivars, which is definitely high and remarkable number. This production ranks them very high even in the international context.
- The total budget represented 12 mil. RON in 2008 and it decreased to 8 mil. RON in 2010. About 56 % from the total amount come from the budget and 44 % are from private funds (contracts with private companies and royalties for use of patents). They have some support from private companies and profit from positive revenues every year.
- There is a significant decrease of the budget over the evaluation period with consequences for research activities and effective use of infrastructure. Self-financing represents around 50 %.
- They have only one international project (FP7).
- The dissemination activities are at medium to high level.
- The INCDA developed a vital cooperation with agricultural universities and other R&D institutions in Romania.
• The INCDA is a member of international networks for testing new cultivars and comparative tests.
• Excellent transfer of knowledge and expertise to farmers.
• The international cooperation is based on bilateral agreements.

C2: Human resources quality (4.3)

• The average age of staff is 46.5 years, slightly exceeding the recommended threshold of 45 years.
• From the age distribution it is obvious that the age category between 40 and 50 years is missing.
• Reduction of personnel (mostly auxiliary and development) over the years has not resulted in the improved age structure. Recently, there is an effort to recruit young scientists. Modest salaries may be an obstacle for recruitment and retention of excellent young scientists.
• 16 PhD students are a very good number of young, competent and motivated people, who are interested in continuing their jobs at the INCDA even after obtaining their PhD degree.
• Assessment of the individual performances is regularly carried out followed by a financial reward.
• The total number of teams – 13 seems to be high and their role is unbalanced. There is a lack of clarity in defining the teams, divisions and working groups.
• The total number of employees is 342 people, out of which 52 are researchers and 54 represent administrative staff, which suggests that an increase in the number of scientists is needed.

C3: Quality of infrastructure and its rate of exploitation (4.7)

• A patrimony of land and buildings is available, including field experiments and a large modernized greenhouse.
• The institute with a long-term tradition in plant breeding possesses a large collection of well adapted genetic resources of high national and international value.
• Molecular genetics, quality, plant physiology and biotechnology labs, etc. are well equipped.
• Due to financial restraints in high running costs, some of the equipment is not used in full. Services of this molecular lab offered for other R&D institutions in the field of agriculture may be another source of income for the institute.
• Even though >7M€ were invested over the evaluation period, the members of the institute feel the infrastructure is not sufficient yet to attain a world-class level.

C4: Management and efficiency and quality of the research environment (4.6)

• Training courses abroad and English lessons for young people were organized. A merit-based system of promotion and incentive/reward for employees are available and the INCDA would like to further refine it.
• A simplification of the administrative procedures would help the research.
• The Scientific Board consists of nine members being the representatives of the Institute main teams. It would be helpful to include external members selected from among top-level scientists at the international level. This will also help to improve the quality of science, the transparency and the efficiency of the decisions.
• A World Bank project for restructuring labs has started to reach a higher efficiency.
Management efficiency and quality of the research environment complies with the best European and International practices. Nevertheless, there is too much administrative load for researchers.

C5: Quality and credibility of the institutional developmental plan (4.8)

- A very clear and objective analysis of strengths and weaknesses and how to deal with them has been presented. A straightforward scientific strategy is available. A realistic human resources strategy for increasing the personnel in key areas as well as scientifically-driven and realistic plan for infrastructural development are available. Their major aims include continuation and promotion of the services to the community and the development of strategic partnerships with international scientific institutions.
- The General director has a profound scientific vision. The scientists at the institute are performing at European-level.
- Difficulties in recruiting and retaining excellent young scientists (salaries are below the EU and national average).
- Excellent national and international collaborations although not structured in international projects.
- The main project focuses on topical issues, e.g. wheat yield responses to climate fluctuations.
- Very active in scientific communication and dissemination.
- The critical number of researchers in the key development areas has been reached. Restructuring of the teams according to thematic approaches would be helpful.

RECOMMENDATIONS

Publications & Dissemination

- More ambitious approach in publications: submit preferentially to ISI journals abroad.
- Large portion of activities are devoted to technical assistance and self-financing.
- The potential for competitive science is not fully exploited.
- The participation in national/international meetings should produce peer-reviewed papers.
- Web portal has to be improved
- To improve the international standard and acceptance of the scientific journal Romanian Agricultural Research it is recommended to change the name of the journal, to include international scientists in the Editorial Board and also to apply reviewing process at the international scale.

Budget

- Fairly good capacity to get grants, however, the budget in the last two years decreased significantly.
- A lot of efforts dedicated to commercial activities.
- Securing an annual budget would reduce the development activities which would result in beneficial effects on the research activities.

Human Management

- It is recommended for the institute to pay attention to the age structure of the research staff and its development.
• Young scientists should visit foreign top-quality laboratories for training and experimental activities. Training abroad is recommended (long-term visits >5–6 months).
• A stronger support of the researchers from the administration is needed, e.g. the researchers should not be the only ones in charge of preparing the financial reports; one financial report a year or per project would be enough. It would help to divide the administrative office into two branches: one for fundamental and applied research; and the other one for development, commerce and production.

Research plan
• A streamlining of the molecular biology labs has been suggested.
• Regular assessment of R&D staff based on clear indicators should be translated into a financial reward as it was several years ago.
• To improve the transparency of decisions, it is recommended that the Scientific Council includes external members, possibly top-level scientists at the international level. This would also help to improve the quality of science.
• A clear strategy for stimulating the development of new ideas should be formulated.
• The reorganization of the INCDA in two different and independent departments (Development and Research) with separate budgets and objectives is recommended.
Divisions and research teams

A – Crop management
2.3.1. Water and plant nutrition management team
2.3.2. Plant protection and weed control team
2.3.4. Organic agriculture systems team

B – Fundamental research and breeding self-pollinated crops
2.3.5. Molecular Genetics and Cytogenetics team
2.3.6. Physiology and Biotechnology team
2.3.7. Wheat and triticale breeding team
2.3.8. Barley and rice breeding team
2.3.9. Linseed, legumes, medicinal and aromatic crops breeding team

C – Breeding open-pollinated crops
2.3.10. Maize and sorghum breeding team
2.3.11. Sunflower breeding and seed production team
2.3.12. Forage crops breeding, seed production and cropping team

Not-research teams
2.3.3. Dissemination and consultancy team
2.3.13. Breeder seed and pre-basic seed production team
2.3.14. Basic seed multiplication and seed processing team
2.3.15. Activity report by R&D service team

Team 1. Water and plant nutrition management

R&D activity
The scientific production of this team is good; the total number of articles published is 23, out of which 7 in ISI indexed journals (5 in collaboration with other teams) and 16 in other publications. The team disseminates its research results through field-days, demonstrations, pre-extension trials, scientific journal and technical publications.

Human Resources
The average age of the team is currently 40 years. Two young scientists were hired during the period.

Infrastructure
The team has a field laboratory, instrumentation for field work and a laboratory for plant and soil analyses. The rate of its use is good.

Management & Research Environment
National partnerships were developed.

General Feedback
The team is very collaborative inside the INCDA: it cooperates with the breeding teams in identifying genotypes suitable for conservation agriculture, with the physiology team and with 5 experimental stations. This is a well performing team.
Team 2. Plant protection and weed control

R&D activity
This is an active team in terms of publications: the total number of articles published is 17, out of which 2 in ISI indexed journals and 15 in other publications (8 in collaboration with other teams). 10 – 14 R&D contracts/year with private firms for testing and establishing standards for registration of new chemical products were carried out.

Human Resources
The average age of the team is currently 41 years. Two young scientists were hired during the period.

Infrastructure
The team has access to experimental field equipment and artificial climate facilities and use specific laboratory equipment. The rate of exploitation is high.

Management & Research Environment
The team collaborates with several other INCDA teams (breeding, crop management, organic and conservative agricultural systems) and experimental stations.

General Feedback
This is a well performing team.

Team 3. Dissemination and consultancy

R&D activity
The main aim of this team is the production of leaflets and brochures for dissemination, organization of demo plots, collaboration in the organization of the annual open field days, organisation of training courses for farmers. No scientific papers were published.

Human Resources
The average age of the team is currently 51 years.

Infrastructure
The team has access to experimental field equipment.

Management & Research Environment
The team has direct collaboration with all other teams concerning dissemination.

General Feedback
This is not a research team and should be joined to other teams (namely, 13 and 14) providing services that are a support for science.

Team 4. Organic agriculture system

R&D activity
Good scientific production, i.e. 7 papers, from which 2 in ISI journals, in collaboration with other teams, and 5 in other publications, plus 3 books and 3 booklets. The first Romanian Camelina variety was registered by this team. Capacity of attracting international funds and active communication with farmers are other features of this team.
Human Resources
The average age of the team is currently 51 years.

Infrastructure
The team has access to field and laboratory equipment, mostly in common with other teams.

Management & Research Environment
The team cooperates with Scottish Agriculture College Edinburgh in an FP7 project, and has informal national partnerships.

General Feedback
This is a well performing team.

Team 5. Molecular genetics and cytogenetics

R&D activity
Twenty papers were published, out of which 7 in ISI journals (4 in collaboration with other teams) and 13 in other publications. Private international funds were attracted from Bayer Crop Science. Pre-breeding materials in wheat (alien introgression lines, DH lines, intra-varietal substitutions lines for individual chromosomes, etc.) were introduced in breeding programs. Research results were shared with the national and international scientific community by publications and communications in conferences.

Human Resources
The average age of the team is currently 49 years. One young scientist was hired during the period. A young researcher is working on her PhD thesis.

Infrastructure
The team has access to experimental field equipment and artificial climate facilities and has its own specific laboratory equipment, adequate for different kind of activities, including molecular genetics and cytogenetics. Exploitation of some lab equipment is sometimes limited by the availability of funds for reagents.

Management & Research Environment
The team is involved in 3 international collaboration projects, and one European regional project. Very good collaboration with other 5 teams (the four breeding teams and the physiology and biotechnology team).

General Feedback
The performance of this team is good.

Team 6. Physiology and biotechnology

R&D activity
Three papers in ISI with relative score of influence, 17 articles in ISI journals (11 as first and 6 co-author) and 19 articles in publications from other databases (15 as first and 4 co-author) were published. Co-authors in 3 patents of 3 new wheat cultivars registered by the wheat breeding team. Funds obtained from Syngenta and BASF multinational company for testing different products
(growth regulators) on crops. Four books were published. Two courses for students and farmers were organized. They participated in 6 International Conferences.

**Human Resources**
The average age of the team is currently 46 years. Two young scientists were hired during the period. One of the team members will defend her PhD thesis soon.

**Infrastructure**
The team has a good biotechnology and plant physiology laboratory equipment as well as access to greenhouse and climate chamber facilities. Most of the field and laboratory equipment was purchased in last five years with funds from national research projects.

**Management & Research Environment**
The members of the team have applied their ideas in new research projects or joined more powerful external research teams involved in top activities. The team was involved in 3 international collaboration projects carried out by the INCDA. The team cooperates with all breeding teams, the team for organic farming and the teams involved in crop management research.

**General Feedback**
Very well performing team.

### Team 7. Wheat and triticale breeding

**R&D activity**
Total number of papers published was 34, out of which 23 in ISI journals (6 in collaboration with other teams) and 11 in other publications (six in collaboration with other teams). Private international funds were attracted from Bayer Crop Science in exchange for providing access to NARDI wheat germplasm. Four NARDI wheat cultivars were registered in Turkey and 1 in Argentina, and 1 triticale was registered in France. To introduce and extend durum crop in Romania, a spin-off agreement was reached with a private company Agroicover to create a durum production chain, from seed to pasta. The wheat breeding team is involved in dissemination of research results by producing “breeder’s seed” of 10 wheat, 2 durum and 6 triticale cultivars, and by providing information needed for publishing extension leaflets.

**Human Resources**
The average age of the team is currently 50 years. Three young scientists were hired during the period. One of them defended her thesis, and two others are working on their PhD research. One young member attended a CIMMYT advanced training course in breeding, in Mexico.

**Infrastructure**
The team has access to experimental field equipment and artificial climate facilities, has a quality laboratory and a phytopathology laboratory (shared with other teams).

**Management & Research Environment**
The team is involved in collaborations with 11 INCDA experimental stations and in 10 international collaboration projects.

**General Feedback**
This is a top-level team in INCDA.
8. Barley and rice breeding

R&D activity
The total number of papers published was 8, out of which 1 in an ISI journal, in collaboration with other teams. The team is involved in dissemination of research results by producing "breeder's seed" of 7 barley cultivars, and by providing information needed for publishing extension leaflets.

Human Resources
The average age of the team is currently 46 years. One young scientist was hired during the period.

Infrastructure
The team uses equipment for production of doubled haploid lines from wide crosses and for determination of protein content. It also has access to experimental field equipment, artificial climate facilities and the phytopathology laboratory.

Management & Research Environment
The team is involved in collaborations with other 3 teams of the Institute and with breeding teams from 11 experimental stations under NARDI Fundulea coordination.

General Feedback
Good team in terms of scientific performance.

Team 9. Linseed, legumes, medicinal and aromatic plants

R&D activity
The total number of papers published was only 2; 1 patent was obtained; 10 new cultivars were registered (2 linseed, 2 soybean, 6 new medicinal and aromatic cultivars). The team is involved in dissemination of research results by producing "breeder's seed" of linseed (1 cultivar), soybean (2 cultivars), peas (1 cultivar), chamomile (1 cultivar), coriander (2 cultivars), fenugreek (1 cultivar), thistle (1 cultivar), and by providing information needed for publishing extension leaflets.

Human Resources
The average age of the team is currently 39 years. Two young scientists were hired during the period.

Infrastructure
The team has access to experimental field equipment, artificial climate facilities and quality laboratory equipment.

Management & Research Environment
The team collaborates with 4 experimental stations and is involved in 1 international collaboration project.

General Feedback
An effort for publishing more ISI papers should be carried out.

Team 10. Maize and sorghum breeding
R&D activity
The total number of papers published was 5, out of which 1 in collaboration with other teams. 1 patent was obtained and two new hybrids were registered. Four new maize hybrids are ready to be tested in Turkey. The team is involved in dissemination of 30 maize hybrids and 6 sorghum cultivars and provides information needed for publishing extension leaflets.

Human Resources
The average age of the team is currently 35 years. Three young engineers were hired during the period.

Infrastructure
The team has access to experimental field equipment and artificial climate facilities.

Management & Research Environment
The team collaborates with 6 experimental stations and is involved in one international collaboration with Maize Research Institute (MRI) Kneja, Bulgaria. It cooperates closely with the Physiology team and the cytogenetics team.

General Feedback
There is a need of publishing ISI papers and increasing international visibility.

Team 11. Sunflower breeding and seed production

R&D activity
The total number of papers published is 10, out of which 2 in ISI journals (1 in collaboration with other teams) and 8 in other publications (two in collaboration with other teams). 6 patents were obtained; 4 new sunflower hybrids were registered in the National Romanian list (as well as European list) and 7 joint hybrids in the European list. Private international funds were attracted from private seed companies, as royalty for the joint hybrids; these companies are: Monsanto, Caussade Semences, Limagrain, Euralis, Soltis, RAGT. 4 NARDI Fundulea sunflower hybrids were registered in Ukraine, 3 in Moldavia and 2 in Russia. The team is involved in dissemination of research results by producing breeder seed of 12 inbred lines, these being parental lines of the actual commercial hybrids, and by providing information needed for publishing extension leaflets.

Human Resources
The average age of the team is currently 56 years.

Infrastructure
The team possesses an equipment for the oil content determination and has access to experimental field equipment and artificial climate facilities.

Management & Research Environment
The team collaborates with 5 experimental stations and with 30–40 private agricultural units specialized in sunflower commercial seed production. The team is involved in 8 international collaboration projects.

General Feedback
Well performing team
Team 12. Forage crops breeding, seed production and crop management

R&D activity
The total number of papers published is 17, out of which 4 in ISI indexed journals (3 in collaboration with other teams) and 13 in other publications (three in collaboration with other teams). 5 patents were obtained and two new varieties were registered. 10 NARDI alfalfa cultivars are in the testing process in different countries (Germany, Holland, Austria, Russian Federation, Turkey, Ukraine, Kazakhstan). The team is involved in dissemination of research results by producing “breeder’s seed and pre-basic seed” of 8 forage species: 11 alfalfa, 2 Italian ryegrass, 2 hybrid ryegrass, 2 orchard grass, 2 Sudan grass and one millet cultivars and by providing information needed for publishing extension leaflets.

Human Resources
The average age of the team is currently 46 years. Two young scientists were hired during the period.

Infrastructure
The team uses a performing combine for harvesting forage, with automatic data acquisition on PC, which contributes to improve the efficiency and quality of the breeding work. The team has access to other experimental field equipment and artificial climate facilities.

Management & Research Environment
The team collaborates with 4 experimental stations and is involved in 3 international partnerships projects.

General Feedback
This is a well performing team but an improving of the quality of papers is recommended.

Team 13. Breeder seed and pre-basic seed production

R&D activity
Only three minor papers were published. Booklets and leaflets were released.

Human Resources
Average age of the team is currently 55 years.

Infrastructure
The team has access to experimental field equipment and specific facilities for seed processing.

Management & Research Environment
The team is involved in collaborations with all plant breeding teams; 11 experimental stations and more than 100 private agricultural units specialized in commercial seed production.

General Feedback
This does not seem a research team and should be joined to other teams (namely, 14 and 15) providing services that are a support for science.

Team 14. Basic seed multiplication and seed processing team
Team 15. Activity report by R&D service team
No information provided for these teams.
INCDA (National Agricultural Research & Development Institute), Fundulea

Proposed certification level: A+ (average score 4.6)

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<td>1</td>
<td>Evaluator 1 – Ladislav PAULE</td>
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|          | **Observers**            |           |
| 1        | Coordinating Authority – Gheorghe SIN |   |
| 2        | CCCDI Representative – Ion PIRNA |           |
| 3        | ANCS Representative – Simona MALUREANU |   |

Proposed Certification level: A+

Date: June 45, 2012