



# **Digital technologies in GEP Units**

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# Introduction

- **Article 54 of Regulation (EC) No 1107/2009 allows experiments /trials with plant protection products to be carried out in the MSs territories for research or development purposes. Each MS may impose limits and conditions under which these trials shall be performed in order to prevent any harmful effects on human or animal health and any unacceptable adverse effect in the environment.**

# **GEP System in Greece (1)**

- **The Authority responsible for the accreditation and inspection of the GEP Units is the Ministry of Rural Development and Food (Directorate of plant production protection, Department of plant protection products)**
- **While, Benaki Phytopathological Institute (B.P.I.) is the authority responsible for the assessment of efficacy trials (in the context of the evaluation of the biological dossiers)**

# **GEP System in Greece (2)**

The GEP (Good Experimental Practice) System consists of

- **Accredited GEP Units**
- **Employing qualified, experienced staff**
- **Using certified and calibrated equipment**
- **Performing efficacy trials according to validated Standard Operating Procedures (SOPs)**
- **Following the related EPPO Standards**

# **GEP Trials**

- **Design of the trial protocol,**
- **Finding the proper experimental fields,**
- **Field phase of the experiments,**
- **Collection of data,**
- **Assessment of data collected,**
- **Drafting of the trial report.**

# Trial Protocols

**GEP Directors are designing the trial protocol according to relevant EPPO Standards.**

## **General EPPO Standards**

- **PP1/181(5) - Conduct and reporting of efficacy evaluation trials, including good experimental practice, and**
- **EPPO PP1/152(4) - Design and analysis of efficacy evaluation trials**

## **Specific EPPO Standards**

- **Huge number of EPPO Standards are being designed by experts taking into consideration the category of plant protection products (fungicides, insecticides, plant growth regulators, etc.), target pest/pathogen/herbicide etc., crop**

# Conducting of trials - Collection of data

Field trialists, following the trial protocol, are responsible for the field phase of the experiments:

- Exploring and finding the proper trial location in terms of weather conditions, soil type, crop, infestation history of the area, etc.
- Applying pesticides using proper equipment and according to pesticide GAP
- Measuring crop emergence/ crop height/crop stage,
- Identifying weeds/insects/diseases/crop stress/plant growth/yield/fruit quality/etc.,
- Collecting all the above data, combining and sharing them with the GEP Director and the contractors.

# Assessment of data - Drafting of Trial Report

**GEP Director:**

- **Receives all data collected**
- **Assesses the data**
- **Drafts the trial report**

**The trial report will be presented to the evaluating authorities for acceptance.**

# Challenges of the current situation

- **Human based**
- **Difficulties faced in practice (weather conditions, practical difficulties)**
- **Visual rating**
- **Precision**
- **Subjectiveness**
- **Time-consuming**
- **Loses during transfer from field to the office**
- **New dose expression (LWA)**

# Technologies used the last years

During the last years, new technologies have appeared at the hands of the trialists, making their job more easy, accurate and transparent

- **Smart portable devices (smartphones, tablets) for :**
  - data entry
  - Photos
  - Weather forecasting
  - GPS for the exact trial location
- **Computer software programs for data analysis and assessment**
- **Internet (meteorological information, infestation maps)**

# **New Technologies (NT) tested**

**New technologies are tested from the GEP Units during the last period:**

- **Use of drones for mapping, exploring the surrounding area, taking photos**
- **Sensor-based traps for insect counting**
- **Computer software programs using business intelligence tools for data collection, data sharing, data assessment, and exporting trial reports**
- **Smartphone applications**

## **NT evolving rapidly**

**In the last years, new technologies are continuously developed and tested by private companies dealing with plant protection products, technology, equipment, and software programming. Some of them are presented in this workshop by the experts.**

**The main target is valid experiments of high quality, in accordance with GEP. Trials that will be accepted by the competent evaluating authorities during the plant protection product authorization process.**

# New Technologies (Pros)

- Reduce human involvement at all stages
- Are more accurate and objective
- Improve detection of crops, weeds, pests at early stages
- Reduce costs (training, transport, human resources)
- Less time consuming
- Enhance data quality
- Are transparent and traceable
- Make data transfer and sharing instant and precise.
- Updated tools for automatic analysis

# **New Technologies (Cons)**

- **Cannot replace human education, expertise**
- **Cannot be useful without proper users**
- **Increased training costs for keeping up with rapidly evolving NT**
- **Increased costs for acquisition and maintenance that sometimes small GEP units cannot cover**
- **Can lead to wrong results if not designed correctly**
- **May not be flexible and easy to adjust in case of unexpected events**
- **Overuse of new technologies may lead to harmful effects on the environment**

# Challenges by NT

## NT have to be:

- Well designed and developed
- Well tested
- Validated by experts
- Easily adapted to new practices and guidance
- Complaint to GEP rules

# Acceptance of new technologies

New technologies must be

- validated for their accuracy and efficiency by technology experts and agronomists,
- Incorporated to SOPs used by the units,
- Officially accepted by evaluating authorities through EPPO guidances

\* In my opinion, not all NT must be officially accepted by authorities. Widely and commonly used devices that are verified by their developer for their good operation (for example smartphones, tablets, meteorological stations, cameras, internet platforms) can be exempted.

# EPPO Standards

With new technologies evolving rapidly, giving GEP Units new digital tools for fastening and increasing their job quality, Panel experts seem to have a lot of work to do in the forthcoming period in detecting the needs for new EPPO Standards.

The question raised is whether this would mean:

- **New General Standards for digital tools**
- **Update and adjust the existing general standards (which is very challenging due to the different types of new technologies), or**
- **Update the various existing Specific Standards**

**Thank you for your time!!!**



## For information

- Email: [gep-contact@minagric.gr](mailto:gep-contact@minagric.gr)
- Website: Hellenic Ministry of Rural Development and Food  
<http://www.minagric.gr/index.php/en/farmer-menu-2/plantprotection-menu/plantprotproducts-menu>