

ANNUAL REPORT 2022



GEVES
Expertise & Performance



www.geves.fr

FOREWORD

Responding sustainably to food, economic, health and environmental challenges is a major objective of the transition to sustainable and ecological agriculture. Plant breeding and crop diversification are among the most important levers for facilitating the transformations which are necessary in order to achieve healthier and more sustainable agricultural and food systems.

In support of this sustainable transition, the GEVES Ambition 2030 strategy has reaffirmed GEVES' commitment to contribute ever more effectively to the excellence of the seed and plant sectors, both nationally and at European and international levels.

In 2022, in a context particularly troubled by tensions related to conflicts, energy and high inflation, GEVES resolutely continued its R&D investments in variety and seed testing to support sustainable transition and adaptation to climate change. GEVES devoted more than 10% of its budget to 60 R&D projects.

Improving the efficiency and sustainability of its testing resources and continuing to modernise and adapt its equipment are priority objectives for GEVES. This is reflected in new investments in testing and working equipment and methods, IT systems, as well as an ambitious action plan for energy sobriety and sustainable development.

As a public expert in variety and seed testing, GEVES implements a wide range of techniques on plants from the gene to the seed, and across a wide range of technical fields (the expert's human eye, laboratory and field image analysis, biochemistry, molecular biology, etc.). This expertise involves large collections of varieties, seeds and pathogens.

Evaluating plant varieties, assessing the quality of seeds for all cultivated species, improving methods and having them approved, training analysts at national and international levels, auditing, contributing to the conservation of plant genetic resources, and providing expertise to support developments in regulations: these are all at the heart of GEVES's activities. In order to take into account evolutions in the needs and expectations of the seed and plant sectors, GEVES's founding members - INRAE, the Ministry of Agriculture and Food Sovereignty, SEMAE - have launched a prospective study that will take place in 2023.

All these projects and successes, presented in this annual report, are only possible thanks to the investment, skills and professional and human qualities of the GEVES staff: our sincere thanks to you all!

We hope you enjoy reading this annual report.



Patrick FLAMMARION
Chairman

Alain TRIDON
CEO

SUMMARY

Foreword	2
Summary	3
Agenda	4-5
Key dates	6-7
Strategic Goal 1 Innovate in plant variety and seed testing for the agricultural and ecological transition	8
Strategic Goal 2 Consolidate our independent and reliable expertise	16
Strategic Goal 3 Promote variety registration, seed quality testing, plant variety protection and the conservation of plant genetic resources	22
Strategic Goal 4 The staff at the heart of GEVES	28
Strategic Goal 5 Enhance efficiency, sustainability and exemplarity at GEVES	32
GEVES: A unique & official organisation in France	36
Annexes	38
Glossary	57
Contact	58



in the support of the agricultural and ecological transition at national, EU and international levels

GEVES 2030 expresses GEVES's commitment to contribute to the excellence of the plant and seeds sector

Ambition

Our ambition

To be the European leader in plant variety and seed testing for the agricultural and ecological transition.

To be efficient, sustainable and exemplary in the performance of our missions.

To develop innovative and reliable testing methods and promote them at national and international level.

To offer quality expertise in support of public policies and stakeholders in the agricultural and food sectors, through the scientific and technical skills of our agents.

Our strategic goals

- 1 Innovate in plant variety and seed testing for the agricultural and ecological transition
- 2 Consolidate our independent and reliable expertise
- 3 Promote variety registration, seed quality testing, plant variety protection and the conservation of plant genetic resources
- 4 The staff at the heart of GEVES
- 5 Enhance efficiency, sustainability and exemplarity at GEVES

KEY DATES in 2022

January 2022

European Commission 21



- Brussels
Working group on the revision of EU regulation.
GEVES reports on its experience integrating sustainability objectives into VCUS testing.

Visit from Belgian examination office 31

- Angers
Two people from the Belgian examination office were received at GEVES

February 2022

Publication of the CTPS Scientific Committee report: *Which varieties for agroecology?*

Renewal of COFRAC accreditation

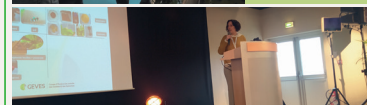
March 2022

SIVAL - Angers 15-17



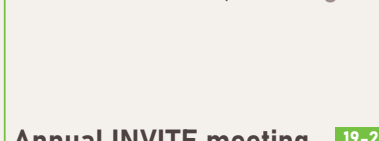
GEVES took part in SIVAL on the Research, Training, Innovation stand, together with partners from the Anjou plant campus.

GEVES organised 2 conferences: "Plant Health: Essential for the Agricultural & Ecological Transition" with a particular focus on emerging viruses such as ToBRFV
"Collection funds and biodiversity: what are they?"



Avril 2022

Visit from DGAL Delegation (Directorate-General for Food) 14



Annual INVITE meeting 19-21



- Austria

Visit to the Anjouère station in the framework of CPVO seminar 28



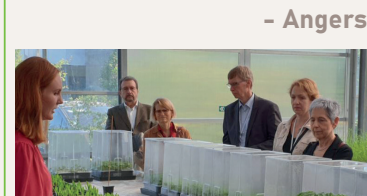
EU seminar on "Variety protection: a vector for sustainability, innovation and growth in the European Union"

Visit from President of German Office 29



May 2022

EU Chief Plant Health Officers visit GEVES 4-6



- Angers
In light of the French Presidency of the EU Council, the French Ministry of Agriculture organised a meeting of the Chief Officers of Plant Health Services (COPHS) of the EU Member States

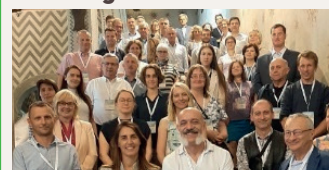
ISTA Annual Congress - Cairo 8-11



GEVES hosts CISAB (Commission for OF) 15

- Cavaillon

Annual EU-VCU group meeting 25-27



- Milan
GEVES shared its experience integrating sustainability objectives in VCUS.

June 2022

GEVES staff GA 2

- Angers



NRL Plant Health Lab Open Days 7

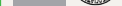
OECD Seed Systems meeting 13-14



- Estonia
GEVES contributed to a round table on the incorporation of sustainability in variety listing.

July 2022

ISTA accreditation renewal



2022 was an eventful year with a large number of national and international events shared with numerous partners, illustrating GEVES's key position in the plant and seed sector.

August 2022

IHC Congress 2022 14-19

- Angers



A major horticultural event for the industry, GEVES contributed with conferences, posters, visits and a stand.

Project conclusion 29-31



- England

This project led to continued monitoring of evolutions in rust races in wheat VCUS networks, at national and European levels, and the creation of a national black rust project.

September 2022

19th Seed Testing Lab Open Days 22-23



The GEVES welcomed more than 70 people. This event, in the form of a "reunion" after two years of videoconferencing, was particularly appreciated by all.

Plant Fair - Angers 13-15



A new format highlighting plants as an eco-contributor to the planet, a positive factor for cities and the countryside, and a source of food and well-being for humans. The GEVES was present in the "research, innovation, training" area with Végépolys Valley, an opportunity to exchange with professionals in the sector, students, and to support the plant sector.

CPVO meeting of agricultural experts and maize workshop 27-29

- Poland

GEVES presents how breeders' applications are used in Maize DUS.

PNRI Beetroot inter-project exchange day 20



As the Yellowresibeet pilot, GEVES shared its progress in characterising beet varieties against yellows viruses.

UPOV TWM 20

At the Technical Working Party on Testing Methods and Techniques, GEVES presented the PathoStat tool for integrating statistics into the analysis of pest resistance test results for DUS testing of vegetable species.

October 2022

Plant & seed sector presented at Science Fair 15-16



The 2022 edition of the Science Village at ESEO in Angers was a great success, with 2,900 visitors. Rich exchanges and surely vocations in the making for curious young people...



November 2022

ISTA Symposium - Athens 2-4

90 scientists from all four corners of the globe came together to discuss essential issues for seed quality: conservation of biodiversity, seed health quality and the importance of seed microbiota for their protection, physical and physiological qualities essential for plant development.



Apple day - Angers 9

GEVES and INRAE hosted a CPVO meeting on apple DUS evaluation.

CPVO pilot audit at GEVES 14-16



The CPVO audited the analytical and DUS costing system at GEVES.

December 2022

Cooperation between GEVES and OAPI concludes with third training session 1st



The project on Strengthening and Promoting the Plant Variety Protection System in the OAPI area has come to an end. This final training session concluded 3 years of intense collaboration between the African Intellectual Property Organisation (OAPI), GEVES, Naktuinbouw, CPVO, UPOV and Semae.

Key Figures in 2022

VARIETY TESTING

SEED QUALITY TESTING



FIELD TRIALS

LABORATORY TESTS

3 757 lots
Variety checks
for certification

3 271 cycles
of DUS studies
for all species

1 318 cycles
of VCUS studies
for agricultural species

Biomolecular and
biochemical tests

Variety
resistance tests

87 987 tests

Plant Variety
Protection
(PVP)

PVP & National
Listing
Other examination
offices

National
Listing

13 000
for listing & PVP

5 939 for
listing, protection &
private clients
Inoculum production :
1 043

35 786
Germination
quality

26 772
Physical
quality
et **1 887** scans 2D/3D

18 473
Seed
health

4 717
Pest detection
using molecular
biology

Plant variety
rights
delivered by

610
new varieties
listed in the French
Catalogue in 2021

67 896
varieties in collections

31 115 Vegetable
3 738 Ornamental
33 043 Agricultural

160 host/pest combinations for variety
resistance testing

60 programmes
de recherche

30 training sessions
194 trainees

26 Laboratory proficiency tests
301 participants
3 600 samples prepared

19 Laboratories audited

PHENOTIC
SEMENCES & PLANTES
39 000 images and
91 000 seeds analysed using
2D/3D x-ray & automatised
germination curves

€ **32.1m**
budget
- R&D 10 %

370 staff
members

462 hectares
of experimental fields

16 371 m² greenhouses &
tunnels

2 725 m²
laboratories

250 host/pest combinations
for seed health

More than **1 500**
visitors welcomed

18 oral presentations

14 publications

18 posters

11 newsletters

Twitter LinkedIn Facebook YouTube Instagram
Réseaux sociaux

INNOVATE IN PLANT VARIETY AND SEED TESTING FOR THE AGRICULTURAL AND ECOLOGICAL TRANSITION

1

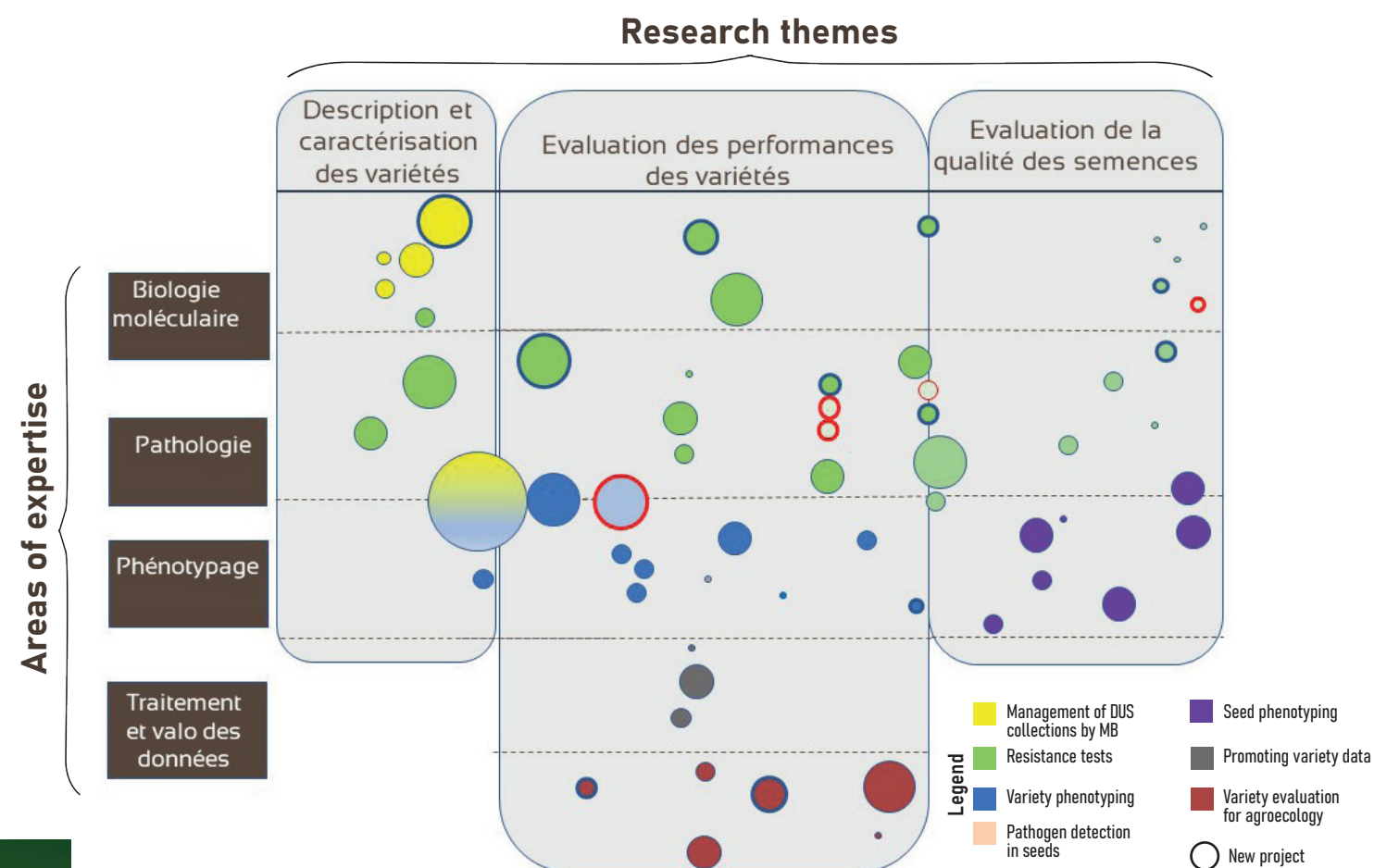
GEVES conducts applied research projects, aiming to improve the evaluation of varieties and seed quality, in a context of sustainable transition. In 2022, GEVES was involved in **60 research actions or projects (national and international)**, as a partner or pilot.

15 new projects started in 2022. Some of these projects will improve the management of reference collections, evaluate new variety resistance to pests, or variety resilience to climate change. New projects aim to improve the evaluation of varieties for organic farming and agroecology. Other scientific collaborations will make it possible to develop methods for analysing seed health quality and evaluating the effect of biocontrol products on seeds.

In 2022, GEVES renewed its scientific council, which is responsible for providing an advisory opinion on research orientations and the scientific partnership policy, and initiated the definition of its new R&D policy.

In 2022, GEVES was approved for the CIR (Research Tax Credit), as an organisation carrying out R&D work with companies. This approval is valid for the years 2022, 2023, and 2024.

60 GEVES research projects/actions in 2022 including 15 new projects* - see details in annex pages 50/51



Evaluating varieties in support of agroecology

Developing a test for sugar beet variety resistance to virus yellows



The PNRI Yellow Resisbeet project (2021-2024), led by GEVES in partnership with ITB, aims to develop a protocol for evaluating variety resistance/tolerance to the 4 viruses (BChV, BMV, BYV and BtMV) responsible for virus yellows on beet. This new test will facilitate the listing of tolerant/resistant varieties in the French Official Catalogue and their rapid availability to farmers.

In 2022, this project resulted in:

- 1) developing a method for producing inoculum from viruliferous aphids (*Myzus persicae*)
- 2) defining inoculation parameters in the field and under controlled conditions ensuring a uniform infestation of viruses and a significant distinction between inoculated and non-inoculated modalities,
- 3) developing a multiplex RT qPCR method to detect and identify these 4 viruses
- 4) studying the most relevant criteria for assessing varietal tolerance based on productivity data and symptom ratings obtained in particular by imaging.

This genetic tool will be proposed to the Experimental Pilot Farms to develop an integrated control method in an agroecological context.

Adapting protocols for assessing variety resistance to changes in pests and diseases: the ToBR-Ag project

ToBR-Ag is a CPVO-funded project involving 18 EU and Asian partners, which began in February 2022 for 3 years.

Led by GEVES, it aims to develop a ToBRFV resistance test for tomato and chilli plants. This emerging Tobamovirus bypasses current resistance genetics and poses a threat to the seed sector due to its ability to spread, leading Europe to assign the virus quarantine status. The screening and introgression of new resistance genetics is one of the main means of control envisaged. After characterising viral isolates, a panel of varieties will be studied to determine the resistance levels in commercial varieties and to validate a biotest method developed by GEVES and a method using molecular biology.

A second project task is adapting the melon resistance biotest to new pathotypes of the aphid *Aphis gossypii*. The correlation of the current protocol for resistance tests under controlled conditions with a new protocol integrating the foliar symptoms observed in the field will be verified. A molecular biology method will be validated as an alternative to the biotest.

For each pathosystem, a DUS protocol will be established as an official method for variety listing and protection.

Taking into account complex cover cropping

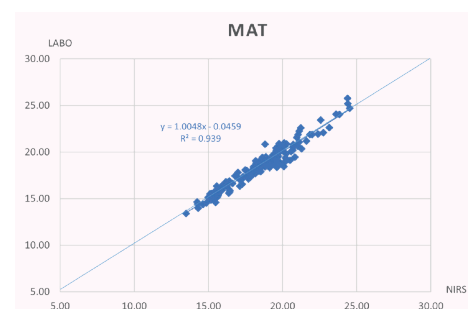


Complex cover crops (species associations or mixtures of varieties) are tools for securing crop production and reducing the use of pesticides. In terms of service plants, a new VCUS study protocol was developed in 2022 on white clover for use as a perennial companion plant for successive annual crops and for grass seed production. The services provided are weed control and nitrogen supply to the cash crop. For the other species, complex cover crops are currently still not taken into account during the official evaluation of varieties due to methodological obstacles. In order to remove these

obstacles, GEVES is a partner in several research projects which include objectives relating to cover crops:

- VIGO studies the effect of oilseed rape vigour on agronomic aims sought by farmers, in particular tolerance to insect damage (mainly flea beetles and terminal bud weevils) and the effect of certain practices such as combining oilseed rape with a leguminous crop on this vigour.
- MoBiDiv aims to better understand the effects of the use of mixtures on the reduction of pesticide use and the interaction mechanisms between plants within mixtures. The project focuses on wheat, pea and forage crops. The aim is to develop tools to breed varieties that are specifically adapted for use in mixtures.
- STABLE aims to evaluate the stability of soft winter wheat varieties grown pure and in mixtures.
- RESO2 aims review methods for evaluating the suitability of varieties for association, a major trait identified to support the agricultural transition.

Evaluation of improved red clover varieties



Relevance of the NIRS red clover calibration equation for protein content.

Co-led by GEVES and the INRAE URP3F chemistry laboratory, with contributions from breeders, Nutrifolium used 1,455 samples of red clover collected in CTPS trials to develop a NIRS prediction equation for the protein, lignocellulose, total sugars and mineral matter content of varieties. This equation is more accurate and has a better predictive value than the equation for alfalfa mixed with red clover.

The suitability of the trial network and associated sampling protocol was also assessed. While the interactions between factors such as variety, location and cutting order justified a multi-location sampling approach with two spring cuts, the absence of any significant effect of the study cycle and variety ploidy meant that sampling could be limited to the second year with a single list of varieties. The introduction of registration rules will be finalised post-project in 2023. The new equation will be promoted to partner organisations.



Patricia LEM
Head of the
Biochemistry
Unit

In the biochemistry unit, we are carrying out projects to develop or improve the methods used in studies for variety listing in the official French catalogue. The integration of SPIR technology, which has a number of advantages - it is fast, non-destructive and does not require the use of chemicals - is a strong point in the development of our methods. The potential of this technology deserves to be explored further. Combined with developments in data processing, it opens up interesting new prospects.

Adapting variety testing to a diversity of agriculture

Agroecological transition is based on diversifying the services provided by crops to the agroecosystem. This implies evaluating varieties for more services and a diversity of cropping practices and environments. The CASDAR RESO2 project aims to change the methods for assessing varietal normality and to adapt trial networks, with a particular focus on the official catalogue listing systems. It aims to translate the proposals from the RESO project into operational actions and support the CTPS sections. This project supports the implementation of the SPAD2 plan ('Seeds and Plants for Sustainable Agriculture', 2020-2024). The project is structured around three main actions:

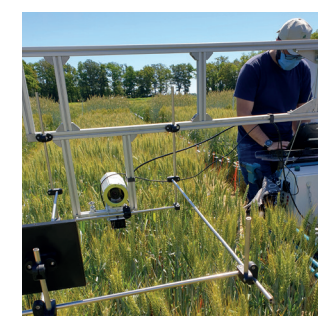
- 1) measuring traits of interest for agroecological systems (weed competitiveness, vigour and suitability for association),
- 2) defining trials under agroecological conditions and studying various hypotheses for integration into evaluation networks
- 3) adapting decision rules (ratings) to encourage listing of varieties for these systems.

The MUSE project is closely linked to the work carried out by the "Variétés du GIS Grandes Cultures HPEE" group (INRAE, Instituts Techniques Agricoles, GEVES), which aims to lay the methodological and technical foundations for a multi-criteria evaluation of varieties that takes into account the expected evolution of cropping systems.

CASDAR RESO2 project: Impact of the agricultural transition on variety testing methods and the design of trial networks. MUSE project: Multi-criteria evaluation of varieties for diversified objectives, cropping systems and practices.

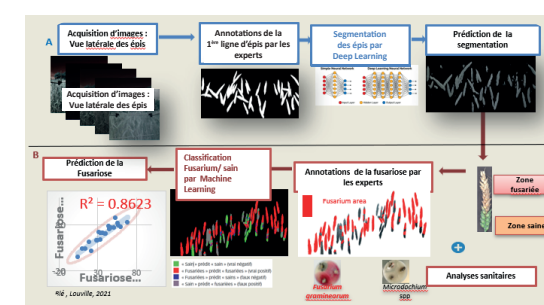


Developing digital phenotyping

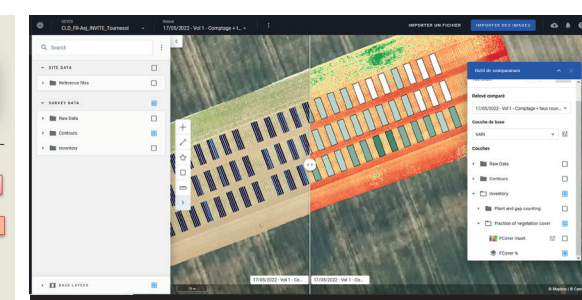


The European H2020 INVITE project aims to improve the efficiency of variety testing. As part of this project, GEVES is participating in the development of new phenotyping tools. In 2022, conventional observations were supplemented by drone tests on maize and sunflower trials and image analysis. Emergence counts and soil cover dynamics were measured. The experience acquired on this project has helped to develop the use of digital phenotyping on 18 species, with 5,822 microplot characterisations. In collaboration with INVITE, the FSOV Fus'eye project has made it possible to improve variety resistance testing by replacing visual ratings

- considered too dependent on the tester - with multispectral imaging to quantify fusarium head blight on wheat. Using the phenotyping of a large panel of varieties undergoing CTPS study or breeding, algorithms based on machine learning have been developed to segment the ears and then identify and quantify fusarium head blight on soft wheat and durum wheat. This work on phenotyping cereal pests will continue with the European Horizon-Infra-2022 project, Phenet, which starts in 2023.



Creation of 2 algorithms:
A: segmentation of cobs; B: quantification of Fusarium head blight; using the CMS4 multispectral camera.



Varieties & climate change: at the heart of the INVITE project



Adapting varieties to climate change is a key concern for GEVES. This theme is being worked on in particular in the H2020 INVITE project, especially for maize. As part of this research project, GEVES is participating in an testing network coordinated by the INRAE LEPSE unit. In 2022, this network included 15 test situations, 4 of which were monitored by GEVES at its Magneraud station and at the INRAE Diascope experimental unit in Mauguio. This EU-wide network explores a range of evaporative demands and temperatures, as well as a range of water availabilities by adding contrasting irrigation levels at certain sites, such as Magneraud and Mauguio. The aim is to develop tools and methods (phenotyping, envirotyping) to identify, in VCUS trials, the varieties that perform best in different water or heat stress scenarios.

Building knowledge & skills around seeds, pests and plant-pathogen interactions

Epidemiological monitoring of cereal rusts



H2020 Rustwatch is a 4-year European project that ended in September 2022. The aim was to develop a new early warning system for wheat rusts (yellow, brown and black rusts), based on a multi-stakeholder and multi-network approach. At the final meeting in Cambridge, GEVES presented the positive impact of this project for

the EU examination offices for variety listing. The offices had better knowledge of new races of rusts, thanks to the development of the "Wheat rust early warning" digital tool, allowing open and rapid dissemination of information on the distribution and frequency of races and genotypes.

Collaboration with the University of Aarhus in Denmark will continue after the project ends for epidemiological monitoring of rusts, via the EU VCU network and using digital tools ([link to Yellow Rust Tools website](#)). Following the spread of black rust in Western Europe, and in France since 2020, exchanges will continue with the Global Rust Reference Center and INRAE, to identify prevalent races in Europe and help breeders develop sustainable resistance.



[Link to
GEVES website](#)

Exploring methods for detecting insects in seed lots

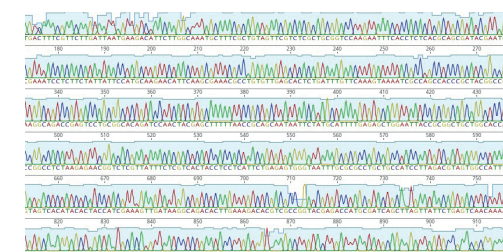


The relationship between insect pests and seeds is a growing problem, as damage caused by insects in the field and/or during storage can have significant environmental and economic impacts. As a result, import restrictions imposed by countries are becoming increasingly stringent and, at present, the ISTA rules do not provide methods enabling laboratories to meet these demands. For this reason, an international project funded by ISTA and led by GEVES was carried out over 3 years to explore different methods with potential for detecting insects in seed lots. Several insect/seed pathosystems were selected, with priority given to

insects concerned by plant passports or as study models.

Literature searches were used to identify existing methods to be tested for each pathosystem in correlation with the type of insect and seed. As a result, pathosystems representative of the type of insect (*Bruchus* sp./Lentils; *Acanthoscelides obtectus*/Beans and *Sitophilus granarius*/Wheat) were tested using the following methods: Berlese trap, sieving, morphological inspection, 2D radiography, oxygen consumption and multispectral imaging. At the same time, visual identification and barcoding were tested for insect identification. The results are currently being analysed and a workshop will be organised in 2023.

Detection of seed-borne pathogens by sequencing (barcoding and metabarcoding projects)



GEVES is coordinating a collaborative project called Barcoding Fusarium, funded by ISTA, to develop and validate a method for identifying strains of Fusarium and Microdochium isolated from cereal seeds (wheat, barley, oats, etc.) using Sanger sequencing. Several partners are taking part in this project, including laboratories in America and Europe. In 2022, the project partners came together to identify the fungal genes that need to be sequenced to enable the correct identification by barcoding of the fungal strains obtained in seed health testing. GEVES is also involved in a collaborative project, called Projet Défi, with partners from the SFR Quasav in Angers (UMR IRHS and Plateau ANAN). This project will evaluate an NGS sequencing and metabarcoding approach for the detection and identification of Fusarium directly on cereal seeds without prior isolation.

Rapid measurement of germination and vigour for vegetable seeds

An ISTA-funded project involving the Germination and Vigour Technical Committees has developed rapid methods for assessing the germination and vigour of seeds for 5 species in the Brassicaceae family: cauliflower, cabbage, radish, brown mustard and Chinese cabbage. Laboratory, greenhouse and field trials, carried out on 10 to 13 batches per species, from 3 different varieties, showed that early germination counting under optimum conditions could predict the physiological quality of seed lots of these species with good accuracy. The results published on cauliflower (Shinohara et al., 2021) showed a good correlation between a germination count at 48h at 20°C or 20h at 30°C, germinative capacity and seed vigour. This early count also has the advantage of being easily automated using visible or multispectral imaging techniques, as shown at the ISTA Seed Symposium 2022 (Ducournau et al., 2022; Wagner et al., 2022), and therefore speeds up seed quality testing.

Towards a global network for the exchange of healthy and infected seeds, for use as reference material.

Seeds are an essential raw material for developing and validating detection methods, organising EIL or training. However, acquiring healthy or infected seeds can be difficult. It seemed important to set up a network of players in the industry to organise and connect suppliers and users of seeds for plant pathology purposes.

Launched in June 2022, the Euphresco Shareseed project, coordinated by GEVES, brings together 18 international participants. The aim of this 3-year project is to develop a platform for exchanging characterised healthy and infected seed lots.

During the first year of the project, a survey was carried out to identify seed requirements and potential suppliers. Discussions within the project led to a list of important criteria to be defined for a seed lot. Various tables are currently under construction and will be made available to professionals on an international website.



Consolidating the GEVES R&D organisation and promoting its results

New GEVES Scientific Council 2023 / 2027

Catherine Giauffret	Researcher on climate stress, <i>Chairwoman of the Scientific Council</i>	INRAE Montpellier
Thierry Candresse	Director of virology research,	INRAE Bordeaux
Loïc Lepiniec	Director of research in seed biology,	UPB
Stéphane Jezequel	Scientific Director,	Arvalis-Institut du végétal
Didier Pellet	Head of the Varieties and Seeds research group,	Agroscope
Medhi Siné	Scientific, Technical and Digital Director,	Acta
Marie Weiss	Remote sensing research engineer,	INRAE Avignon
Christophe Salon	Director of research in ecophysiology,	INRAE Dijon
Alain Charcosset	Director of research in quantitative genetics,	INRAE Le Moulon
Mathilde Causse	Director of genetics research,	INRAE Avignon
Jean-Albert Fougereux	Technical Director,	FNAMS
Philippe Reignault	Director of plant health laboratory,	ANSES
Anne Grevet	GMO and NBT research officer, DGAL,	Ministry of Agriculture (FR)

Promoting research at GEVES

The advances made possible by the research work carried out at GEVES are promoted through publications and participation in national and international seminars. In 2022, GEVES published seven articles in scientific journals and seven articles in technical journals. GEVES's technical and scientific experts presented the results of their research in seed and variety quality testing at national and international conferences and meetings: CIMA, ISTA, CPVO, IHC 2022, including 18 posters and 18 oral communications.



GEVES at IHC 2022



The International Horticultural Congress is a major horticultural event held every 4 years. From 14 to 19 August, 2,500 delegates from all over the world (88 countries) came together at IHC2022 in Angers to discuss a wide range of scientific subjects relating to specialised plants (fruit, vegetables and ornamental plants). This scientific congress was packed with presentations on a wide range of subjects (long and shorter plenary sessions, symposia and e-posters), including presentations by GEVES experts. Throughout the congress, a GEVES stand provided an opportunity for exchanges with scientists and professionals from all over the world. [\(link to videos\)](#)

GEVES also organised technical tours on Wednesday 17 August:

- tour of GEVES's variety research unit at Brion
- tour of the National Seed Testing Station at GEVES Beaucouzé.



PERSPECTIVES 2023

GEVES's new R&D policy will be defined and implemented in 2023, with the support of the newly formed Scientific Council. New research projects will develop the use of image analysis in variety testing for listing (AgroEcophen, PEPR Agroecology and Digital), and improve the description and evaluation of leguminous species (Belis, Horizon Europe).

There are also high expectations for the development of imagery and artificial intelligence applied to seed quality testing.

CONSOLIDATE OUR INDEPENDENT & RELIABLE EXPERTISE

2

With nearly 8,500 variety evaluations and 100,000 seed tests in 2022, GEVES's expertise is applied on a daily basis in the support of seed regulations and the seed sector. Our ISO 9001, COFRAC, ISTA and CPVO accreditations have been renewed, confirming the quality of GEVES's testing systems for a wide range of species, as well as the expertise of GEVES staff. This expertise is much in demand in our laboratory technical supervision and training activities.

In support of public policies, GEVES, as an examination office and National Reference Laboratory, develops new methods and proposes them for officialisation at national and/or international level. These methods relate in particular to the challenges of the agricultural transition and climate change and the ongoing drive for efficiency and sustainability.

Anticipate and support the expectations of the competent authorities and the seed sector, and adapting evaluation and

New evaluations for listing



Within the CTPS framework, GEVES is developing experiments for testing new species, new uses or new characteristics presented by breeders. New species are being evaluated to adapt to climate change or new consumer trends (chickpea, niebe bean, edamame soya, linseed rich in omega 3, legumes for use in turf, etc.). To make agricultural production safer and speed up the reduction of pesticides, disease-tolerant and resistant varieties are being developed (work on beet yellows is being evaluated, hemp varieties tolerant to broomrape are being assessed, botrytis and aschochytois in broad beans, the ZYMV virus in cucumbers, aphid testing in melons, etc.). More and more diversified uses are being tested (white clover grown as a companion plant, polyphenol-rich maize, maize grown at high density, etc.), which requires the development of innovative protocols, based on the results of public research, technical institutes, plant breeders, or internal developments at GEVES, sometimes supported as part of research projects.

Organic farming initiatives



Since 1 January 2022, GEVES has been ready to receive notifications of Organic Heterogeneous Material, new plant material, defined by very high heterogeneity, by European Regulation EU 2018/848.

GEVES and CTPS are helping to set up temporary experiments on organic varieties suitable for organic production.

This temporary experiment, which will start on 1 July 2023, will help to gather evidence to confirm or refute the need to specifically adapt the DUS rules for organic varieties suitable for organic production, and encourage the sharing of experience between Member States.

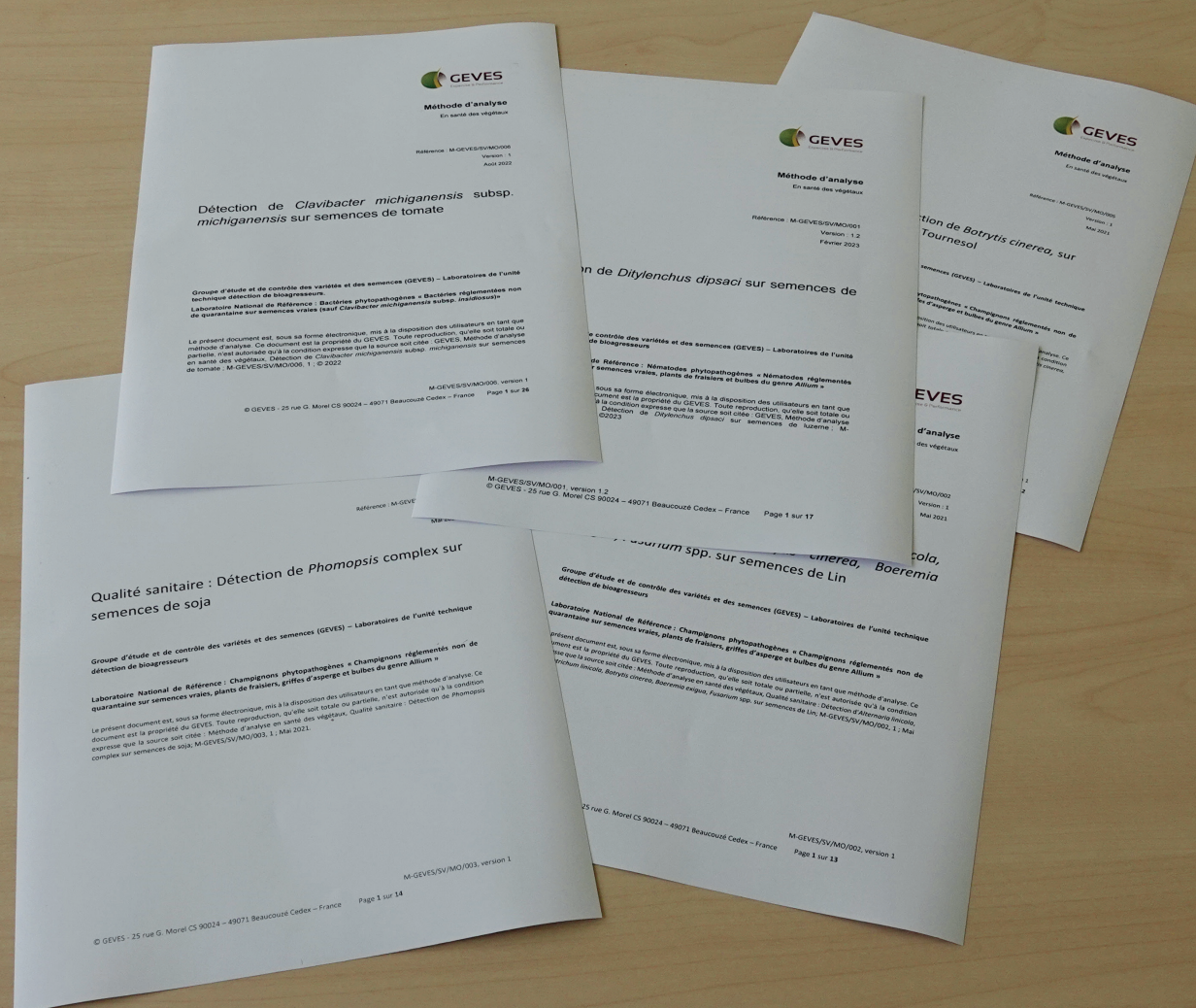
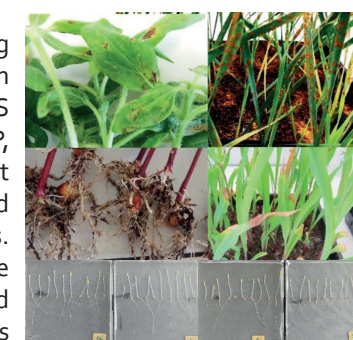
The participation of GEVES in the Liveseeding project enhances exchanges with European organic players. This activity in favour of organic farming is reflected in the different species worked on. For vegetables, GEVES's Brion station, where varieties proposed by well-known organic breeders are evaluated, hosted the ASF days on the theme of "Variety breeding for organic vegetable production".

In terms of agricultural plants, several varieties of soft winter wheat are registered each year for use in organic farming and are being studied under a specific scheme (3 registrations in 2022, 6 in 2021). 3 durum wheats are also being evaluated for organic farming. In 2022, the national VCUS network will be expanded to include organic trial sites: 4 for triticale, 2 for spring linseed and 1 for spring oats.

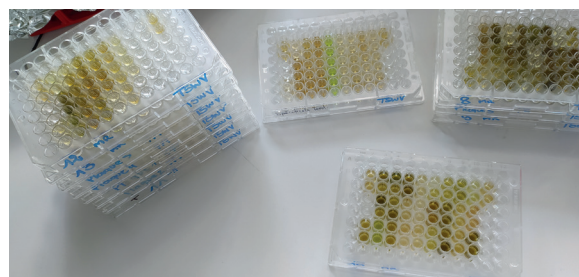
As regards fruit species and vines, the CTPS sections are incorporating the issue of organic plant production into their work.

Biostimulant biocontrol : Expertise at the forefront of R&D

GEVES is expanding its expertise in methodologies for evaluating biocontrol solutions and biostimulants for seeds and seedlings, in support of the seed sector and the agricultural transition. GEVES is involved in several research projects (SUCSEED, ASCOLUP, ACTIFOL) and in setting up the SEEDBIOPROTECT project (2023-2026), to support the development of knowledge and methodologies for assessing the effect of these new solutions. Concerning biocontrol, numerous evaluations have been carried out for various operators using GEVES seed expertise. Four new pathosystems were developed this year: *Fusarium*-sunflower / *Fusarium*-oilseed rape / Downy mildew-cabbage / *Pythium*-carrot. Concerning biostimulants, new quantitative and dynamic methods are being developed to measure the effectiveness of seed treatment stimulation based on the speed of germination, growth and root development using image analysis. In the long term, these methods will make it possible to replace time-consuming and destructive measurements of plant biomass. Lastly, GEVES piloted the revision of a CEB method dedicated to the evaluation of seed treatment products for cereals and contributes to the work of the BESTIM RMT.



New pathology tests developed for variety listing and protection



In 2022, two new services were developed for the registration and protection of varieties: evaluation of resistance to *Meloidogyne chitwoodi* and detection of TSWV in chrysanthemums. The GEVES pathology laboratory has developed a test to assess the resistance of crucifers and service plants to *Meloidogyne chitwoodi* and *M. fallax*.

After obtaining quarantine approval for the handling of these quarantine organisms, a methodology was developed to define a test protocol, reference material (controls and nematode population) and the different levels of resistance for each of the 2 species. The protocol for assessing the resistance of crucifers and service plants to *Meloidogyne chitwoodi* has been validated by the CTPS and is now available as a criterion for variety listing. The protocol relating to *Meloidogyne fallax* should soon be similarly successful. As part of the collection of chrysanthemum plants, GEVES has developed a method for detecting the TSWV virus to ensure that varieties are free from this virus before being introduced into the greenhouse housing the reference collection (1,200 varieties). The sampling and ELISA detection methods were validated by verifying the performance criteria.



Improving the use of variety data

Enhancing use of variety data: progress in 2022

2022 is the first year in which the results obtained on new varieties registered in the official French catalogue will be published on the Varmaïs website. This site, managed in partnership with Arvalis and UFS, presents the results of VCUS testing. These results are also compiled with testing results carried out by Arvalis after registration, enabling the publication of data based on a large number of testing situations.

In 2022, a major project to improve the information published on forage grass and legume varieties began in partnership with SEMAE, Arvalis, breeders and INRAE. The calculations currently published on the Herbe-book website are based on multi-year and multi-site averages. The Herbe-Book research programme plans to use data from each plot to improve the accuracy of variety testing. This project will deliver its results by the end of 2024.

Consult the results obtained from variety listing:

[Varmaïs](#) • [Herbe-book](#) • [Choix du gazon](#)

Find out more about VCUS testing



Exciting opportunities offered by new technologies

Molecular biology in DUS testing

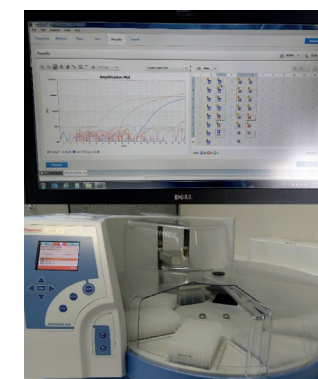


The management of reference collections represents a major challenge in DUS activities. The size of these collections is steadily increasing, and the growing number of species worked on at GEVES is making this activity more and more time-consuming. Molecular biology is routinely used for several species (maize, sorghum, spring barley) to better manage reference collections, in accordance with UPOV procedures.

In 2022, GEVES continued to develop and deploy these strategies for three species: oilseed rape, tomato and hydrangea. Isozyme electrophoresis is currently used to help manage the oilseed rape reference collection. This in-house work is aimed at using SNP marking technology. In addition, a new concept for making the most of molecular variety characterisation has been developed, which will make it possible to significantly reduce planting in the 1st year of the DUS study, a particularly problematic step for rape. The work carried out on tomatoes via a project supported by Naktuinbouw (Netherlands) aims to identify a common set of SNP markers between EU offices for the molecular characterisation of reference collections. This work represents the first step towards a molecular marking strategy to support collection management. Lastly, there are particular problems in managing reference collections of woody ornamental species such as hydrangea, where certain cultivars are kept in public gardens. The molecular marking strategy for this first ornamental model species aims to optimise the choice of controls and to secure DUS trials by checking the identity of plants and cuttings.

Providing expertise to regulatory authorities and the seed sector

New methods for detecting pathogens in seeds



GEVES now offers rapid, high-throughput screening methods using Seed-Extract PCR (SE-PCR) for the detection of *Acidovorax citrulli* on melon, watermelon and squash/courgette seeds, and *Clavibacter michiganensis* subsp. *michiganensis* on tomato seeds. The laboratory assessed the performance criteria and confirmed its ability to use these methods.

The SE-PCR method for the detection of *Acidovorax citrulli* enables larger series to be analysed and the turnaround time is reduced from 37 to 10 days. The grow-out method is still available as a first-line treatment or to confirm pathogenicity following a positive SE-PCR result.

The SE-PCR method for detecting *Clavibacter* in tomato seeds corresponds to the screening step added to the ISF/ISHI-Veg method (v5 - July 2022) for which GEVES took part in the validation interlaboratory trials. The dilution-spreading method remains available as a first-line method or to confirm a positive SE-PCR result. These methods, based on the detection of nucleic acids, can give positive results that are not proof of the presence of live bacteria. Confirmations on new seed samples can be carried out to confirm/rule out the presence of live bacteria.

National Reference Laboratory activities (NRL)



● Preparation and officialisation of testing methods:

6 new methods prepared by GEVES have been made official by the Ministry of Agriculture. They concern sprouting (Aubergine, Navette, Seradelle, Cameline), Lupin bitterness and detection of *Clavibacter michiganensis* subsp. *michiganensis* on tomato seeds (find out more).

The method for detecting bruchids on field beans, peas and beans is currently being finalised before being submitted for official approval. The problem linked to the presence of insect pests in seeds is emerging rapidly and requests for analyses are increasing. GEVES recently led a research project funded by ISTA to explore different methods for detecting insects in seed batches.

Methods were developed and validated in :

La mise au point de méthodes et leur validation se sont poursuivies en :

- bacteriology : *Xanthomonas axonopodis* pv. *phaseoli* et *X. fuscans* subsp. *fuscans* (French bean) ;
- mycology: *Botrytis cinerea* (Sunflower), *Plasmopara halstedii* (Sunflower) ;
- nematology: *Aphelenchoides besseyi* (rice), *A. besseyi*, *A. fragariae*, *A. ritzenabosi*, *A. blastophorus* (strawberry).

● Technical support for laboratories:

GEVES's Interlaboratory Proficiency Test (PT) activity is significant, with 26 PTs in 2022 involving 300 participants. Interlaboratory Comparison testing is carried out for laboratories authorised to conduct testing on behalf of SEMAE, at the request of the UFS (vegetables and flowers), or on behalf of ISTA. It is also part of GEVES's assessment of authorised laboratories falling under GEVES's NRL mandates. Following participation in PTs for authorisation, GEVES provides specific monitoring for authorised plant health laboratories, in conjunction with the DGAL's Bureau des laboratoires. Technical support for laboratories is also provided by carrying out audits prior to authorisation. 19 audits were carried out this year by a team of 12 auditors.

GEVES jointly organised the authorised laboratories day in June 2022 with the ANSES plant health laboratory. We were also able to organise the 19th annual face-to-face seed quality laboratory days. 80 participants, mainly from seed certification laboratories, came together for this event including information (ISTA rules, quality system, training, etc.) and instructive, much-appreciated exchanges. The programme included 2 workshops on sunflower germination (23 participants) and aubergine germination (18 participants), and a tour of the renovated GEVES laboratories.

● Training:

The quality of GEVES's training courses was once again widely recognised by participants: 30 training courses were attended by almost 200 trainees (professionals from the laboratory analysis sector and students). Training in Seed Extract PCR for the detection of *Ditylenchus dipsaci* was organised specifically for laboratories accredited under this mandate.

Courses preparing for the Analyst and Senior Analyst qualifications were attended by 32 trainees. From this year onwards, the Senior Analyst examinations will be organised in the form of a single oral test for candidates. This change was specifically communicated to the staff of seed quality testing laboratories.



Justine Foucher
NRL Engineer - Plant Health

"In 2022, the work I carried out with the NRL teams enabled new tests to be carried out in the laboratory, the reliability of detection methods to be studied and a GEVES method to be made official. I also took part in the organisation of training and PTs for several networks of approved laboratories. These activities consolidate the expertise of GEVES and ensure the reliability of testing for the seed industry. They reflect values that I consider to be very important, namely expertise and shared knowledge. The diversity of the work I've undertaken and the interactions I've had with various teams have made my work stimulating and highly rewarding."

FOCUS



Quality recognition & Accreditations

GEVES benefits from a global and harmonised Quality Management System.

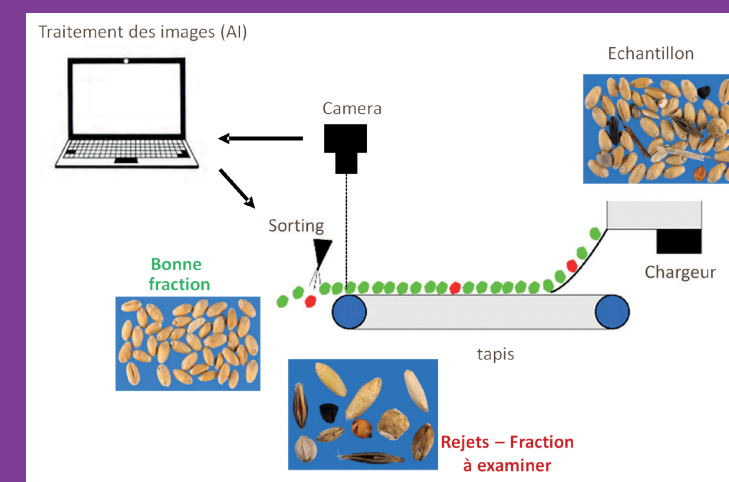
GEVES is recognised as follows:

- ✓ Certification ISO 9001: version 2015 - BioGEVES and VCUS variety testing (Value for Cultivation, Use and Sustainability)
- ✓ Accreditation of GEVES's SNES and BioGEVES laboratories by Cofrac according to ISO 17025 standard:
 - GEVES Beaucauzé: Cofrac N°1-1316 (since 2002)
 - GEVES Le Magneraud: Cofrac N°1-6176 (since 2004)
- ✓ Accreditation by ISTA since 2001 (N°FRDL0200) for seed testing
Renewal obtained in 2022 for the period 2022/2024
- ✓ CPVO accreditation for Distinctness Uniformity Stability variety testing
Renewal for 525 species following the CPVO audit in September 2022

PERSPECTIVES 2023

A key mission for GEVES as NRL is to develop methods and innovations within the laboratories, with the aim of proposing changes in methods across the network of French laboratories and internationally via ISTA. For the Physical Analysis laboratory, a project at the heart of this mission was launched in 2022 and should see concrete applications in 2023. The aim of this project is to partially automate testing for counting species of other plants. This will involve the use of robotics and artificial intelligence to pre-screen samples. The aim for 2023 is to validate the use of the automated system for at least 3-4 species (oilseed rape as well as certain forage crops and cereals).

As regards variety testing, the development of testing methods will continue to be at the heart of GEVES's contributions to the CTPS in the framework of variety listing.



PROMOTE VARIETY REGISTRATION, SEED QUALITY TESTING, PLANT VARIETY PROTECTION AND THE CONSERVATION OF PLANT GENETIC RESOURCES

3

As the national organisation of one of the world's largest seed and plant production countries, GEVES has a specific mission as a centre of technical expertise, working on issues related to these fields at international, European and national level. Many GEVES experts are actively involved in international organisations (UPOV, CPVO, ISTA in particular) for the development and harmonisation of testing methods. GEVES contributes its expertise to the preparation of changes to European regulations, helping to share French experience. In collaboration with other examination offices, it provides training for experts in other countries, particularly in Africa and Asia, thereby helping to promote these testing methods worldwide. The GEVES is engaged in communication initiatives aimed at a wide audience, based on the impartiality and quality of its expertise, through its presence at trade shows, its newsletter and its presence on social media. GEVES continues to be closely involved in the conservation of plant genetic resources.



Involvement in international organisations

GEVES's involvement in UPOV

UPOV

Every year, GEVES contributes its expertise in DUS testing and DUS support methods (statistics, IT development, image analysis, genotyping) to UPOV working groups. In Cambridge, two GEVES experts took part in the Working Group on Agricultural Crops (TWA), which completed the revision of soybean and cocksfoot guidelines. At the first meeting of the technical working group on test methods and techniques (TWM), GEVES presented Pathostat, a decision-support tool that integrates statistics to help analyse the results of resistance tests on vegetable pests. This application is now officially included in UPOV's list of exchangeable software. In October 2022, several GEVES experts took part in the UPOV Technical Committee, the Legal and Administrative Committee, the Consultative Committee and the UPOV Council. In particular, the Technical Committee examined ways in which UPOV could improve its support for DUS testing. An ad hoc working group has been set up, in which GEVES is making proposals. In addition, a GEVES representative is chairing the TWF group for the 2024-2026 term.

GEVES's contribution to the CPVO



In Europe, GEVES experts played an active role in drafting protocols and consolidating the operating rules of examination offices with the CPVO, and in discussions on future developments for ornamental, fruit, agricultural and vegetable species. At the meeting of agricultural experts in Poland, GEVES presented its maize DUS system with participation from the applicant, and this system was compared with the existing system in Italy. GEVES also presented the R&D project on winter oilseed rape to optimise management of the reference collection using molecular markers, and its intention to continue with a new collaborative project to be submitted in 2023. In addition, experts shared their experience of maize DUS testing directly in the field at the Polish testing station. Ornamental species experts - including two from GEVES - met in the Netherlands to discuss DUS procedures in relation to specific characteristics for ornamental species. With the support of the CPVO, GEVES organised an Apple Day in November, a technical day for European DUS experts on fruit species, in particular apples. The group was hosted at the INRAE La Rétuzière site, to which GEVES subcontracts the implementation of DUS trials for pip species. The workshops organised provided a good opportunity to discuss the challenges of assessing distinctness of apple mutants, with exercises to check how to apply the UPOV guidelines currently being revised for apple, based on fruit observations.

GEVES responded to the costing exercise for updating the CPVO's remuneration of examination offices. In addition, a CPVO team visited GEVES for a pilot audit project on the calculation of DUS examination costs. GEVES is also participating in the working group on possible changes to the remuneration arrangements for the offices. Finally, the GEVES took part in the CPVO's annual meeting with the examination offices, at which the technical, administrative and financial considerations of implementing DUS examinations are discussed. The GEVES contributed to discussions on the supply of reference materials.

GEVES at the ECPGR



The Steering Committee of the European Cooperative Programme for the Conservation and Sustainable Use of Plant Genetic Resources (ECPGR) met in June 2022. Currently in its X phase, the ECPGR held a mid-phase meeting at which it took stock of the actions undertaken (EVA evaluation network, EURISCO), discussed ways of improving the way it operates in the future and implemented the PGR strategy established as part of the H2020 GenResBridge project. As France's representative in the ECPGR, GEVES took part in the Steering Committee meeting and joined the working group tasked with proposing a revision of the ECPGR's modus operandi for the final meeting of phase X, to be held in June 2023.



GEVES's active presence within ISTA

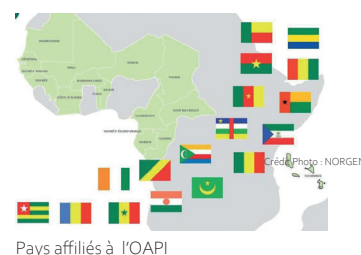


GEVES has a significant technical and scientific presence at ISTA. At the General Assembly in Cairo in May, two methods developed by GEVES were approved (for germination and health quality). GEVES experts chair the technical committees for Sampling, Seed Health and Proficiency Tests. At the Athens Symposium in November, GEVES presented 4 oral papers and 8 posters, notably on phenotyping for seed germination quality, pathogen detection methods and the ISTA Pest List. Two ISTA-funded projects, led by GEVES, were completed: "Development of rapid tests for predicting germination and vigour, and their potential for automation by image analysis" and "Development of methods for detecting insects in seeds". They show promising results for the development of new methods. GEVES is supervising the ISTA Reference Pest List project, which aims to define whether seeds are vectors for pests and diseases. 23 plant species have been studied, and it was determined that the seed was a vector for 145 pests. The Seed Health committee organised a webinar on detection methods for viruses, bacteria, fungi and nematodes, attended by over 100 participants from 28 countries. A sampling-purity-sprouting workshop was held in Hyderabad, India, for 20 participants from 8 countries. GEVES is also a member of the executive committee that set up the Young@ISTA programme to encourage young professionals to take part in ISTA's work, and is working in particular on new technology, the introduction of tropical species, the development of e-certificates, etc.

International cooperation activities

GEVES DHS courses abroad

After 3 years of intense collaboration between the African Intellectual Property Organisation (OAPI), GEVES, NAKT, CPVO, UPOV and SEMAE, the project to Strengthen and Promote the Plant Variety Protection System in the OAPI area has come to an end. Funded by the European Commission and the African, Caribbean and Pacific Group of States, the project enabled 3 groups of trainees to learn from GEVES's expertise in setting up DUS testing, and to discover the organisation of the seed industry in France. Beforehand, GEVES took part in seminars to ensure that the principles of plant variety protection were widely communicated within OAPI, and visited future examination centres to support local organisations in the practical implementation of DUS tests. Aware of the importance of promoting plant variety listing and protection, GEVES staff are regularly involved in such cooperation programmes. In 2022, for example, the GEVES DUS expert for cabbage and cauliflower travelled to India to demonstrate our expertise on these species.



Pays affiliés à l'OAPI



December training

June training

Strengthening the strategy of influence at EU level

Contribute to discussions on regulations on PRM and organic varieties

A GEVES representative took part in 2 working meetings prior to the drafting of the European Commission's legislative proposal on the revision of the regulations on Plant Reproductive Material. These 2 meetings were devoted to sustainability issues, and the way in which they could be taken into account in variety listing testing. In this respect, the French experience of VCUS for agricultural species and vines was illustrated and praised. The role of decision rules, experimentation methods and the choice of comparison controls was highlighted in helping to meet the challenges of the Green Deal. GEVES experts took part in the preparatory discussions for the drafting of implementing directives for temporary experimentation on Organic Varieties Adapted to Organic Production conducted by the European Commission. On this occasion, they insisted on the necessary link between this new system and sector-specific marketing directives, questioning the need to derogate from the uniformity standards for a few characteristics defined on this basis. They also raised the issue of heterogeneity, a constitutive characteristic of these organic varieties adapted to organic production according to the definition in European organic regulation 2018/848. In addition, GEVES reiterated the need to carry out VCUS tests under organic conditions, wherever possible, although this is not totally compulsory.

EU-VCU group: focus on sustainability



GEVES took part in the 15th seminar of the group of VATE experts from various European examination offices (EU-VCU group), organised by CREA in Milan, Italy, on 25-27 May 2022. The main focus was how to take account of sustainability objectives in variety listing procedures. After discussing the experiences of different countries and the new challenges to be met in order to take greater account of sustainability in VCUS studies (adaptation to climate change, abiotic stress, etc.), the representatives of the examination offices worked on the revision of the EU seed and variety regulations. In particular, GEVES contributed to the drafting of a memorandum sent to the European Commission setting out possible ways of strengthening sustainability objectives in the catalogue (listing) regulations.

COPHS Visit

In light of the French Presidency of the EU Council, the French Ministry of Agriculture organised a meeting of the Chief Officers of Plant Health Services (COPHS) of the EU Member States on 4-6 May in Angers.



This meeting, which also included the services of the European Union Commission and the Ministry of Agriculture, examined strategic aspects of EU plant health policies. GEVES welcomed the delegation of 60 people, presenting its activities in pest detection in seeds and the evaluation of variety tolerance to biotic stresses in controlled environments and in the field.



Contribution to the CPVO seminar: Variety protection as a vector for sustainability, innovation and growth in the European Union



At this European seminar organised by the CPVO on 28 April, GEVES shared its experience through a speech in the plenary session and organised a visit to the Anjouère variety testing unit. More than thirty people took part: MEPs, representatives of the Ministry of Agriculture, the European Commission, the CPVO and the European Commission. Presentations were given on the methods used to carry out flax DUS testing, cereal disease resistance trials and their use in variety listing tests, and R&D work to develop a test for tolerance of oilseed rape varieties to sclerotinia. Visitors stressed the importance of variety testing in meeting environmental challenges.



Sylvie Ducournau

Head of the Germination Laboratory

"After many years as a member and then technical committee chair, in 2022 I began my second term on the ISTA Executive Committee. I remain a member and Liaison Officer of several committees, which allows me to get involved with projects and methods developed by the committees. The Executive Committee gives me a more global view of how the association works and the issues involved in its development and recognition. I'm involved in several groups and projects: Accreditation, Science and Technology and Young@ISTA, which are important for both ISTA and GEVES."

Reaching out to professionals and the general public

Visits and events in France

After the Covid period, which severely limited the number of events, 2022 saw the return of trade shows. **SIVAL**, a trade fair for professionals in the fruit and vegetable sector, took place on 15-17 March. GEVES took part in SIVAL on the Research, Training, Innovation stand, shared with partners from the Anjou plant campus, with a demonstration of the Plant Quiz created by the GEVES teams (currently available in French only). GEVES organised two conferences:

- Plant health: Essential for the agro-ecological transition with a particular focus on emerging viruses such as ToBRFV
- Collection funds and biodiversity: what are they?



The **Salon du Végétal** was held in Angers from 13-15 September, with a new format highlighting plants as an eco-contributor to the planet, a positive factor for towns and

countryside, a source of food and a source of well-being for humans. The GEVES was present in the *Research, Innovation and Training* area with Végépolys Valley, where it had the opportunity to talk to industry professionals and students, and to support the plant sector and the return of this trade fair to Angers.

At the **2022 Science Fair** (a national event in France), GEVES presented the seed and variety sector at the Science Village at ESEO in Angers. Over 2,900 visitors visited the event on 15-16 October, mostly with their families. They were curious and very interested in the world of plants, which they discovered through activities and games highlighting the diversity of species, varieties, shapes and sizes of seeds, uses of plants, professions including the expertise of GEVES, and also how varieties can be a lever for the agro-ecological transition. You can discover some of the material presented by clicking on the links below:

- [Plant Quiz \(French version only\)](#)
- [Are you a top SEED?](#)



Visitors to GEVES - After a period of exclusive video presentations, particularly for groups of students, visits have resumed in 2022 for professionals, students in the plant sector and the general public. More than 1,500 visitors (from France and abroad) visited GEVES's stations in 2022 to gain a better understanding of the jobs and techniques involved in describing and evaluating varieties and ensuring seed quality. Various media were created in 2022 to explain our missions, in particular a collection of career videos available on the GEVES YouTube channel.



<https://www.youtube.com/@GevesVideos/videos>

Newsletters



The distribution of a monthly newsletter continued in 2022, sharing a wide range of articles on variety evaluation, seed quality, methodological research work, the involvement of GEVES at European and international level on these subjects, plant genetic resources, plant health, the registration of new varieties in the Official Catalogue, and much more. All subjects and articles are written by GEVES experts and sent to around 4,000 subscribers.

Official recognition of managers of collections of resources for agriculture and inclusion in the National Collection



This year, 5 managers obtained official recognition as individual managers or on behalf of a network. They come from a wide range of backgrounds, reflecting the diversity of the conservation community. 2022 was also the year in which the managers officially recognised in 2020 were monitored for the first time. This demonstrated their commitment to continuous improvement and the importance of discussions with the CTPS Plant Genetic Resources Section to provide them with the best possible support.

At the same time, 1,032 new resources were added to the National Collection. With these latest additions, the National Collection now comprises 4,978 accessions. The members of the CTPS Plant Genetic Resources Section have also improved the technical examination regulations and the dossier for inclusion in the National Collection. In particular, these amendments allow the manager to explain the choice of accessions and why, from their point of view, they are heritage resources.



5 new projects supported financially by the support fund set up by the Ministry of Agriculture for resources maintained *in situ* and collections of plant genetic resources

As every year since 2017, GEVES managed a call for applications on behalf of the Ministry of Agriculture. 5 new projects were funded in 2022, mainly dedicated to fruit species. The majority of these projects concern resource characterisation (39%), human resource support (31%), resource regeneration (17%) and investment (12%). The results of 6 projects supported in previous calls were also analysed. A summary of these projects is available [here \(French version only\)](#).



PERSPECTIVES 2023

GEVES will be hosting the next meeting of the international Working Group for Fruit Species (TWF) in Nîmes, on 3-7 July 2023.

GEVES will be hosting the EU-VCU Group in May 2023 to discuss variety testing, particularly in terms of sustainability and resilience to the effects of climate change.

THE STAFF AT THE HEART OF GEVES

The staff are the strength and the foundation of GEVES. Experts with a passion for plants, they provide the quality of work, independence and neutrality that are essential GEVES values. To build a sustainable future, GEVES takes care of its human capital to combine expertise, performance and well-being.

In 2022, it was finally possible to come together again at the GEVES Staff General Meeting. Staff were able to meet again and share the challenges of the 'GEVES Ambition 2030' strategy paper, enjoy team-building activities together. GEVES, in consultation with the staff representatives on the CSE and CSSCT, is continuing to introduce measures to promote a better work-life balance and to take care of the health and safety of all its employees: These initiatives include the Professional Equality Plan, a sustainable mobility package, improved conditions of access to health insurance, the appointment of a disability adviser and the management of information on seeds treated. Proposals to improve the pay policy were also made to enhance career development and recognise the investment made by GEVES staff, some of which have already been implemented, making GEVES a more attractive place to recruit new talent and retain staff on fixed-term or seasonal contracts. These improvements, defined in consultation with the Staff Committee, will be pursued in 2023.



Promoting cohesion and well-being at GEVES

GEVES Staff General Meeting



The **Ambition 2030** strategy paper ([video available here](#)) approved by the Board of Directors in July 2020, focusing on 5 key areas, underlines GEVES's commitment to making an ever greater contribution to the excellence of the seeds and plants sector in support of the agro-ecological transition, at national, European and international level. It was worked on collectively during a day of cohesion, the General Assembly bringing together GEVES staff in June 2022 in Angers at the Terra Botanica park. This sunny day was an opportunity for staff to exchange ideas, work together and enjoy the company of the 260 participants.



Pauline Bonneau
HR Assistant

Duo Day

GEVES took part in Duo Day for the first time on 17 November 2022. This national initiative gives volunteer employees the opportunity to share their daily lives, for a day, with a disabled person. The programme included: presentation of the company, learning about a job, hands-on experience in a department and experience-sharing! This was a great opportunity to raise awareness among all staff of the diversity of disability situations at work, and to change the way people look at disability. In all, 5 duos were formed to discover very different professions, including plant testing technician and management assistant. The participants found the day "interesting", "rich in sharing", "unique" and "worth repeating". All this positive feedback is very encouraging, and we hope that the next event will be a success. The high level of involvement shown by staff on this first occasion demonstrates the motivation of staff in improving the integration of people with disabilities at GEVES.



Equal opportunities action plan

Professional equality between men and women at GEVES is at the heart of the Human Resources policy and a priority of the "Staff at the heart of GEVES" strategic goal. In 2022, the General Management of GEVES signed a PROFESSIONAL EQUALITY plan, with indicators. The aim of the plan is to define, where necessary, measures in four areas:

- 1) Work-life balance, organisational culture
- 2) Gender balance in leadership and decision-making
- 3) Gender equality in recruitment and career development
- 4) Measures against gender-based violence, including sexual harassment

The GEVES undertakes, by this means, to guarantee the upholding and promotion of the principles of equal treatment and non-discrimination at all stages of its employees' professional lives.



Laurence Le Corre
Staff Committee Secretary

Staff Committee

I have been a staff representative at GEVES since 2006. In 2019, when the CSE (Staff Committee) was created, I was elected, and I have contributed with enthusiasm and freedom of speech to the various advances in many social and economic projects, while understanding the difficulties of changing the needs and expectations of everyone. That's why I'm standing for re-election for the new term 2023-2027. I've been appointed secretary of the works council, a challenge I set myself in order to acquire new skills in my professional life. My role as staff representative is not always an easy task, but it gives me a better understanding of the workings of GEVES's organisation and allows me to contribute to the smooth running and progress of the quality of collective and professional life.

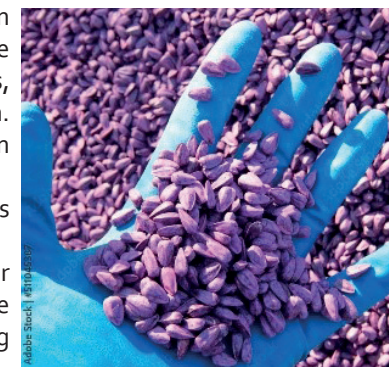
Optimising health and safety at work

sensibiliser et nous assurer
l'obtention d'informations

Seed treatment: essential information for seed laboratory testing

In order to perform seed testing, GEVES requires information about the seeds including seed treatments applied. These may be biological, chemical, physical or thermal treatments, etc. used in seed treatment, coating or pelliculation. In seed quality testing laboratories, these technologies can have an impact on :

- analyst safety: knowing what treatments have been applied means you can protect analysts appropriately.
- the reliability of testing results: analysis methods may differ depending on whether the seed is treated or coated, and on the type of treatment. Without reliable information, there is a risk of using the wrong service and rendering the test invalid.



GEVES is committed to an information management plan for seed treatment:

- construction of a database incorporating a wide range of commercial names of seed treatment products: 200 names are referenced in the database with their safety data sheets and their risk phrases and warnings.
- computerised automation of information for teams, proportionate to the hazardous nature of the product.
- communication with clients: to raise their awareness and ensure that we obtain the information we need.

Since 1 January 2023, the commercial name of each seed treatment product applied to seeds has been mandatory when placing test orders.

Recognising and supporting professional development



Philippe Pannetier
Expert instructor



Ludvine Soubigou-Tacconnat
Instructor in-training

In-house training: from the basics to expertise in seed identification

In-house training in purity and counting tests is one of the pillars of our activities. The resulting expertise ensures the quality of results and supports our NRL missions. This training is based on a two-person team (trainer/learner) working together for several years. The pedagogical progression is specifically designed to share knowledge and lead the learner towards the most complex tests. The final stage in the process, for an experienced analyst, is to pass on what he or she has learned. The "learn-practise-transmit" triangle is complete.



Patrick Bagot
Head of the Anjouère experimental unit

The GEVES teams are expanding their agro-ecology skills

Following a previous training course in 2021 on soil conservation agriculture run by Sarah Singla, a farmer from Aveyron, all the teams in charge of the experimental fields visited the CA-SYS facility at INRAE Dijon-Epoisses and the organic experimental farm at Thorigné d'Anjou (Pays de la Loire Chamber of Agriculture). A large number of actions have since been undertaken at all these stations. Going forward, the Pays de la Loire Chamber of Agriculture will be providing support to Anjouère staff over the first half of 2023, focusing on 3 areas: soil fertility, alternative techniques and functional biodiversity.

Quality of life at work: take action!



Following the survey conducted in 2021, GEVES drew up an action plan to improve quality of life at work, which was presented at the staff general meeting. The actions are based on the pillars of a QWL policy rooted in managerial practices: health, improved working conditions, prevention of psychosocial risks.

An example of action: To support GEVES managers, training courses in QWL best practice have been organised and will be extended by co-development

workshops to create a learning community to improve managerial practices, based on real-life situations and benefiting from multiple viewpoints.

PERSPECTIVES 2023

Human Resources Information System (HRIS)

Today more than ever, IT tools have become essential.

GEVES is therefore setting up an HRIS from 2023 to :

- Facilitate HR management and strategic decision-making with up-to-date data in real time;
- Harmonise HR processes and practices;
- Increase productivity and reduce costs by automating processes;
- Save time for the HR department, allowing them to focus on high added-value tasks;
- Empowering all staff by giving them greater autonomy.

This HRIS will cover the majority of HR activities, including administrative management, time and absence management, recruitment management, training management, management of annual interviews, etc. As a result, 2023 will be a year of renewal for HR practices within GEVES.

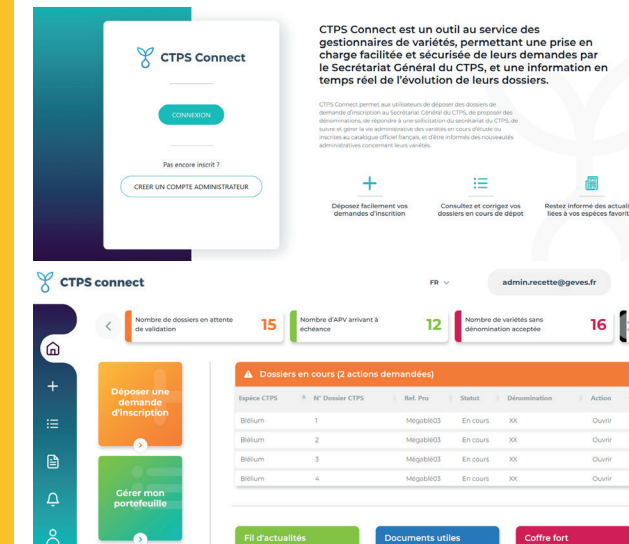
ENHANCE EFFICIENCY, SUSTAINABILITY AND EXEMPLARITY AT GEVES

5

As the national examination office and official laboratory for a rapidly changing seed and plant sector, GEVES's activities are also evolving, and with them the need for facilities, equipment and IT systems. In 2022, works continued on modernising the head office laboratories, which are almost thirty years old, in order to improve working conditions, reinforce health and safety standards and adapt capacity. The modernisation of facilities and the development of activities are also aimed at making the GEVES's missions more sustainable through the agro-ecological transition of its experimental areas. At the same time, an action plan has been drawn up and deployed to improve control of GEVES's energy consumption, with the first projects scheduled for completion in 2022 and 2023.

Improving the efficiency of internal administration

CTPS Connect



GEVES is preparing new digital services for plant breeders: CTPS Connect. At the end of 2023 and beginning of 2024, this website will enable applications for listing in the official French catalogue to be submitted and monitored. It will be a significant source of efficiency gains for the CTPS secretariat managed by GEVES, by making it possible to centralise the monitoring of applications, automate administrative processing, and allow applicants to manage changes in their applications. This project is part of a general development of the GEVES IT systems.

Transfer of quality testing of lots from the variety reference collection to the germination laboratory



Reference collections of field crop varieties are kept at the Magneraud experimental unit (17). It is vital to maintain and build up these collections, which are essential for carrying out testing prior to listing or intellectual protection of field crop varieties.

The GEVES teams ensure that relevant controls are always available, in sufficient quality and quantity for trial campaigns.

Initially, these tests were carried out at Le Magneraud in specially designed climate modules. Since autumn 2022, the GEVES germination laboratory has been carrying out all the germination capacity testing for this collection in order to optimise resources, skills and equipment. These tests, carried out at GEVES's National Reference Laboratory for seeds and seedlings, will guarantee the germination quality of seeds entering the official collection and intended for field trials. This represents 6000 tests a year on 80 different species.



Franck Rigau - Head of Seed Management for VCUS Trials

The project began in 2018. Each year, the Magneraud seed management department receives around 30 tons of seed (study and control varieties) for dispatch to partner experimenters in the VCUS networks. Some of the batches sent are also subject to treatment with pesticides. Analysis of the sample preparation process for VCUS trials has identified several objectives for the development of a new preparation chain:

- Reducing bag handling and improving workstation ergonomics.
- Improving the traceability of records in information systems.
- Optimising the dosage of bags by individualising the quantity of seed per experimenter in order to reduce the quantities requested from breeders.
- Ensuring the safety of seed processing personnel by automating the process.

At the start of the project, various facilities (plant breeders, German counterparts, etc.) were visited to study requirements and define the specifications for the installation. The first elements of this new line arrived at Le Magneraud in 2020, and its installation was carried out in several stages, with a large number of tests required to finalise the prototype. The first official preparations began in 2022, and the teams' aim is to continue optimising the various automation phases to achieve even greater production efficiency.



Reducing greenhouse gas emissions from GEVES activities

Energy management plan

Given the trend in energy costs, this item of expenditure, which stood at €534k in 2021, could increase by a factor of 2 to 3 by 2023.

GEVES has drawn up an action plan based on 4 priorities:

- 1. Reducing energy consumption by modernising equipment, facilities and buildings:** LED lighting, replacement of lighting in climatic modules within 2 years, preparation of an action plan to improve the energy performance of buildings and cold rooms used to store reference collections and testing samples, etc.
- 2. Reduce consumption by changing practices:** identify the most energy-intensive testing methods and look for ways to change them, adapt the way certain assessment protocols are implemented (e.g. changing the sowing date in glasshouses), increase day-to-day vigilance in energy use, etc.
- 3. Producing self-consumed energy:** equipping three experimental stations with solar power energy production in 2023, mainly for self-consumption, studying a project for the Beaucouzé site, etc.
- 4. Evaluate:** Electricity consumption will be 4% lower in 2022 than in 2021.



Supporting the agro-ecological transition in the management of testing stations

Works in the SNES physical analysis laboratory: efficiency, optimisation and safety



The main aim of the work carried out in the physical analysis laboratory in 2022 was to improve comfort, working conditions and safety for staff. The first phase concerned the purity and water content activities and made it possible to improve health and safety in the workplace, in particular with the creation of a single treated seeds area incorporating equipment with suction chambers and the creation of dedicated equipment airlocks. In addition, other laboratory equipment has been optimised: height-adjustable workbenches, airtreatment, etc. The room housing the SNES seed collections has also been renovated. The renovation of the laboratory continued for the imaging and cytology activities. In cytology, the space has been optimised with the installation of a new fume cupboard and height-adjustable benches for the microscopy

workstations, as well as the creation of a new laundry room. The imaging department has been expanded to accommodate the growth in activity.

Enhancing agroecological practices across GEVES stations

In 2022, GEVES's 5 experimental units continued to implement actions aimed at reducing the use of pesticide products, developing functional biodiversity within the experimental areas and optimising the use of nitrogen fertilisers and irrigation. The implementation of these measures has had no impact on the quality of our experiments. We are also working towards HVE certification (High Environmental Value) for our experimental fields by 2023.



Franck Ruault - Manager of Brion experimental grounds

On our sandy soils, irrigation control is vital to the success of our trials. Since 2020, I've been using a drip irrigation system to replace full sprinkler coverage to maintain the site's 1.5 ha of ornamental plant collections. This provides excellent precision in the positioning and dosage of the water. This year, I installed this drip system on the 4,000 m² DHS pea nursery, which not only improves irrigation efficiency but also reduces the use of plant protection products, by limiting their leaching. In concrete terms, I've cut the site's irrigation water consumption by 25% in 3 years, and I'm thinking about developing this drip system on other nurseries.



Pierrick Roulier - Manager of Anjouère experimental grounds

Between 2017 and 2022, the use of pesticide products will be reduced by 60% on the Anjouère fields, by changing the crop rotation and limiting the systematic application of pesticide products. To keep up this momentum, I'm working with the unit's teams to develop mechanical weeding at an increasingly early stage on our experimental platforms.

The quality of the adjustment of this hoeing equipment is essential to eliminate weeds, and above all to avoid losing or damaging the plants of varieties being studied. Particularly in tight rows, there is no room for error. This year's initial tests on cereal and flax nurseries have been encouraging, and after a few adjustments, I'm confident that we'll be able to deploy this technique on the majority of our trials.

PERSPECTIVES 2023

Roll-out of the energy management plan: production of electricity at three experimental stations, equipment modernisation, continued vigilance regarding practices.

Towards level 3 High Environmental Value certification for experimental units

Continued investment to modernise the IT applications used by laboratories and for VCUS variety testing.



GEVES: a unique & official organisation in France

GEVES is a **Public Interest Group** with three founding partner organisations:



- French National Research Institute for Agriculture, Food and Environment (INRAE) - 60%



- French Ministry of Agriculture - 20%



- French Interprofessional Organisation for Seeds and Plants (SEMAE) - 20%

This unique set-up ensures GEVES's independence and neutrality in carrying out its activities in accordance with its regulatory and official missions and mandates.

The union of state, research and sector expertise ensures that all aspects of the sector are fully taken into account.

Governance of GEVES

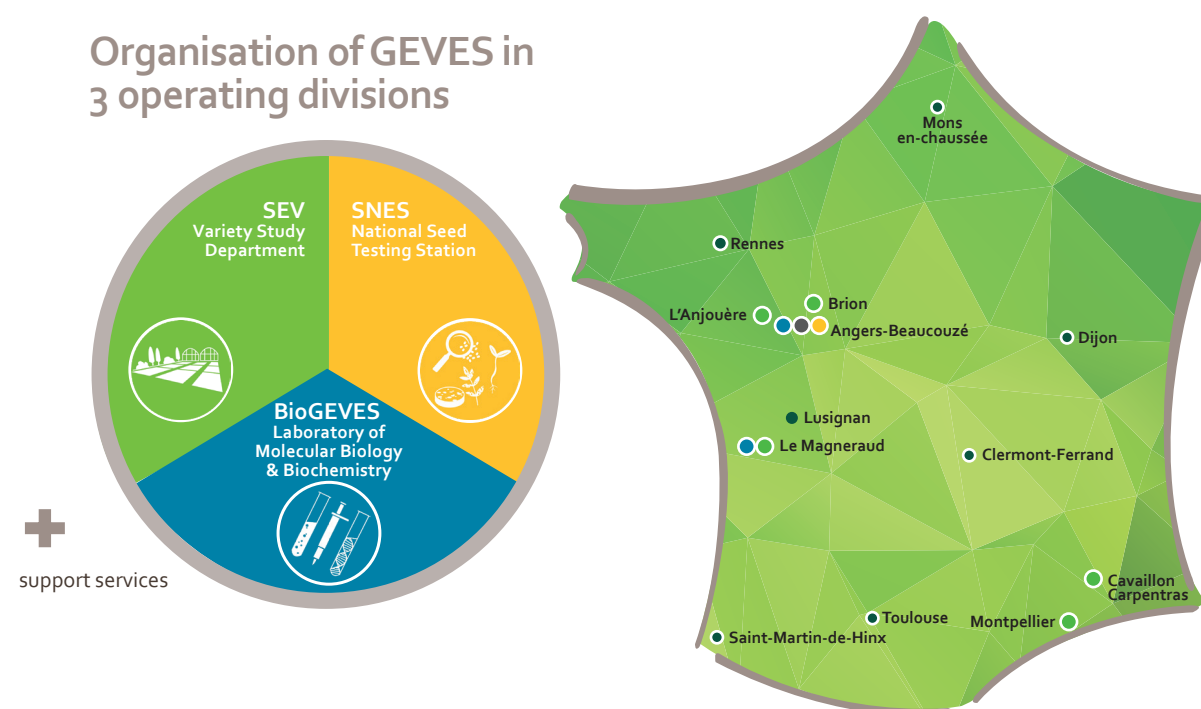
GEVES's Executive Board of Directors is composed of 13 members:

6 INRAE representatives - 2 representatives from the French Ministry of Agriculture

2 SEMAE representatives - 2 GEVES staff representatives - President of the CTPS

as well as a Government Commissioner (Ministry of Research) and a State Controller.

Organisation of GEVES in 3 operating divisions



Activities

To carry out its missions, GEVES performs a wide range of activities:

- Description of varieties and evaluation of genetic progress
- Quality testing for seeds and seedlings
- Methodological research
- Management of plant genetic resources
- Training courses
- Audits, consulting & expertise
- International cooperation
- Monitoring of the French network of seed testing laboratories
- Organisation of Proficiency Tests (PT)
- Communication

Les missions du GEVES

GEVES has official, regulatory missions and carries out testing activities and methodological development for:

- National listing of new varieties in the Official French Catalogue
- Plant variety protection
- Official seed testing as part of its NRL mandates for seeds, GMOs and plant health (RNQP-matrix seeds)

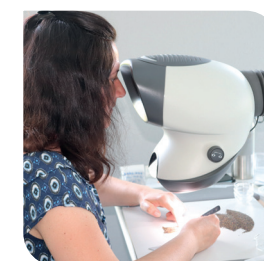
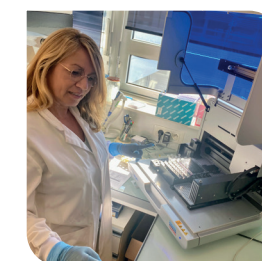
GEVES is also responsible for the national coordination of plant genetic resources on behalf of the Ministry of Agriculture

GEVES is the National Reference Laboratory for:

- GMO detection: GMOs in maize (seed) and soya, rapeseed and flax (seed and vegetative parts) by Decree of 19 octobre 2011
- quality testing of seeds and propagating material by Decree of 1 March 2017
- plant health by Decree of 20 November 2020

GEVES is as an approved laboratory for certain seed health quality tests and accredited by ISTA for all species. It carries out official testing, particularly for seed exports: for phytosanitary passports and certificates as well as Orange and Blue International Certificates.

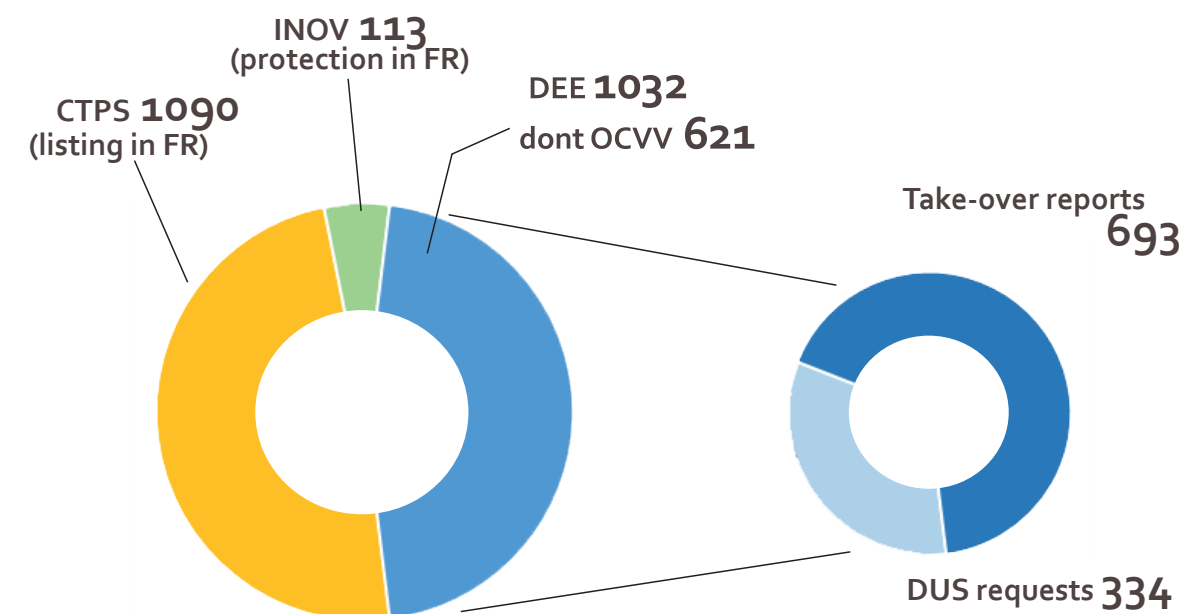
GEVES makes its specialised expertise openly available to the plant and seed sectors, providing high-quality services to a range of private clients.





Variety testing activities

1 - New variety applications



DEE : Applications from abroad

ANNUAL REPORT 2022

✓ Variety testing activities	39
✓ Varieties registered in the French Catalogue in 2022	44
✓ Quality testing for seeds and varieties	46
✓ Research activities	50
✓ Resources	52
✓ Budget	55

DUS applications from abroad - DEE

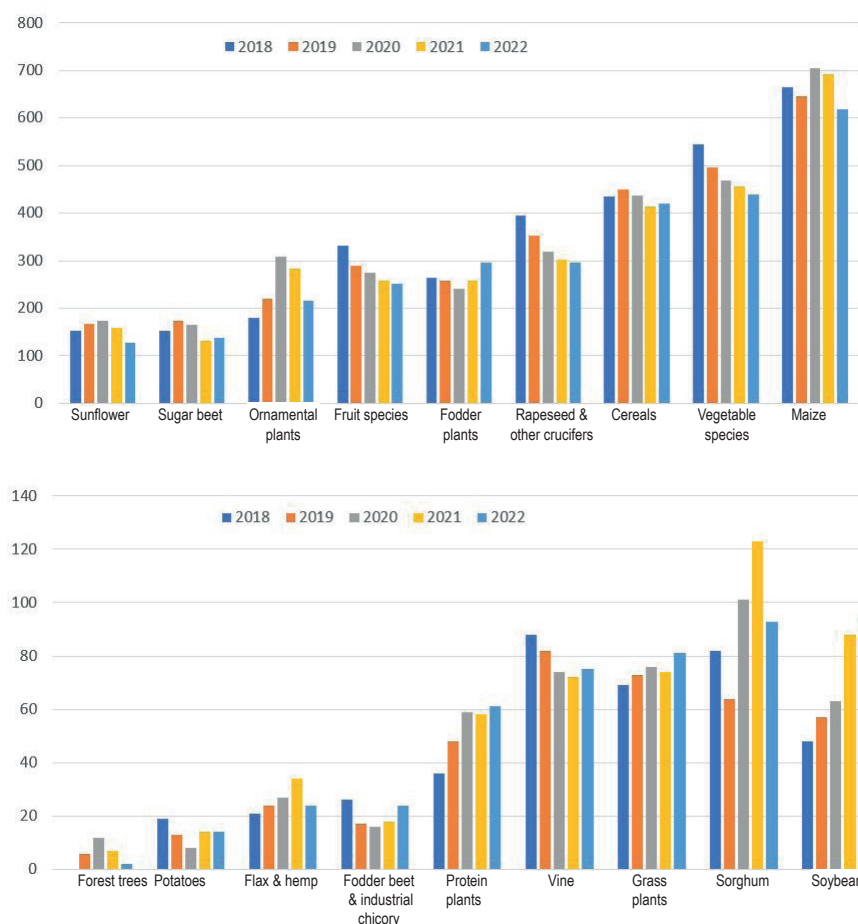
- 70 % take-over repots
30% new DUS studies for:
- CPVO: 238 applications
 - Netherlands: 17 applications
 - Germany: 26 applications
 - Switzerland: 19 applications
 - United Kingdom: 12 applications
 - Denmark: 11 applications
 - Belgium: 9 applications.





Variety testing activities

2 - DUS studies - Evolution of no. of DUS cycles 2018-2022



Total volume DUS:
3267 cycles
across 152 espèces

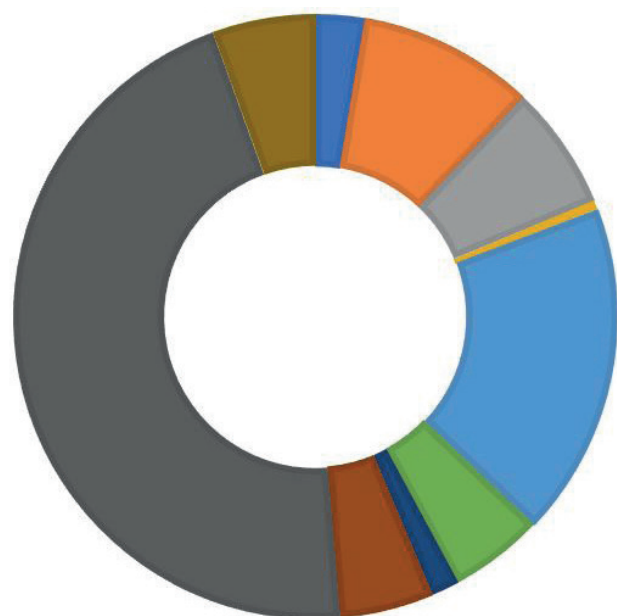
- 2516 conducted at
GEVES

- 467 subcontracted
to other
organisations (INRAE
or other)

- 284 subcontracted
to other EU
examination offices

DUS reference collections

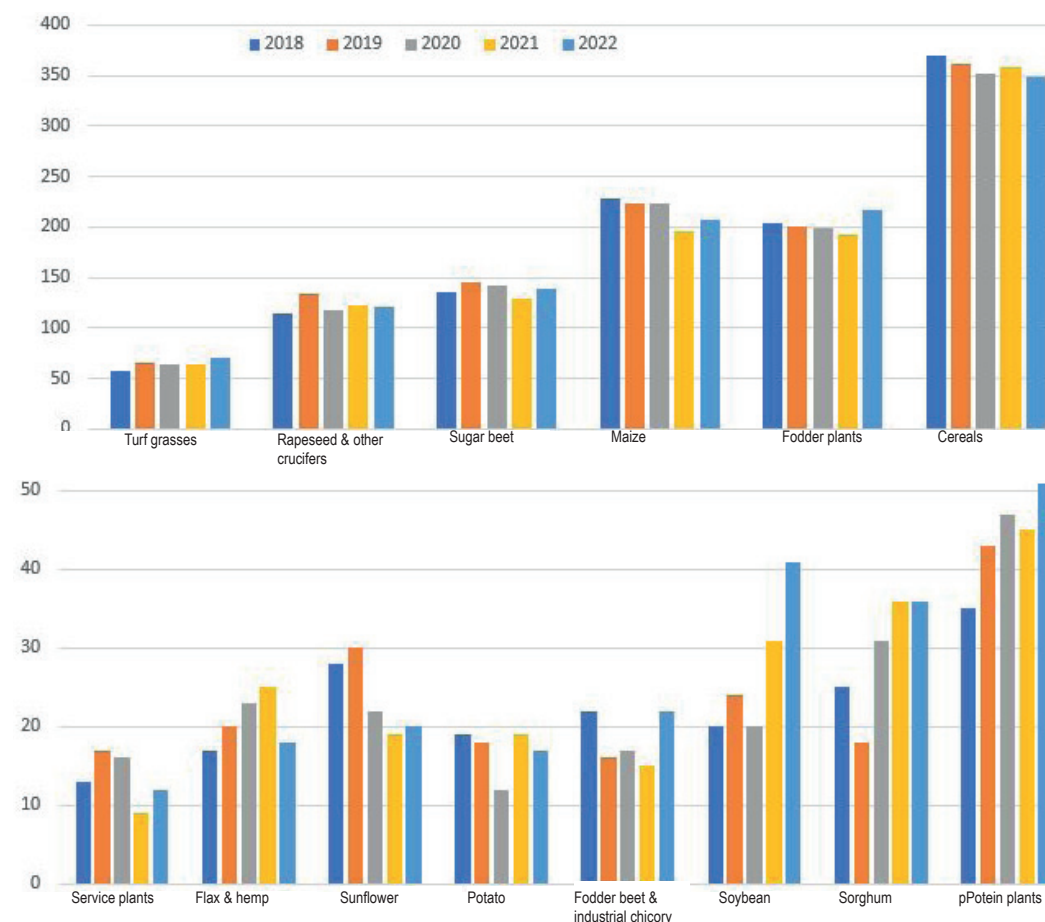
Beet & industrial chicory	1 808
Fodder & grass plant	3 424
Cereals	6 406
Protein plants	1 026
Rapeseed & other crucifers	4 509
Sunflower & soybean	3 409
Flax & hemp	328
Vegetable species	31 115
Maize & sorghum	12 133
Ornamental species	3 738
Total	67 896



Variety testing activities

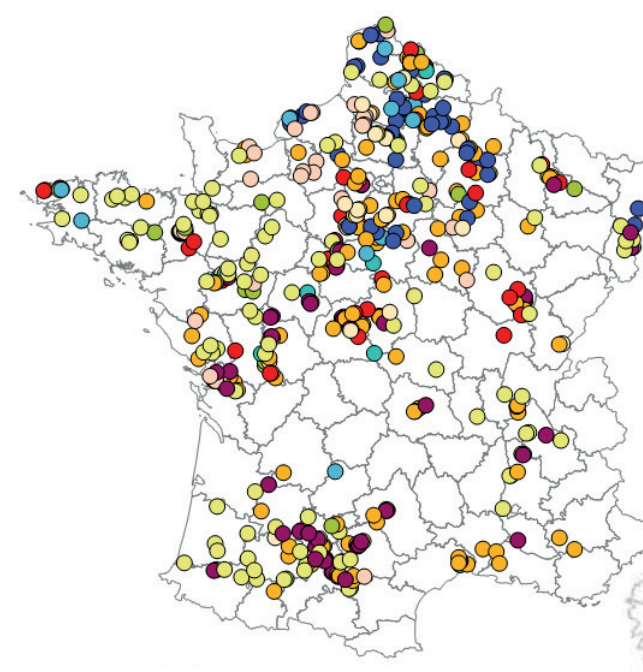
3 - VCUS studies

Evolution in no. of VCUS cycles 2018-2022



Total VCUS volume: 1,318 study cycles across 68 species + 198 optional assessments

VCUS trial network



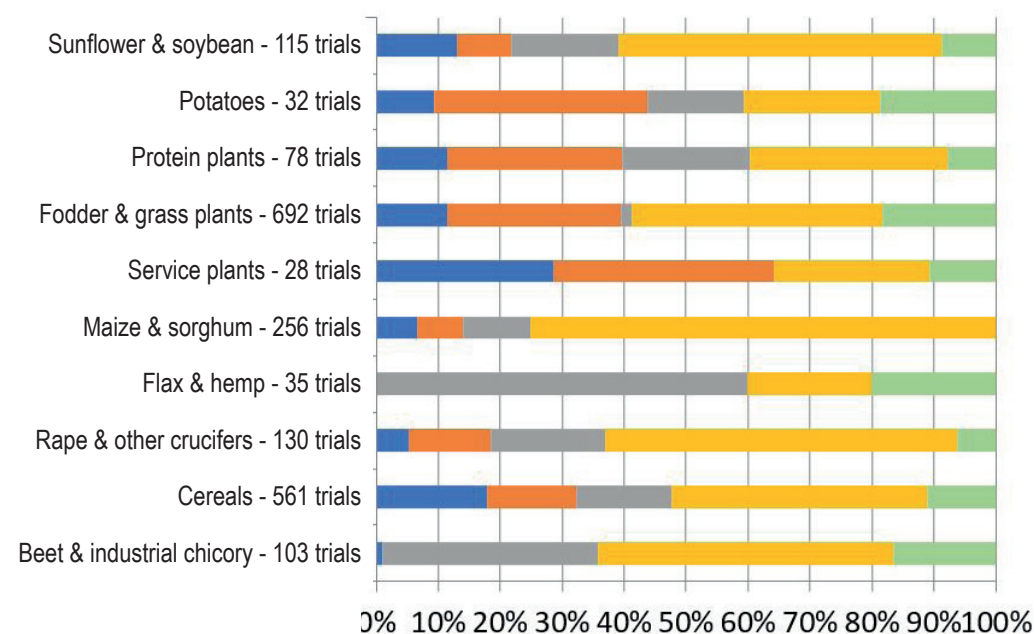
1999 VATE trials including :
- 1572 trials for evaluation of overall value
- 372 trials for study of specific characteristics (behaviour against pests, lodging, cold, earliness, etc.)
- 55 trials at breeder's request to check one or more variety characteristics (specific quality profiles, behaviour against pests, behaviour under certain management, etc.). This concerns nearly 10% of candidate varieties.

Espèces :		
Colza et autres crucifères	Plantes de services	Céréales à paille
Plantes fourragères	Tournesol et soja	Protéagineux
Pomme de terre	Mais et sorgho	Lin et chanvre
Betteraves et chicorée industrielle		



Variety testing activities

Les réseaux VATE : des réseaux multipartenaires



■ GEVES ■ INRAE ■ ITA ■ Plant breeders ■ Autres

ITA: Agricultural Technical Institutes

Other: professional organisations, agricultural schools & colleges, cooperatives/trade unions, international

Evaluation of the value of use in the laboratory: 40,000 technological tests carried out at GEVES or in partner laboratories

Laboratory tests for VCUS evaluation of agricultural varieties

40 000 technological tests carried out at GEVES or in partner laboratories

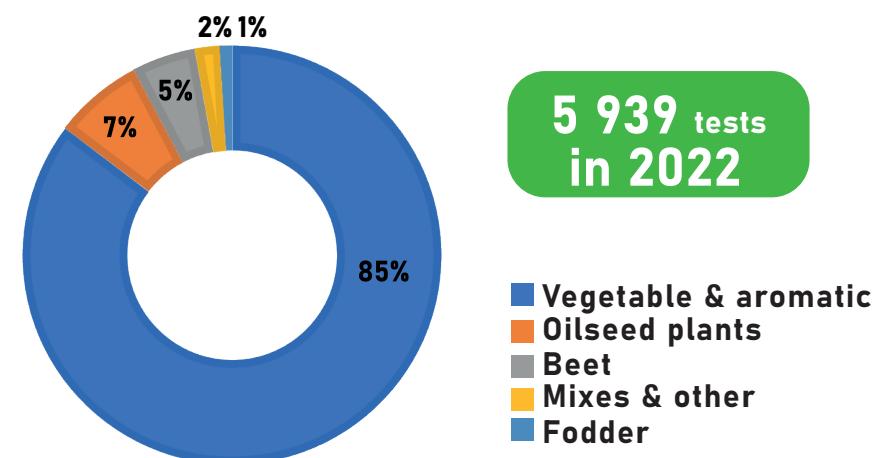
For example :

- Brewing value for barley
- Bread-making test for soft wheat
- Sugar yield and quality for beet
- Oil content for rapeseed and sunflower
- Fibre quality for flax
- Value of potatoes (chips, crisps, etc.)
- Nutritional value for animals (silage maize, pasture grass, hay, etc.)

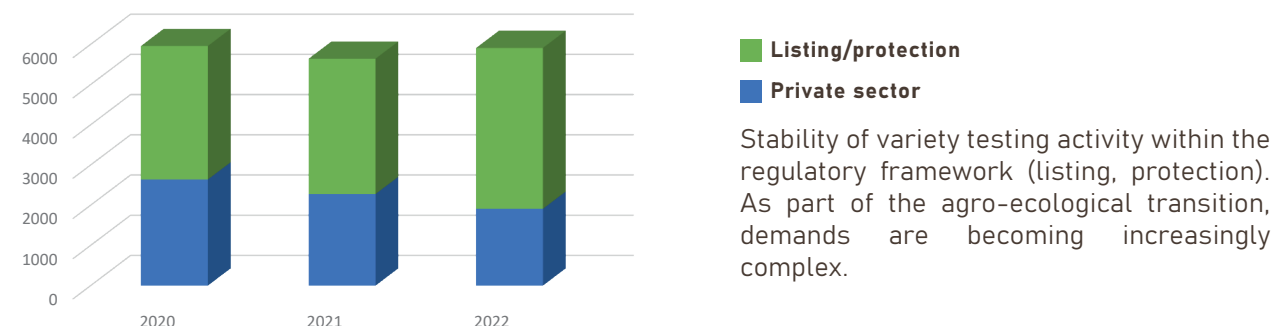


Variety testing activities

5 - Variety testing activities in controlled environments and inoculum production



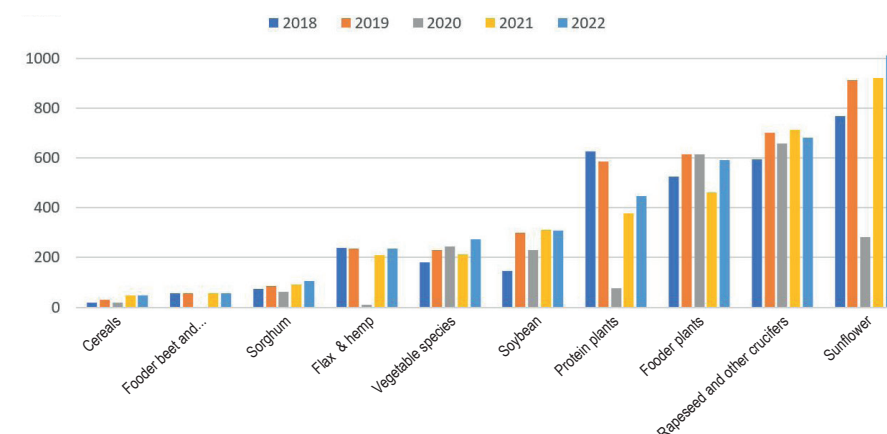
Evolution and distribution of Variety resistance activity



In addition:

- **153** cytology tests for DUS
- **2720** germination tests to check the germinative capacity of seeds in reference collections
- **485** seed health tests before planting
- **1043** inoculum productions for VCUS tests in the field or for seed sector professionals

6 - No. of seed lots checked for SEMAE



Varietal testing is mainly carried out on behalf of SEMAE as part of the certification process for seed lots to check varietal identity and purity.

For maize, checks are carried out by INRAE and FNPSMS, and for cereals by Arvalis. GEVES's role is to provide the corresponding reference sample: 1106 lots in 2022. Around a hundred controls have been carried out for other clients.



Varieties registered in the French Official Catalogue in 2022

See all varieties registered in the Official French Catalogue:
www.geves.fr/catalogue/



Varieties registered by order of the Ministry of Agriculture, on the proposal of the CTPS and based on the evaluations carried out by GEVES for the following lists:

A: Agricultural varieties whose seed can be multiplied and marketed in France and the EU

B: Agricultural varieties whose seeds can be multiplied in France for export outside the EU

C: Conservation varieties grown in specific regions, threatened by genetic erosion and marketable in the region of origin

P: Hybrid components

AGRICULTURAL SPECIES	A	B	P	TOTAL
Beet & Industrial Chicory	43	3	0	46
Fodder beet	1			1
Sugar beet	38	3		41
Industrial chicory	4			4
Cereals	60	24	9	93
Spring oat				0
Winte roat	2			2
Spring naked oat	1			1
Durum wheat	2			2
Common winter wheat	30	15	1	46
2-row spring barley	11	2		13
2-row winter barley	3	1		4
6-row winter barley	10	6	8	24
Rice	1			1
Triticale	4	2		6
Rapeseed & other crucifers	25	12	0	37
Winter oilseed rape	23	12		35
Spring oilseed rape	1			1
Swede rape	1			1
				0
Flax & hemp	10	2	0	12
Hemp	3	1		4
Spring flax	5			5
Spring linseed	0	1		1
Winter linseed	2			2
Maize & sorghum	55	49	0	104
Maize	46	47		93
Fodder sorghum	4	0		4
Sorghum	5	2		7
Fodder & grass plants	55	4	0	59
Cocksfoot	1			1
Hard fescue	1			1
Tall fescue	1	1		2
Tall fescue	3			3
Slender creeping red fescues	3			3
Chewings fescue	4			4
Strong creeping red fescues	1			1
Lucerne	5			5
Smooth-stalked meadowgrass	1			1
Fodder perennial ryegrass	6	2		8
Turfgrass perennial ryegrass	9			9
Italian ryegrass	3	1		4
Hybrid ryegrass	9			9
White clover	1			1
Balansa Clover	1			1
Crimson clover	2			2
Arrow-leaf clover	1			1
Spring common vetch	1			1
Winter common vetch	2			2
Protein plants	23	0	0	23
Spring field bean	3			3
Winter field bean				0
Lentil				0
White lupin				0
Chickpea	6			6
Spring protein pea	11			11
Winter protein pea	3			3
Potatoes	6	0	0	6
Potatoes	6			6
Sunflower, soybean	12	4	0	16
Soybean	9			9
Sunflower	3	4		7
Vine	10	0	0	10
Vine	10			10
				0
TOTAL	299	98	9	406



Varieties registered in the French Official Catalogue in 2022

a: Varieties whose seed may be certified "basic seed" or "certified seed" or controlled as "standard seed" and marketed in France.

b: Varieties whose seed can be controlled only as "standard seed" and marketed in France.

c: Conservation varieties grown in specific regions, threatened by genetic erosion and marketable in their region of origin

d: Varieties without intrinsic value for commercial production but created to meet specific growing conditions and marketable in France

List 1: Varieties with an official description whose seedlings may be marketed and certified within the European Union

List 2: Varieties with an officially recognised description and marketed for the first time before 30/09/2012, whose propagating material may be marketed within the European Union (certification on a case by case basis)

List A: Varieties whose propagating material may be marketed within the European Union

VEGETABLE SPECIES	A	B	P	TOTAL
Carrot	3			3
Celery	2			2
Curly endive	4			4
Endive	1			1
Cauliflower	14			14
Broccoli	1			1
White cabbage	3			3
Courgette	4	1		5
Shallot	1			1
Spinach	1			1
Fennel	1			1
French bean	1			1
lettuce	37			37
Lycopersicon esculentum x lycopersicon pinpinellifolium	1			1
Lamb's lettuce	3			3
Sweet or pop corn	7			7
Melon	46			46
Watermelon	4			4
Turnip	1			1
Bunching onion	2			2
Onion	5			5
Pepper	7			7
Leek	3			3
Pea	10			10
Gourd	2		2	4
Black radish	3			3
Solanum lycopersicum x solanum habrochaïtes	4			4
Tomato	27		3	30
				0
Total	198	1	5	204

TOTAL varieties registered in the French Catalogue in 2022 :
Agricultural + vegetable varieties = **610**



Seed quality testing activities



Activities by laboratory

Seed sector: tests for private operators in the context of R&D, production or national/international trade (OIC, phytosanitary certificate tests, etc.)

Regulatory – Regional Food Dept./Fraud: tests for public authorities such as the Regional Food Service and the Regional Directorate for Food, Agriculture and Forestry.

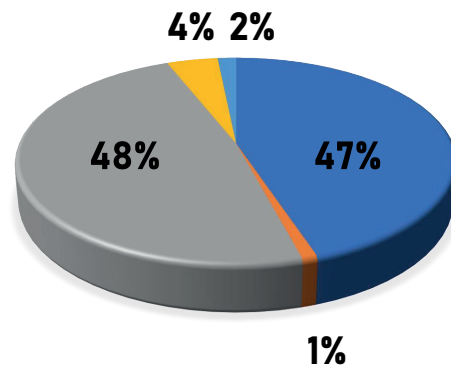
Regulatory – SOC: tests for the SOC as part of the certification of commercial lots, monitoring of approved company laboratories, commercial and territorial controls and phytosanitary passports.

Listing – Protection: analyses commissioned by the CTPS for variety registration and for the CPVO and INOV for the plant variety protection.

Other: tests carried out in the framework of development and validation of methods, studies and proficiency tests.

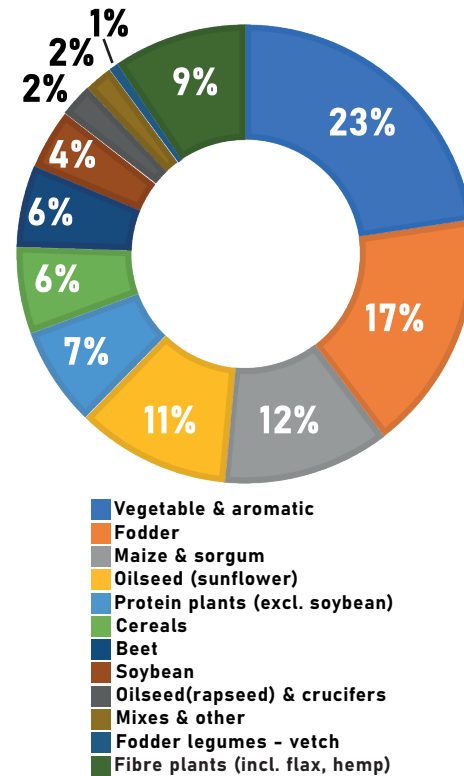
En 2022, 81 046 tests were carried out.

Seed sector – 47%
Regulatory – SEMAE – 48%
Listing – protection – 4%
Regulatory – Regional Food Dept./Fraud – 1%
Other – 2%

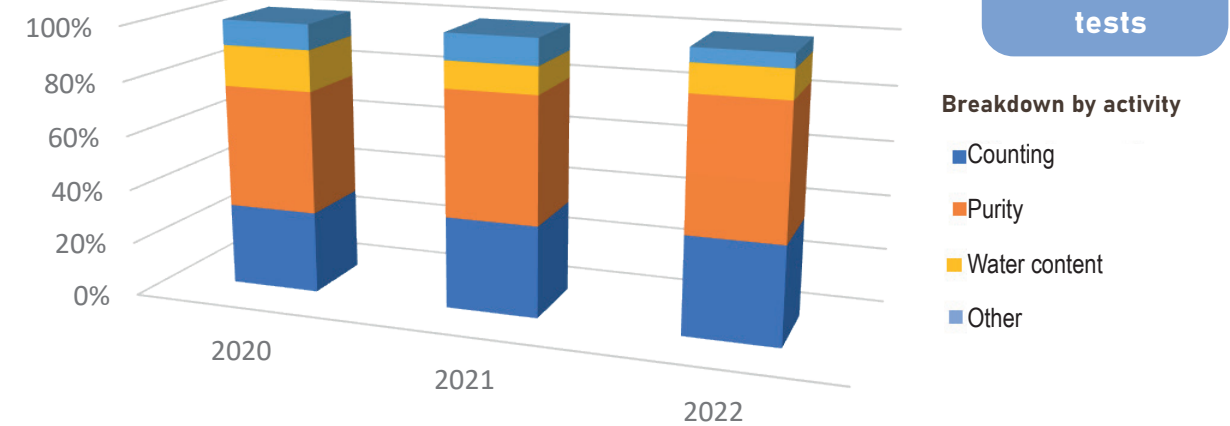


Regulatory tests account for 50% of our activity. A very large proportion of these tests are conducted for seed exports: ISTA certificates, pest detection tests and counting of invasive plant species for phytosanitary certificates.

Breakdown of tests requested in 2022 by species



Physical analysis tests



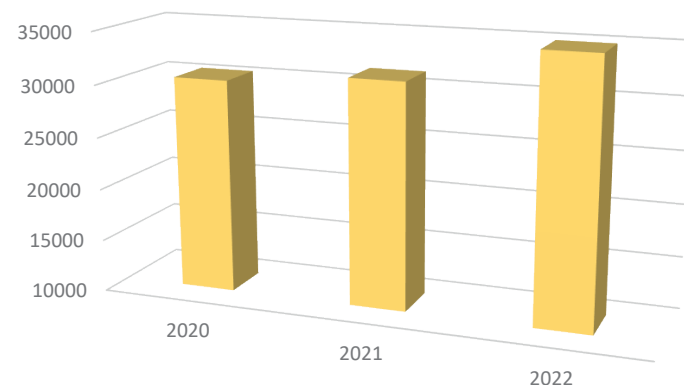
Nearly 27,000 tests carried out by 2022. The slight decrease is mainly due to changes in certain technical regulations, which removed water content testing for certification purposes (flax).

In radiography/imaging, activity has risen sharply compared with 2021 with a total of **1 887 scans**



Germination laboratory tests

Germination capacity tests

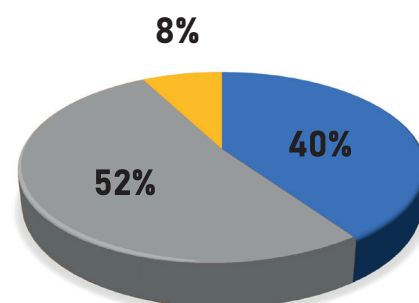


35 786 tests

Nearly 36,000 tests carried out in 2022, a slight increase on previous years. These tests were mainly carried out for regulatory purposes or for international trade: OIC

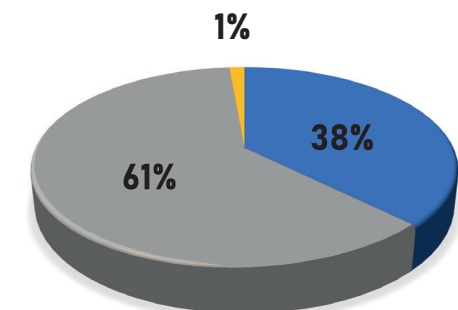
Breakdown by requester

Seed sector professionals
Regulatory – SEMAE
Listing – Protection



Breakdown by request

Seed sector professionals
Regulatory – SEMAE
Listing – Protection





Activities by laboratory

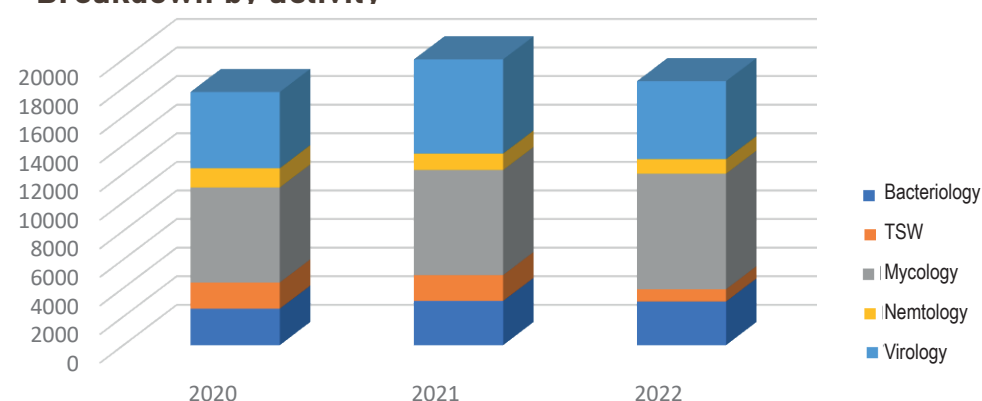


Seed health tests

There was a decrease in health quality tests, mainly in virology, due to the decrease in ToBRFV tests (decrease in requests) and health quality testing of the chrysanthemum collection, an exceptional decrease limited to 2021. For other activities, the number of tests is stable or increasing (mycology).

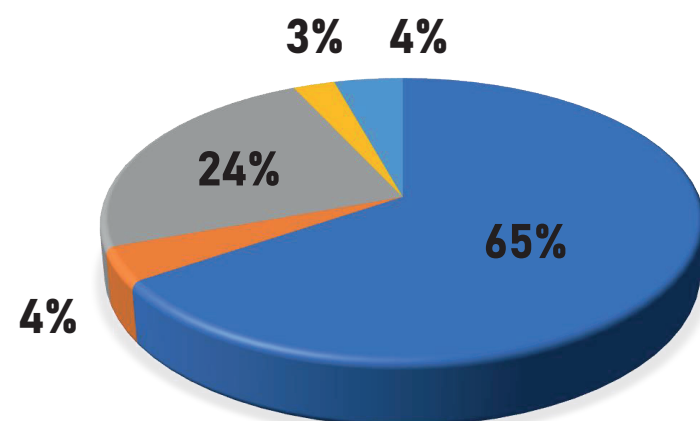
18 473 tests

Breakdown by activity



Breakdown by request

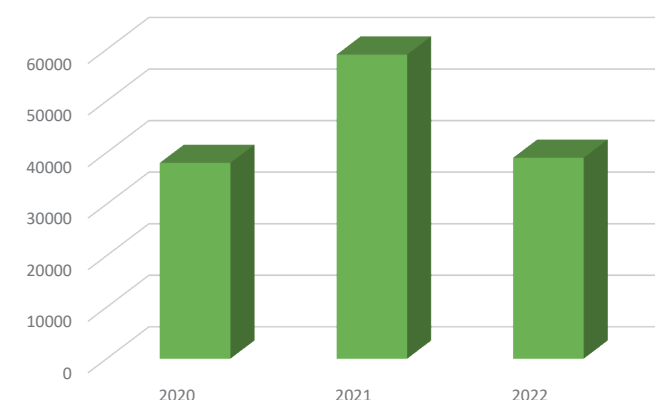
Seed sector professionals
Regulatory SEMAE - 48%
Listing- Protection - 3%
Regulatory - Regional Fraud Dept/ Fraud - 24%
Autres - 4%



Activités par laboratoire



Seed phenotyping



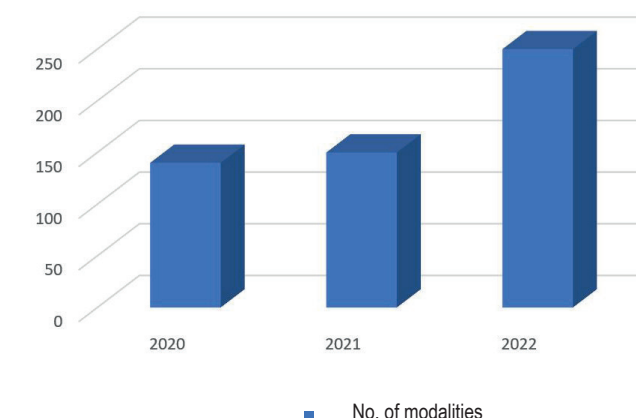
Phenotic - image analysis

In 2022, the platform's work on seeds mainly involved phenotyping for research programmes (SUCSEED, NAVIG, AVATAR in Germany, collaboration with the University of Saskatchan in Canada) to study the effectiveness of biostimulants on seeds (BIOSTIM project) and providing services to seed companies.



Evaluation of treatment effects (biocontrol, biostimulation, alternative treatments, etc.) on seeds and seedlings under controlled conditions

Development of this activity in line with the agro-ecological transition, in all areas (biostimulation, biocontrol, other treatments, etc.). This activity also has a strong R&D component (development of pathotests).





Research activities

Project name	Project aim	Funded by	Duration
Evaluation of varieties and seeds for agroecology			
Herbebook	Development of a tool for comparing fodder varieties	SEMAE	2018-
INVITE	Innovate in varietal testing in Europe, to encourage the development of varieties that are better adapted to variable biotic and abiotic conditions and to more sustainable agricultural practices.	Europe	2019-2024
IPHARD	Ideotyping and Phenotyping for the Adaptation of Soya and Sunflower Varieties to Relay or Backcrop Cultivation	CASDAR	2020-2023
RESO2	Impact of the agro-ecological transition on variety testing methods and the design of trial networks	CASDAR	2021-2023
STABLE	Evaluating the STABILITY of common winter wheat varieties grown alone and in mixtures.	CASDAR	2021-2024
Adventices blé tendre	Improving the competitiveness of common wheat varieties against weeds in organic farming	FSOV	2021-2024
RMT Bestim	Stimulating plant health in agroecological systems	CASDAR	2021-2025
Mobidiv	Mobilising and selecting intra- and inter-specific crop diversity for systemic change towards pesticide-free agriculture	ANR	2021-2026
Sucseed	Put an end to the use of pesticides on seeds and propose alternative solutions	ANR	2021-2026
Muse	Multi-criteria evaluation of varieties for different objectives, cropping systems and practices	GIS GCHP2E	2022-2023
Seedbioprotect	Seed protection using biocontrol solutions	Biocontrol Consortium	2022-2025
Liveseeding	Organic seeds and plant breeding to accelerate the development of sustainable and diversified food systems in Europe	Europe	2022-2026
Adapting varieties and seeds to combat climate change			
Soybean precocity	Improving the earliness classification of soybean varieties for registration	CASDAR	2019-2022
Abiotic stress	Tolerance of varieties to abiotic stresses linked to climate change	GEVES project	2022-
Variety resistance and tolerance to pests and diseases			
Optiplasm	Optimising the official evaluation of oilseed rape varieties against cruciferous clubroot	CASDAR	2018-2022
Rustwatch	A European early warning system for wheat rust diseases	Europe	2018-2022
AMS Extrapol	Research into the transmission of poleroviruses in beetroot for the evaluation of resistant varieties in the field	CASDAR	2019-2022
Atipical	Updating and perpetuating knowledge and biological and molecular resources on leaf diseases of oilseed rape	CASDAR	2019-2022
Actifol	Improving knowledge of the transmission, epidemiology and management of <i>Fusarium oxysporum f.sp lactucae</i>	CASDAR	2020-2022
WDV	Resistance/tolerance to stunted root disease in wheat and barley	FSOV	2020-2023
Harmorescoll	Setting up a harmonised European system of collections of reference isolates, controls and differential hosts to facilitate disease resistance testing.	CPVO	2020-2023
Ascolup	<i>Ascochyta Collectotrichum</i> Lupin Chickpea	CASDAR	2020-2023
Yellows Resistbeet	Development of tests for resistance to beet yellows viruses under controlled conditions and evaluation of real productivity in situations of yellows in the field.	France Agrimer	2021-2024
Linicolin	Optimisation of a protocol for assessing flax varieties against septoria disease	CASDAR	2022-2024
Precotion	Development of a protocol for field testing of oilseed rape varieties for <i>Sclerotinia</i>	CASDAR	2022-2024
ToBR-Ag	Updating of DUS resistance tests in line with changes in pests: introduction of ToBRFV resistance tests for tomatoes and peppers and improvement of the melon/ <i>Aphis gossypii</i> resistance test.	CPVO	2022-2025
PhenoLAG	Multi-site platform for phenotyping seed legumes for their behaviour in relation to diseases	France Agrimer	2022-2025
Plant health tests	Improvement or development of new methods, validation of resistance levels and sets of differential hosts, and epidemiological studies, for variety listing tests	GEVES project	ongoing
Evaluation de la qualité des variétés			
Nutrifolium	NIRS evaluation of the nutritional value of red clover varieties for listing in the catalogue.	CASDAR	2019-2022
AMS PHENODON	Development of a rapid phenotyping method for assessing variety resistance to mycotoxin accumulation in durum wheat and triticale.	CASDAR	2020-2023
FAN	Anti-nutritional factors	GEVES project	ongoing
RMN	Development of Nuclear Magnetic Resonance method	GEVES project	ongoing
NIRS	Near Infrared Spectroscopy	GEVES project	ongoing



Rsearch activities

Project name	Project aim	Funded by	Duration
Evaluation de la qualité des semences			
Pest list ISTA	Mise à jour des maladies transmises par les semences	ISTA	2019-2022
Fusarium barcoding	Développement d'un outils d'identification des souches de <i>Fusarium</i> et <i>Microdochium</i> isolées de semences de céréales par barcoding	ISTA	2022-2024
Virus cereals	Diagnostic et épidémiologie des virus des céréales	Europe	2022-2024
Infested seed lots	Montage d'un réseau d'échanges de semences saines et infectées à travers le monde, pour un usage de matériel de référence	Europe	2022-2024
Metabarcoding	Détection et identification de <i>Fusarium</i> sur blé par technologie de séquençage	SFR QUASAV	2022-2024
Qualité Sanitaire ISTA	Participation aux activités du Comité Qualité Sanitaire de l'ISTA	projet interne	en continu
Bm détection	Mise au point et validation de méthodes pour la détection de pathogènes sur semences	projet interne	en continu
Matériel de référence	Développement , gestion et structuration du matériel de référence (souches, inoculum, semences d'hôtes différentiels et de variétés témoins)	projet interne	en continu
Vigueur ISTA	Participation aux activités du Comité Vigueur de l'ISTA	projet interne	en continu
L'analyse d'images au service de l'évaluation des variétés			
Fus'Eye	Nouvel outil de phénotypage spectral au champ pour quantifier la fusariose de l'épi sur céréales	FSOV	2018-2022
Literal	Système de phénotypage des variétés	CASDAR	2019-2022
Vigo	Comprendre et phénotyper la vigueur du colza à l'automne pour proposer des variétés adaptées à des conduites agroécologiques	CASDAR	2021-2025
RMT Naexus	Réseau Numérique Agricole pour le développement de l'Enseignement, l'eXpérimentation et les Usages	CASDAR	2021-2025
Phenet	Outils et méthodes pour le PHENotpage des variétés et l'EnviroTypage des essais à l'échelle européenne	Europe	2022-2027
L'analyse d'images au service de l'évaluation des semences			
Qualilev	Improving the germination quality and emergence speed of sunflower seeds in adverse conditions	FSRSO	2019-2022
Resilens	Constitution and evaluation of a collection of lentil genetic resources	CASDAR	2019-2022
Brassexplor	Exploring the genetic diversity of <i>Brassica</i> species for sustainable crop production	Europe	2020-2023
Physical quality AI	Automation of physical seed analyses using image analysis	GEVES project	2020-2023
ISTA Insect detection	Exploring methods for detecting insects in seed lots	ISTA	2021-2022
Phenotyping tools	Development of seed phenotyping tools with the Phenotic platform	GEVES project	ongoing
Molecular biology for variety and seed testing			
SNP tomate	Validation of a set of SNP markers to determine genetic distances for the management of tomato reference collections	CPVO	2019-2022
CAP- PHENOGEN	Proof of concept of the value of molecular marking as a complement to phenotyping for characterising variety resistance to cereal pests as part of VCUS studies.	CASDAR	2020-2023
Idevol	Technological development for the identification of potato varieties using microsatellite markers to support seed certification.	CASDAR	2020-2023
Hydrangea	Use of molecular data for DUS studies in ornamental plants: a case study of Hydrangea	CPVO	2022-2023
Extraction of nucleid acids	Inventory and validation of quality control procedures for the extraction of nucleic acids for real-time PCR used to diagnose harmful organisms	Europe	2022-2024
Marquage mol R légumières	New methods for assessing varietal resistance and new DUS traits assessed using molecular biology	GEVES project	ongoing
Valorise MB for DUS	Use of molecular biology for DUS variety studies	GEVES project	ongoing

Legend

- DUS collection management using molecular biology
- Resistance tests
- New projects
- Variety phenotyping
- Detection of pathogens in seeds
- Seed phenotyping
- Valorising variety data
- Variety testing in support of agroecology

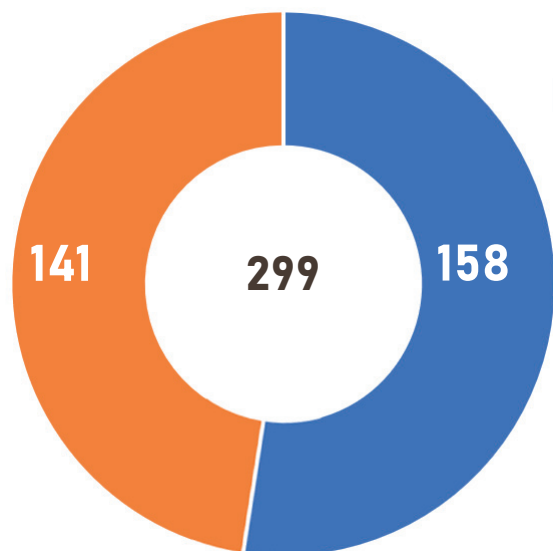


Human resources 2022



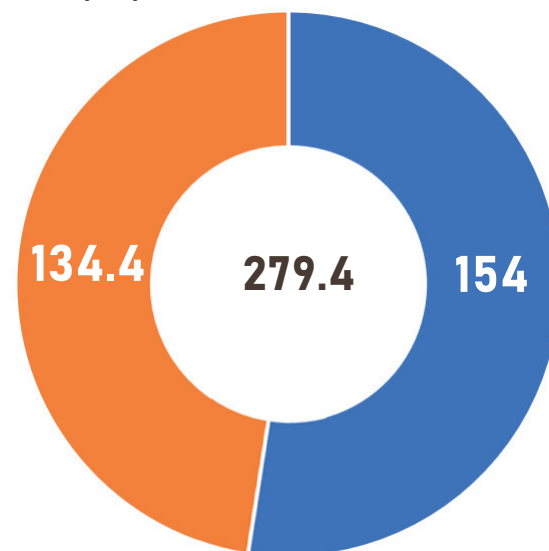
Human resources 2022

Natural persons
31/12/2022



INRAE
Permanent
GIP staff
(CDI)

Full Time Equivalent
31/12/2022



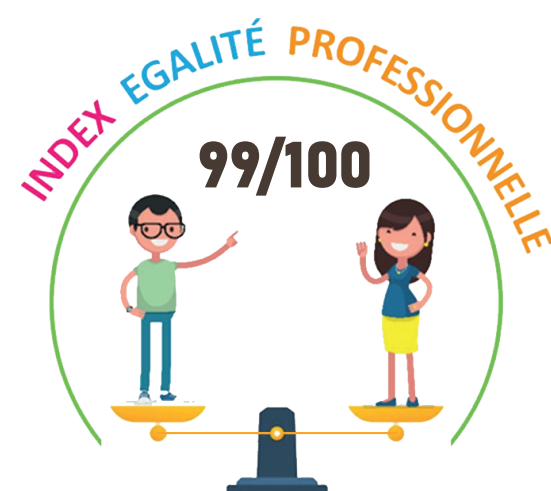
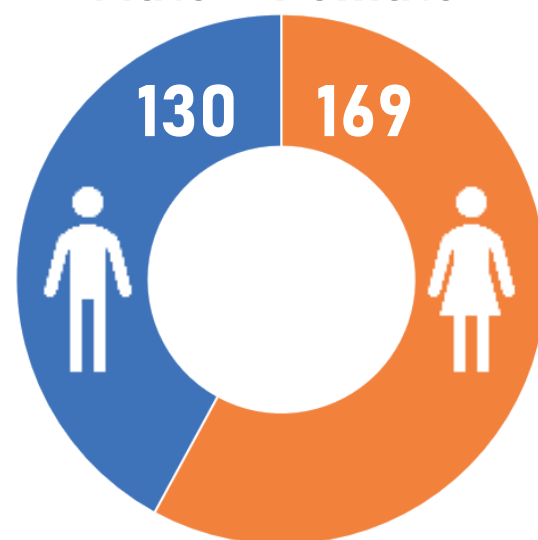
Fixed-term GIP staff (CDD)

207 staff
recruited

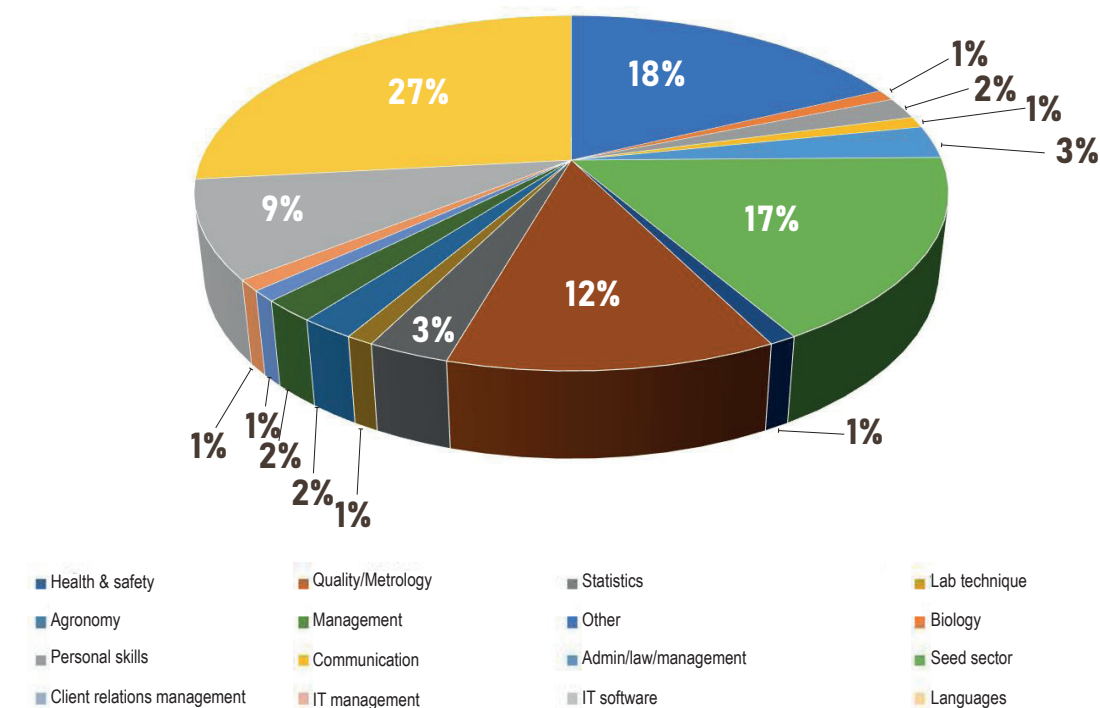


78,15
full time
equivalent

Male - Female

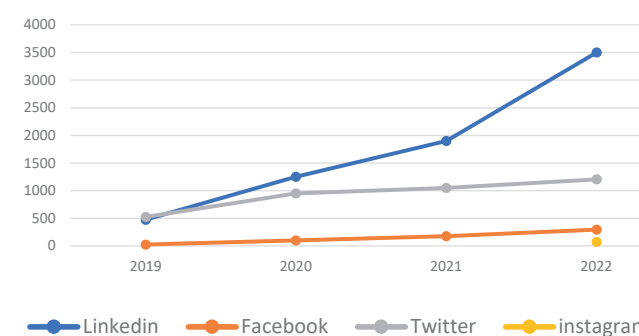


Breakdown of staff training



Communication

- No. of followers



- GEVES Info monthly newsletter:

- ✓ 42 980 emails sent in 2022
- ✓ 3897 subscribers in Jan. 2022 (Fr + En)
- ✓ 3923 subscribers in Dec. 2022 (Fr + En)



New Instagram
account in 2022

- See all newsletters and
subscribe

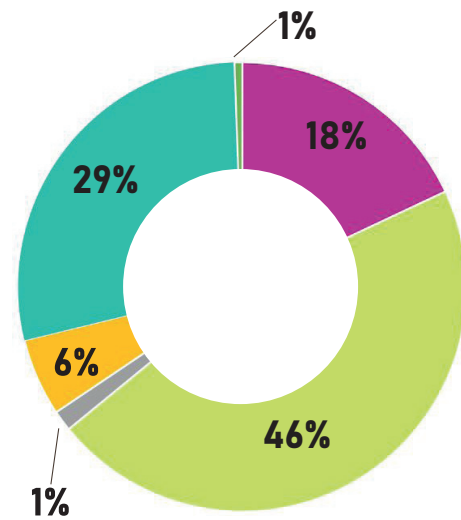




Budget 2022

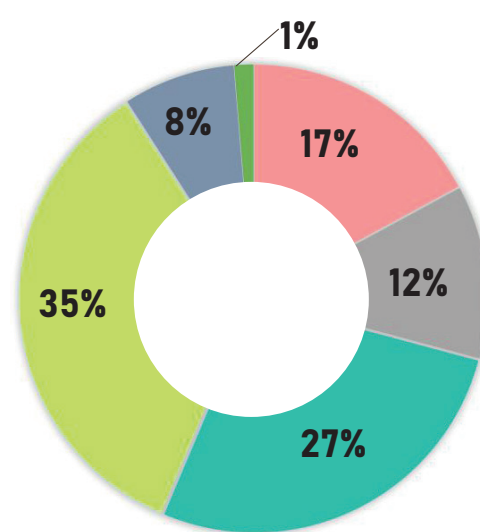
Operating income: €30 940 K

Seed testing revenue	18 %
Variety testing revenue	46 %
Other services revenue	01 %
Subsidies/agreements	06 %
INRAE funding	28 %
Other products	01 %

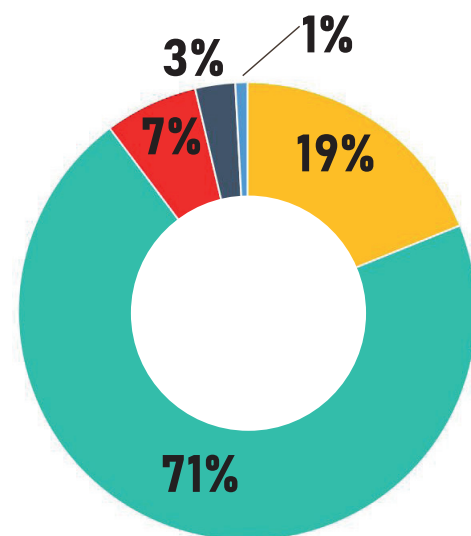


Operating costs: €32 137 K

Purchases	17 %
External costs	12 %
INRAE funding	27 %
Staff costs	35 %
Depreciations	08 %
Other costs	01 %



Contributions from GEVES founding members and other bodies

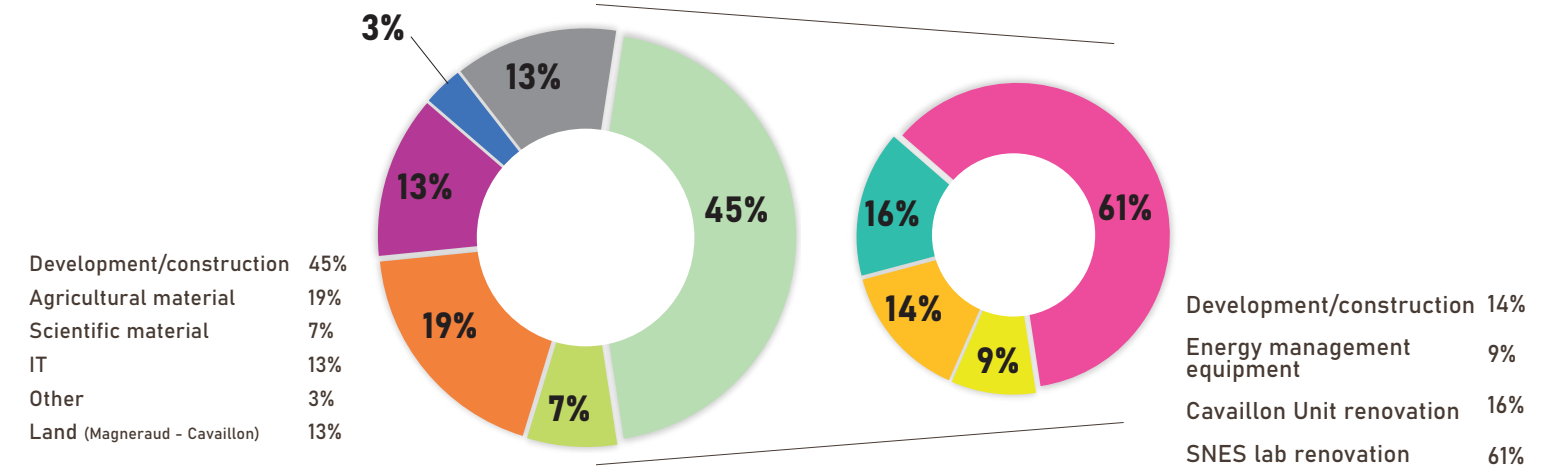


	Amount in K€	in %
SEMAE	2 374	19
INRAE	8 909	71
MINISTERE	827	07
EU	355	03
Other	107	01



Budget 2022

2022 Investments: €3 355 K



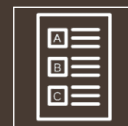
Facilities & Resources

Laboratories & experimental fields

Site	Lab surface area (m²)	Surface area of cold rooms, growing rooms (m²)	Greenhouse & tunnel surface area (m²)	Field surface area (eha)	Surface provided (en ha)
Beaucouzé	2 360				
Anjouère			1 200	175.1	22
Brion		100	6 500	35.2	2.4
Le Magneraud	365	590		73.9	59
Montpellier				39.6	3
Cavaillon Carpentras		146	8 260	57.5	-
TOTAL	2 725	836	15 960	381.3	86.4

Experimental surface areas

Location	Surface		Surface area by test				No. species studied	No. Small plots	No. plants (ornamental)
	Field trials Ha	Sheltered trials m²	DUS %	Variety control %	VCUS %	Other %			
Anjouère	33,22	710	59	8	31	2	69	38 263	300
Brion	6,86	4 100	80	17		2	61	6 725	11 787
Cavaillon	13,11	10 100	61	38			46	8 749	8 749
Le Magneraud	22,45		67	13	18	2	26	19 557	
Montpellier	6,79		18	34	48		30	6 320	
TOTAL	82,43	14 910	60	17	21	2	162	79 614	20 836



Glossary



A

AFNOR: French national organisation for standardisation
ANSES: French Agency for Food, Environmental and Occupational Health & Safety
APV: Pre-marketing authorisation
Arvalis: French arable crops R&D institute
ASFIS: Association for training of seed industry professionals

B

BioGEVES: GEVES Biochemistry and Molecular Biology Laboratory
BIA: Pests and pathogens
BIC: Blue International Certificate (ISTA)
BIO: See OIC
BMT: UPOV working group on biochemical and molecular techniques
BRG: French Genetic Resources Bureau
BSA: Bundessortenamt (German counterpart)
BSPIC: French Seed and Integrated Pest Management Office (Ministry of Agriculture)

C

CASDAR: Special Allocation Fund for Agricultural and Rural Development
CEPP: Plant protection product saving certificate
CIR: Research Tax Credit
CIRAD: French Agricultural Research and International Development Organisation
CISAB: CTPS Commission for Organic Agriculture
CISPS: CTPS Commission for Ecosystemic Plants
COFRAC: French Accreditation Committee
CPPSI: Collaboration for Plant Pathogen Strain Identification
CPVO: Community Plant Variety Office
CRPM: French Rural and Maritime Fisheries Code
CRGAA: FAO Commission on Genetic Resources for Food and Agriculture
CTIFL: French Interprofessional Technical Centre for Fruit and Vegetables
CTPS: French Permanent Technical Committee for plant breeding
CV: Variety control

D

DAAT: Technical Support Service (GEVES)
DEE: Foreign application for study
DGAL: French Directorate General for Food (Ministry of Agriculture)
DGCCRF: French Directorate General for Competition Policy, Consumer Affairs and Fraud Control
DHS: See DUS
DOR: Officially Recognised Description
DSN: GEVES website for seed testing requests
DUS: Distinctness Uniformity Stability

E

EIL: See PT
ECPGR: European Cooperative programme for Plant Genetic Resources
ELISA: Immuno-enzymatic method
ETP: See FTE
ETPT: See WYE

F

FAO: Food and agriculture organization of the United Nations

FEDER: European Economic and Regional Development Fund
FRB: French Foundation for Research on Biodiversity
FSOV: Plant Breeding Support Fund
FSRSO: Support Fund for Oilseed Research
FTE: Full time equivalent
FUI: Single Inter-Ministry Fund

G

GEVES: French Variety and Seed Study and Control Group
GIP: Public Interest Group

I

IBISA: Infrastructure in Biology, Health and Agronomy
IBEB: French Institute of Environmental Biology and Biotechnology
INOV: French National Office for Plant Breeders' Rights
INRAE: French National Research Institute for Agriculture, Food and the Environment
INVITE: INnovations in plant Variety Testing in Europe to foster the introduction of new varieties better adapted to varying biotic and abiotic conditions and to more sustainable crop management practices.
IRHS: Research Institute for Horticulture and Seeds
ISHI: International Seed Health Initiative
ISO: International Organisation for Standardization
ISF: International Seed Federation
ISTA: International Seed Testing Association
ITAB: French Technical Institute for Organic Agriculture
ITEIPMAI: Interprofessional Technical Institute for Perfumer, Medicinal and Aromatic Plants
ITPGRFA: International Treaty on Plant Genetic Resources for Food and Agriculture

L

LBPV: Laboratory of Plant Biology and Physiology
LED: Light Emitting Diode
LIMS: Laboratory Information Management System
LNR: See NRL

M

MAA: French Ministry of Agriculture and Food
MATREF: French National Network of Reference Material
MOBIDIV: Mobiliser et sélectionner la diversité cultivée

N

NAKT: Naktuinbouw (Dutch counterpart)
NBT: New Breeding Techniques
NIAB: National Institute of Agricultural Botany (British counterpart)
NIRS: Near Infra Red Spectrometry
NPPO: National Plant Protection Office
NRL: National Reference Laboratory

O

OAPI: African Intellectual Property Organization
OECD: Organisation for Economic Cooperation and Development
OCVV: See CPVO
OIC: Orange International Certificate (ISTA)

P

PCR: Polymerase Chain Reaction
PGR: Plant Genetic Resources
PHENOTIC: Instrumentation and imaging platform for seeds and plants
POPAM: Ornamental, Aromatic and Medicinal Plants
PT: Proficiency Test
PVP: Plant Variety Protection
PVR: Plant Variety Right

Q

qPCR: Method for measuring the initial amount of DNA

R

RNE: French National VCUS Testing Network
RNQP: Regulated Non-Quarantine Pests
RT-PCR: Real Time Polymerase Chain Reaction

S

SEMAE: French Interprofessional Organisation for Seeds and Plants (formerly GNIS)
SEV: GEVES Variety Study Department
SFR QUASAV: Federative Research Structure for Plant Quality and Health.
SNES: GEVES National Seed Testing Station
SNP: Single Nucleotide Polymorphism
SOC: French Official Service for Control and Certification of Seeds and Plants
SPAD: «Seeds and Plants for Sustainable Agriculture» government plan
SRAL: Regional Food Service (Ministry of Agriculture)
SSR: Simple Sequence Repeat
SUCSEED: Stop the Use of Cides in Seeds

T

TIRPAA: See ITPGRFA
TWA: UPOV working group for agricultural plants
TWC: UPOV working group for computer programs and statistics
TWF: UPOV working group for fruit plants
TWO: UPOV working group for ornamental plants
TWV: UPOV working group for vegetable plants

U

UPOV: International Union for the Protection of New Varieties of Plants
URGI: INRAE Genomics Research Unit
UFS: French union for seed companies & plant breeders
UMR: Mixed Research Unit
UMT Capte: Mixed Technology Sensors and Remote Sensing Unit

V

VATE: See VCUS
VCUS: Value for Cultivation, Use and Sustainability

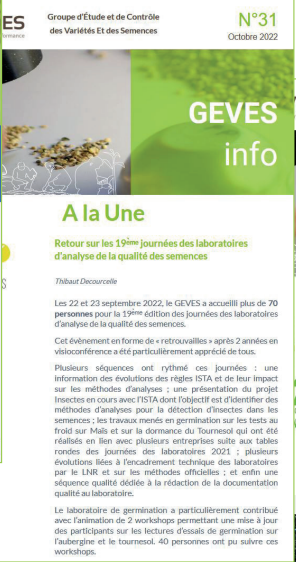
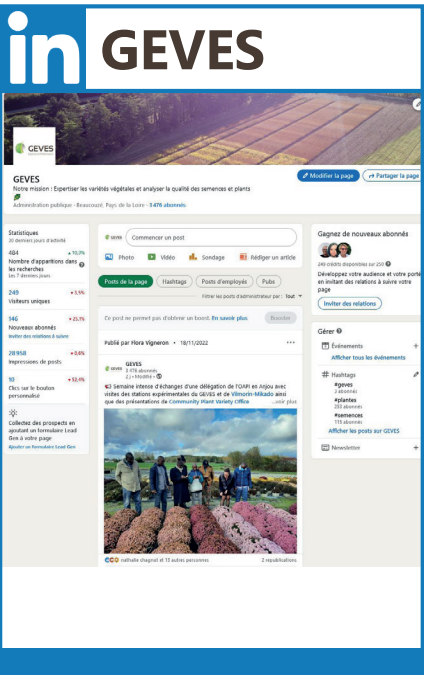
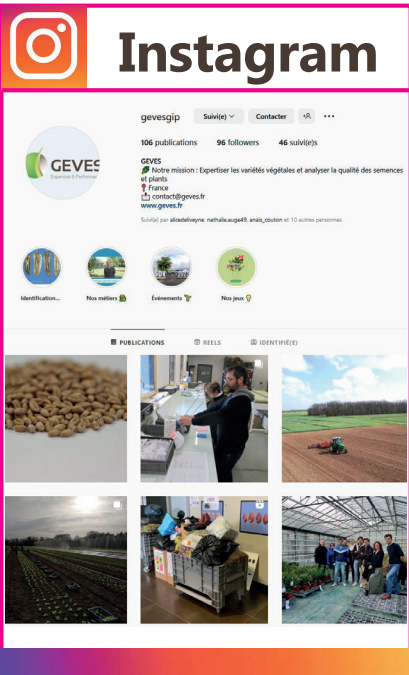
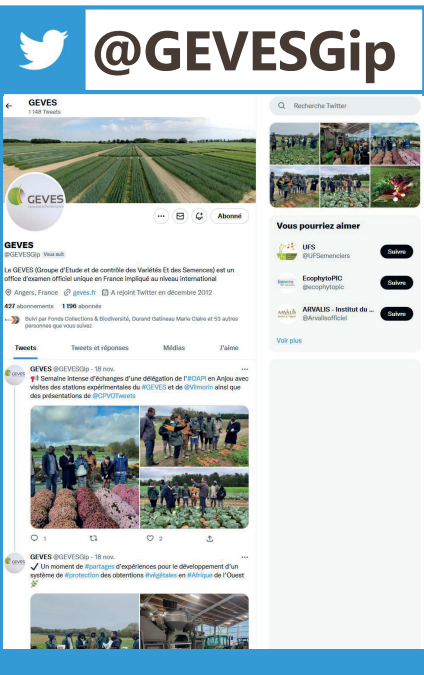
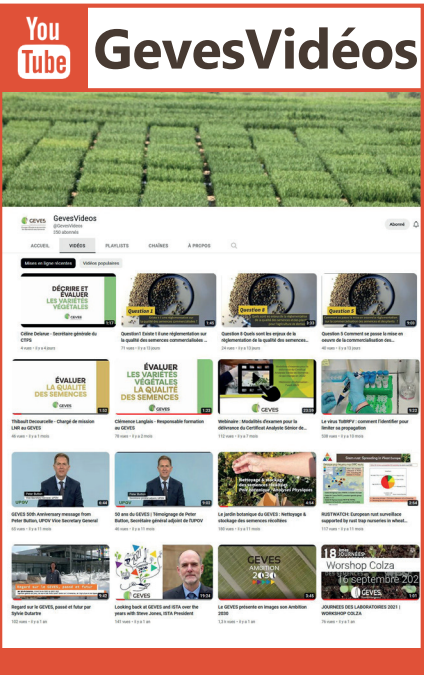
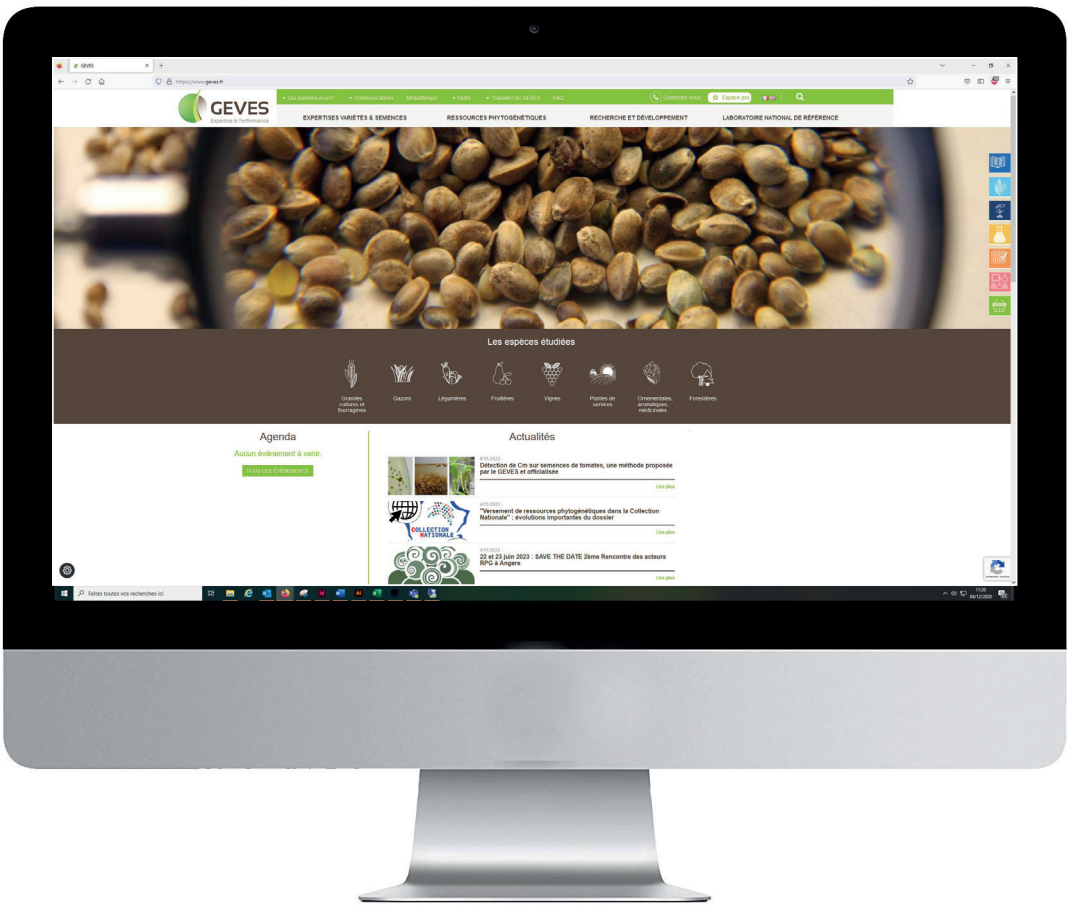
W

WYE: Work Year Equivalent

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