



A strategy for
Research, Development and Innovation
in
The Franciszek Górski
Institute of Plant Physiology
Polish Academy of Sciences (IPP PAS)
(2023 – 2030)

General characteristics of The Franciszek Górski Institute of Plant Physiology, Polish Academy of Sciences (IPP PAS)

The *Franciszek Górski* Institute of Plant Physiology is a scientific institution of the Second Division of Biological and Agricultural Sciences, Polish Academy of Sciences, supporting the development of science in the field of plant physiology, with special emphasis on ecophysiological factors determining the productivity of crops, while maintaining of the highest standards. The Institute was established on 1 July 2003 as a successor to the scientific and intellectual achievements of the Department of Plant Physiology, Polish Academy of Sciences in Krakow which had existed since 15 November 1956.

Today, the Institute is an important scientific centre in the field of broadly understood physiology of crop yield, taking into account the balance between physiology at the level of the plant and plant population level and the physiology of cellular and molecular processes. Research conducted at the Institute supports modern agriculture in deriving new varieties with improved traits that combine high yield and quality under increasingly unstable environmental conditions resulting from climate change and increased environmental stresses(Fig. 1).



Figure 1. A. Institute's main building; B,C. Examples of laboratories (B) and plants used in the research (C).

Themes and research groups in IPP PAS

IPP PAS combines basic science research with the high education on the 8th level.

Our scientists are organized in [5 Departments](#):

- Department of Developmental Biology
- Department of Cell Biology
- Department of Biotechnology
- Department of Stress Biology
- Department of Ecophysiology

Additionally, there are [Research Groups](#) that interact with each other across Agricultural and Natural Sciences connected in frame of three Scientific Themes:

- Zygotic/non-zygotic embryogenesis: from an embryo to plant (Fig. 2)
- Abiotic stress research (Fig. 3)
- Cyanobacteria and algae research (Fig. 4)

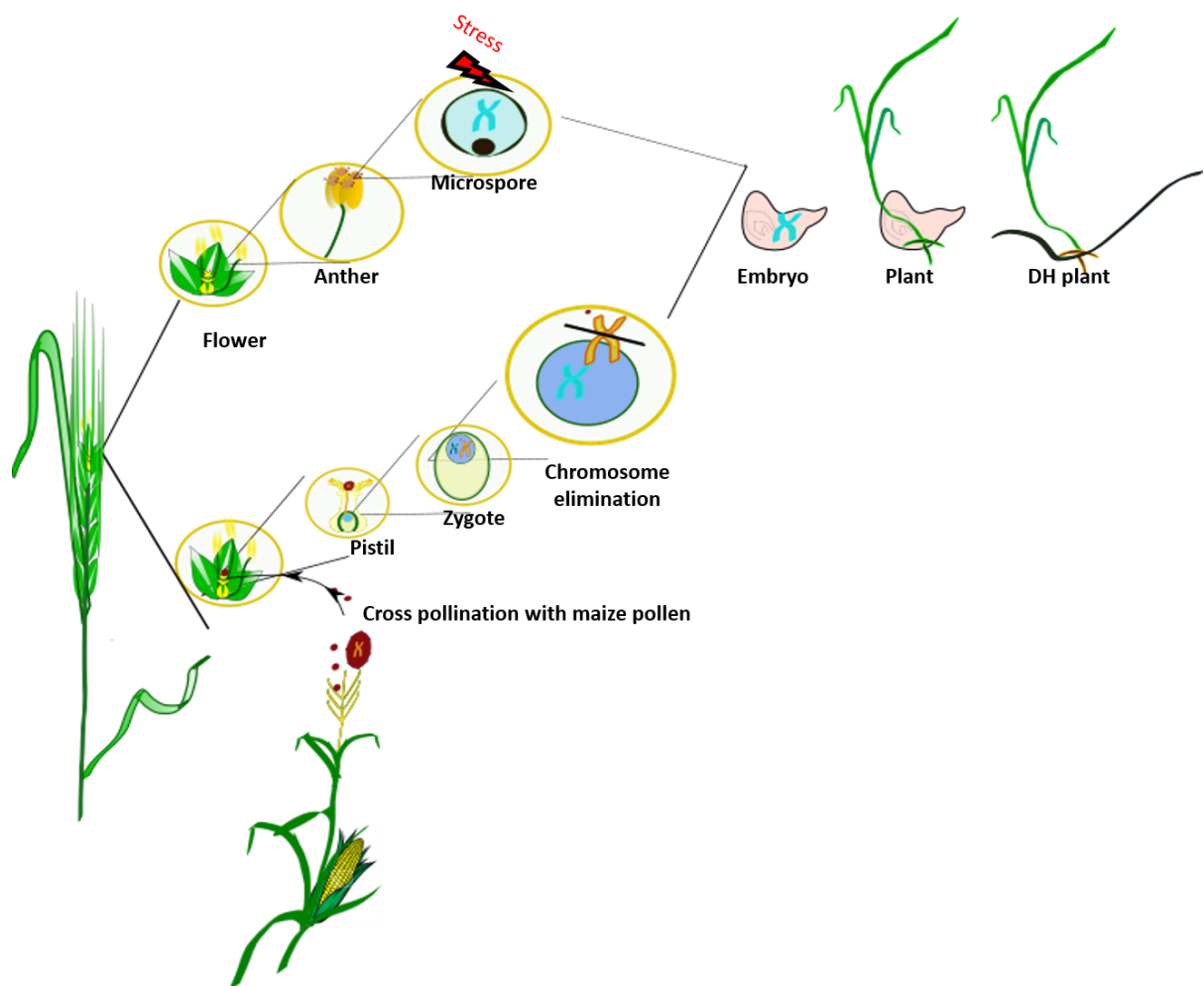


Figure 2. Haploid/doubled haploid (DHs) plants production in crop species.

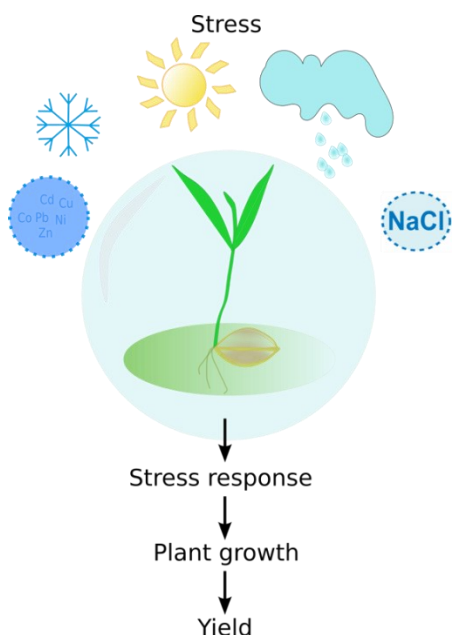


Figure 3. Plant responses to abiotic stresses.

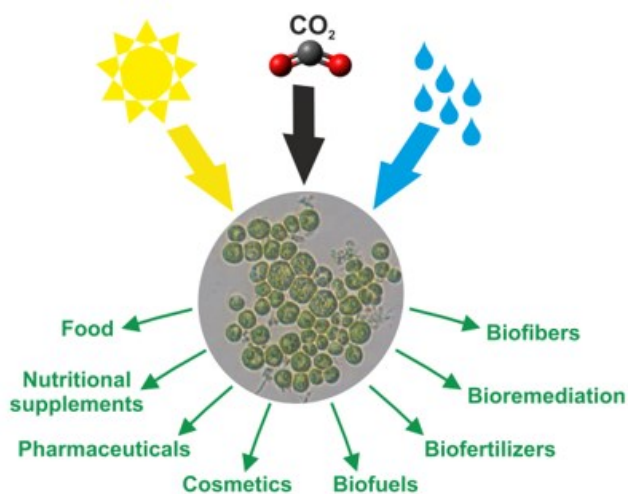


Figure 4. Metabolomics of cyanobacteria and microalgae.

The Institute has modern laboratory facilities to support physiological, biochemical, molecular and biometric analyses of plant material (e.g. HPLC or calorimetric systems). High quality optical equipment (light and fluorescence microscopes and binoculars) is also used for biological research.

Organizational structure

The employment structure of the IPP PAS and its organizational chart are shown in Figures 5 and 6.

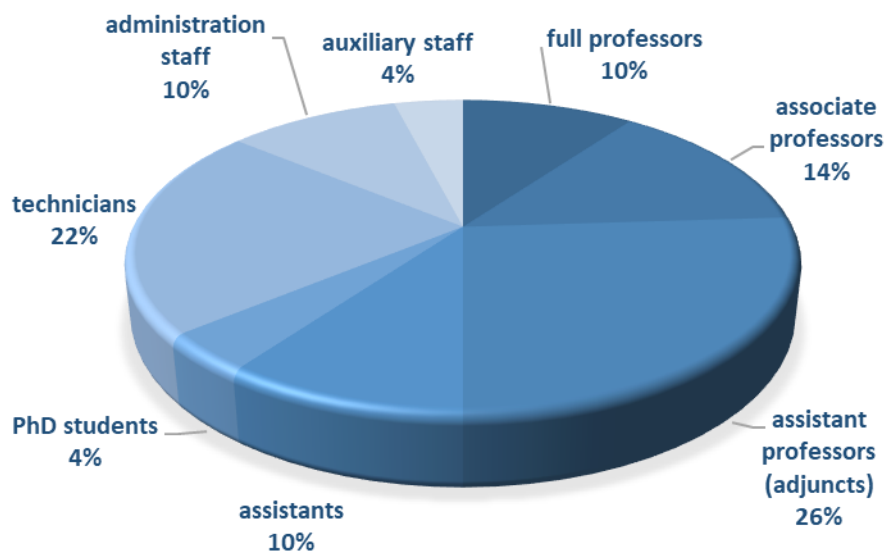


Figure 5. Employment structure in the IPP PAS by position. (Status at the end of 2022).

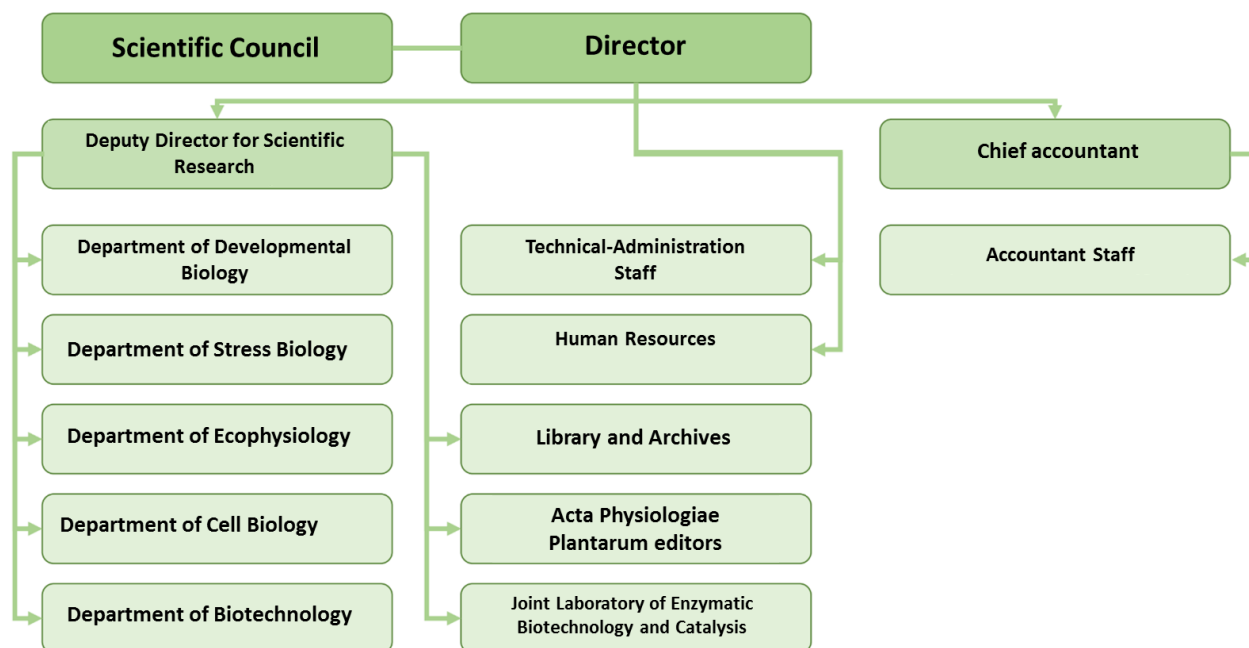


Figure 6. Organisational chart of the IPP PAS.

Regional and international cooperation

The *F. Górski* Institute of Plant Physiology Polish Academy of Sciences (IPP PAS) co-operates with many of national and foreign partner institutions and participates in the activities of world research organisations.

IPP PAS scientists collaborate with universities, research institutes and plant breeding companies throughout Poland. The IPP PAS has the most intensive cooperation with the University of Agriculture in Kraków, in particular with the Department of Plant Physiology, Breeding and Seed Science. IPP PAS scientists are also very active in scientific cooperation with the Jagiellonian University (Institute of Botany, Małopolska Center of Biotechnology), Pedagogical University in Kraków, University of Science and Technology in Kraków, University of Silesia in Katowice, Nicolaus Copernicus University in Toruń, Adam Mickiewicz University in Poznań, West Pomeranian University of Technology in Szczecin, M. Curie-Skłodowska University in Lublin, University of Wrocław, University of Gdańsk, University of Reszów, Institute of Horticulture in Skierniewice. IPP PAS also actively cooperates with units of the Polish Academy of Sciences in Kraków, e.g. Institute of Botany, Institute of Catalysis and Surface Physicochemistry and other localisations e.g. Institute of Plant Genetics in Poznań. Our Institute cooperates also with Polish plant breeding companies: Plant Breeding Strzelce Ltd., DANKO Plant Breeding Ltd., Plant Breeding Smolice Ltd., Poznańska Plant Breeding Ltd., Małopolska Plant Breeding Ltd. and Vitroflora Ltd. The collaboration is focused on the development of efficient methods for the production of doubled haploids in cereals and the determination of a universal indicator of tolerance in cereals, mainly to soil drought stress.

The basic forms of broad understood scientific cooperation are: participation of the IPP PAS in consortia implementing research projects financed from national funds, and participation of

scientists as contractors in projects implemented in other leading scientific units in Poland (listed above).

IPP PAS runs the Doctoral School of Natural and Agricultural Sciences together with – the W. Szafer Institute of Botany (IB PAS, coordinating unit), the Institute of Nature Conservation (INC PAS), the Institute of Systematics and Evolution of Animals (ISEA PAS) – and the National Research Institute of Animal Production (NRIAP). The Doctoral School will begin operations on 1 October 2019 and will educate international doctoral students in three scientific disciplines: biological sciences, agriculture and horticulture, animal husbandry, and fisheries.

The Institute is the owner of an international scientific journal - Acta Physiologiae Plantarum (APP; journal website: Acta Physiologiae Plantarum - Springer), founded in 1978 and published by Springer-Verlag (<https://www.springer.com/journal/11738>), which publishes peer-reviewed articles on all facets of plant physiology at different levels of biological organisation, ranging from relevant aspects of molecular and cell biology to biochemistry. Currently, APP is currently listed in InCite Journal Citation Reports (Clarivate) and has five-year IF: 2.9 (2022).

IPP PAS also collaborates with international universities, organisations and foreign academies of science from Europe, Asia and North America. IPP PAS combines both, bilateral contacts, and joint research resulting from international cooperation agreements with: Plant Functional Genomics group, Institute of Molecular Biotechnology, Department of Biotechnology, VIBT-BOKU, University of Natural Resources and Life Sciences in Vienna (Austria); Plant Breeding and Genetics Laboratory Joint FAO/IAEA in Vienna (Austria); Institute of Experimental Botany CAS, Centre of Plant Structural and Functional Genomics in Olomouc (Czech Republic); Laboratory of Growth Regulators, Faculty of Science, Palacký University in Olomouc (Slovakia); Institute of Experimental Botany of the Czech Republic Academy of Sciences; Department of Renewable Resources, University of Alberta in Edmonton (Canada); Botanisches Institut und Botanischer Garten Abt. Pflanzliche Zellbiologie Universität in Kiel (Germany); Department of Biology and Ecology, Faculty of Science, University of Kragujevac (Serbia); Plant Protection Institute, Hungarian Academy of Sciences in Budapest (Hungary); Department of Biotechnology, University of Okara (Pakistan).

Recently, IPP PAS researchers have carried out a number of projects focusing on various aspects of tolerance of crop tolerance to environmental stresses as well as plant embryogenesis and development, e.g. redox regulation in leaf senescence; genetic, biochemical and physiological determinants of rye (*Secale cereale* L.) response to drought stress including the role of the epicuticular wax structure; molecular characterisation of the rye dwarf gene; analysis of nuclear organisation and dynamics in barley (*Hordeum vulgare* L.) endosperm tissues; identification and characterisation of imprinted genes during barley seed development; physiological basis of frost resistance defects in winter rape (*Brassica napus* L.) as a result of deacclimation processes - the role of brassinosteroids; integrative genotypic and phenotypic analysis of the response of wheat (*Triticum aestivum* L.) mutant lines to drought stress; the role of brassinosteroids in the mechanisms of barley resistance to powdery mildew; oxidative stress and its role in the regulation of embryogenesis in isolated microspore cultures of triticale (\times *Triticosecale* Wittm.) and barley (*Hordeum vulgare* L.).

IPP PAS actions towards receiving the 'HR EXCELLENCE IN RESEARCH' award

In 2022, the Director of IPP PAS signed the [Declaration of endorsement letter](#) of the 40 principles of the European Charter for researchers and the Code of conduct for the recruitment of researchers ([C&C](#)).

By submitting the declaration, the IPP PAS has joined the group of research and academic institutions that recognise the value of the principles contained in the C&C, and have committed to apply them in planning and practice in relation to working conditions.

The principles included in the C&C specify the responsibilities and rights of researchers and of the Institute and provide a framework within which researchers are encouraged to act responsibly in their professional activities at work and to respect each other. The Charter is addressed to all researchers in the European Union at all stages of their careers.

Based on the C&C, research institutions across Europe are implementing the so-called Human Resources Strategy for Researchers ([HRS4R](#)). Successful institutions receive the HR Award or HR Excellence in Research Award from the European Commission.

The aim of applying the principles of the C&C in the IPP PAS is to improve working conditions and the relationship between researchers and the Institute in order to support the professional development and the success of individual researchers and teams which is the basis for successful research for the benefit of society. In line with the principles of the C&C, all forms of mobility are supported as part of professional development.

To achieve this goal, the Institute proposed actions to stimulate change and improve conditions for the recruitment, work and professional development of students and researchers.

The relevant strategy of the IPP PAS is to build up a cadre of scientists of the highest quality and to increase the capacity for innovation. The range of objectives and goals pursued by IPP PAS includes freedom of research and appropriate R&D policies. In order to make IPP PAS visible as an institution that creates and promotes favourable working conditions for scientists, the IPP PAS management has decided to gradually implement the principles contained in the C&C. In this way, the prestigious award of 'HR Excellence in Research' can be achieved. Implementing the principles of the Charter and Code is a difficult and time-consuming process that will take several years, but efforts will be made to achieve this goal.

Current status of the Initial phase

The timetable for key actions is shown in Figure 7 below.



Figure 7. The timetable of main actions taken in IPP PAS in years 2022-2023.

Since then, the IPP PAS has been progressively implementing the corrective action plan and self-assessment of the planned activities.

Gender Equality Plan

The IPP PAS developed the [Gender Equality Plan 2023-2027](#) (GEP; Director's resolution no. [D-021-1/2023](#) of 28 March 2023) based on the anonymous survey (conducted 17-21 November 2022). The analyses carried out (sorted by gender, age and other categories) allowed the development of a gender equality policy at IPP PAS as a scientific and research institution.

The GEP project team (7 people) has been established (Director's resolution no. [D-021-16/2022](#)), resources have been allocated and the Deputy Director will act as the institutional guarantor of the project. The GEP focuses on the following thematic areas I-V: (I) reconciliation of work and family life and organisational culture, (II) gender balance in leadership and decision-making, (III) gender equality in recruitment and career development, (IV) integration of the gender dimension in research and teaching, (V) measures against gender-based violence, including sexual harassment. The GEP covers both cultural and structural aspects of the functioning of the IPP PAS.

The observed gender gap (dominance of women among academics and administrators) results from the national situation. There is a phenomenon of feminisation within academia. In Poland, men are in the minority among researchers, although women and men have equal rights, including researcher salaries and access to available positions. Considering the overall situation in Poland and the similar dissatisfaction of women and men regarding salaries, there is no "gender pay gap" in the IPP PAS.

Open, Transparent and Merit-based Recruitment (OTM-R) policy

The IPP PAS pursues a policy of open, transparent and merit-based recruitment for scientific, scientific-technical and technical positions (Open, Transparent and Merit-based Recruitment; OTM-R) positions (Director's resolution no. [D-021-4/2023](#)).

The [OTM-R policy](#) at the IPP PAS is a tool for implementing the strategy of the IPP PAS in the context of efforts to be awarded the HR Excellence in Research (HR Logo), which defines the rules and standards for recruitment of scientists and technicians according to the [EU Report of the Steering Group on Human Resources Management](#).

The OTM-R policy ensures that the best person for the job is recruited, thereby achieving greater equality, enhancing the competitiveness of national research systems, and strengthening international cooperation and collaboration in the IPP PAS.

The current status of OTM-R at the IPP PAS was reported in [OTM-R checklist](#).

The survey of existing rules and practices at IPP PAS according to the C&C

In June 2022, a survey on working conditions and career development was conducted among the all employees. All participants were assured that the survey was anonymous.

[The survey questionnaire](#) covered 40 principles applicable to researchers according to the guidelines contained in the Charter and the Code. Participants were asked a total of 56 questions (one, two or three questions on a given principle).

Respondents were asked to choose one of four answers:

YES NO DONT KNOW NOT APPLICABLE

In addition, each questionnaire item included a text box where respondents could (voluntarily) enter their suggestions. The survey was conducted online in Office 365 Forms.

Respondents were also asked about gender:

WOMAN MAN OTHER I PREFER NOT TO SPECIFY

The following assessment criteria have been adopted to verify compliance with the principles set out in the Charter and the Code:

State	Criteria
Fully implemented	> 80 % of possitive answers
Almost but not implemented	50 - 79 % of possitive answers
Partially implemented	30 - 49 % of possitive answers
Insufficiently implemented	0 - 29 % of possitive answers
I can't comment	<i>not evaluated</i>
Not applicable	<i>not evaluated</i>

The total number of participants in the survey was 35. The survey group consisted of women (57%), men (17%) and persons, who preferred not to specify their gender (26%) (Fig. 8). The breakdown of the survey participants by academic title/degree shows that 31% of the respondents have the academic title of Professor (Prof) or the degree of Doctor of Science (Dr hab.; DSc.) and 57% have the degree of Doctor (Dr; PhD) or the title of Master of Sciences (MSc.) and the rest of them represent the administrative or technical units (12%) (Fig. 9).

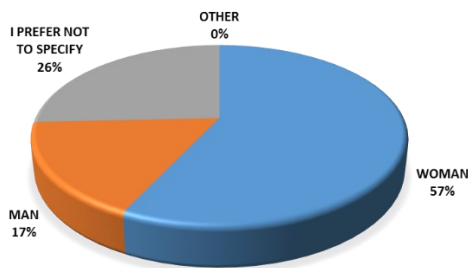


Figure 8. Breakdown of respondents by gender.

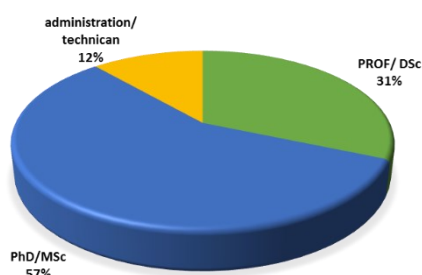


Figure 9. Breakdown of respondents by academic degree/title.

A comprehensive analysis of the answers given in the survey shows that the respondents' opinion of the situation in the IPP PAS is positive (up to 79-80%, i.e. almost completely). The researchers provided significantly fewer negative answers. More detailed information can be found at: [Survey_Results summary](#).

GAP analysis

The survey results showed some lack of coherence with the C&C principles and regulations existing in the IPP PAS. Some national or organisational legislation that could limit C&C implementation was listed in [Gap Analysis – overview](#). In addition, some initiatives that have already been taken to improve the situation or new proposals that could remedy the current situation were also mentioned.

The planned actions will address discrepancies between the internal rules followed in the IPP PAS and the principles set out in the C&C.

Action Plan

The gap analysis allowed to identify the strengths and weaknesses in the current practice of the IPP PAS, which were described in [Action Plan](#). In addition, the list of all individual HRS4R actions that will be implemented in the IPP PAS to address the weaknesses or strengths identified in the gap analysis. Responsible persons/units have been assigned to implement the identified areas for improvement in the functioning of the IPP PAS.

Monitoring of the implementation and effectiveness of planned activities

Task. 1. Oversee the implementation process of the HRS4R Strategy

- every year, an online interim survey will be sent to all employees and PhD students in order to monitor the implementation process of the HRS4R strategy (*Time*: the first one will be sent in January 2024; T1 *Responsibility Leader*: Co-Coordinator of the HRS4R WG)

Task. 2. Supervising the activities of units involved in the implementation process

- annual report on the implementation of the actions (*Time*: the first one will be sent in January 2024; T2 *Responsibility Leader 1*: person in charge of the specific Action indicated in the Action Plan),

- semi-annual meetings of the SC and WG with the persons in charge of the specific Action (*Time*: the first meeting will be held in December 2023; T2 *Responsibility Leader 2*: representing the SC HRS4R Director of the IPP PAS)

Task. 3. Ensuring the quality and effectiveness of the HRS4R Strategy activities

- semi-annual meetings of the SC and WG with the persons in charge of the specific action. Based on the annual activity of HRS4R summary/report, broad discussion will point out certain implementation successes, failures, obstacles and will draw possible risk management. Finally, staff and PhD students will be informed via email about the current implementation effectiveness (progress and results) (*Time*: the first meeting will be held in December 2023; T3 *Responsibility Leaders 3*: Coordinator representing SC HRS4R - Director of the IPP PAS and Co-Coordinator representing WG HRS4R)

Task. 4. Define measures to implement the Action Plan

- a self-assessment of the implementation of the Action Plan will be provided every year (*Time*: the assessment will be made in December 2024; T4 *Responsibility Leaders 4*: Coordinator representing SC HRS4R - Director of the IPP PAS and Co-Coordinator representing WG HRS4R)

Task. 5. Inform the SC about the results of the implementation of the HRS4R strategy in the IPP PAS.

- report annually on the successful implementation of the HRS4R strategy in the IPP PAS. The HRS4R SC will be responsible for monitoring the implementation of the HRS4R strategy in the IPP PAS and proposing further changes (*Time*: the first one will be sent in December 2024; T2 *Responsibility Leaders 5*: Coordinator representing SC HRS4R - Director of the IPP PAS and Co-Coordinator representing WG HRS4R).

Conclusions

The analysis of legal acts and survey results, as well as the GAP analysis, revealed the strengths and weaknesses of the organisation and functioning of the IPP PAS, with particular emphasis on the process of recruitment and development of research staff.

We believe that our strengths are based on the national legislation, laws and codes, and internal regulations concerning the most important aspects of research work. The absence of inconsistencies between local legislation and the generally applicable law greatly facilitates the implementation of new provisions related to obtaining the HRS4R certificate. The IPP PAS introduced the 'Gender Equality Plan' by Regulation No [D-021-1/2023](#). In addition, IPP PAS implemented the Open, Transparent and Merit-based Recruitment (OTM-R) policy for scientific, scientific-technical and technical positions by the Director's resolution No [D-021-4/2023](#).

Some weaknesses have also been identified that require further action and are included in the [Action Plan](#). One of these identified weakness is the imperfect periodic evaluation system for scientific staff, so a new evaluation/appraisal system for all R1-R4 researchers is currently being developed. A new regulation is planned to be implemented by the end of 2023. There is also a need to improve IPP PAS funding and working conditions in order to attract foreign researchers, especially early-stage researchers. That should be aimed after developed OTM-R policy. It should be emphasised that the developed HRS4R strategy of the IPP PAS is in line with the current legal acts: [The Amendments to the Statute](#) (Director's resolution no. D-021-10/2023 from July 31st, 2023) and A strategy for Research, Development and Innovation in the IPP PAS (2023 – 2030).

The strategic objectives defined in the IPP PAS are aimed at strengthening the international position of the Institute, increasing the Institute's cooperation with international stakeholders and developing the potential of researchers through increased mobility. The implementation of C&C in the IPP PAS will contribute to the achievement of the Institute's strategic objectives, maintaining the highest European standards of recruitment and creating a favourable research environment. Obtaining the 'HR Excellence in Research' logo will confirm that *The Franciszek Górski* Institute of Plant Physiology Polish Academy of Sciences is committed to creating a friendly research environment and conducting research in accordance with current professional standards. It will also increase the Institute's attractiveness as a strategic partner in the implementation of joint research projects and enable the Institute to raise more funds to support its continuous development.

Additional information

HRS4R IPP PAS strategy associated regulations:

1. [Declaration of Endorsement](#) of the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers (Charter and Code) and Commitment to implement them *via* the Human Resources Strategy for Researchers (HRS4R).
2. [Director's resolution No D-021-11/2023](#) establishes the HRS4R Steering Committee and Working Group.
3. [Gender Equality Plan](#)
4. [OTM-R policy](#)