

PP 1/332 (1) Principles for recording yield data when evaluating the efficacy of fungicides and insecticides

Specific scope: This Standard provides principles for when yield data are needed for fungicide and insecticide effectiveness and crop safety trials. These principles are also applicable for other types of plant protection products, such as nematicides and molluscicides, but not applicable to herbicides. This Standard is intended to be used in association with EPPO Standards of the series PP 1 *Efficacy evaluation of plant protection products*.

Specific approval and amendment: First approved in 2024–09.

1 | INTRODUCTION

Yield in the context of this Standard refers to both quantitative and qualitative yield. Depending on the situation, data for either or both of these yield parameters may be required. The criteria for assessing quantity and quality of yield are generally crop-specific and can be found in specific EPPO Standards in the series PP 1 *Efficacy evaluation of plant protection products*.

2 | GUIDING PRINCIPLES

2.1 | Yield assessments in effectiveness trials

2.1.1 | Pest counts or direct measurement of pest damage is feasible

If pest counts or direct measurement of pest damage is feasible, and a relationship exists between the need to control the pest and to benefit yield, there is no requirement to record yield data in effectiveness trials.

2.1.2 | Pest counts and direct measurement of pest damage are not feasible

For some pests, pest counts and direct measurement of pest damage are difficult or impractical to obtain. In these situations, yield data are required for effectiveness purposes. For certain nematodes it may be important to

measure yield to assess their impact on the crop. Examples of Standards in which yield data are included are PP 1/321 *Root knot nematodes (Meloidogyne spp.) in outdoor crops* and PP 1/322 *Root knot nematodes (Meloidogyne spp.) on fruiting vegetables in protected conditions*.

2.1.3 | Other specific cases

Other specific cases are as follows:

- For pests where the impact on yield is not already established, yield data should be provided to demonstrate that there is a beneficial effect from the use of the plant protection product.
- In some countries for certain pests, experience and scientific evidence may indicate that there is no overall yield benefit from control measures using a plant protection product, and so the national regulatory authority will not authorize the use of a plant protection product against that pest. Applicants are therefore advised to consult regulatory authorities and relevant national guidance on the importance of the proposed target(s) to that country. Where the pest status is disputed by the applicant, or there is evidence the pest status has changed, yield data should be provided to demonstrate if there is a beneficial effect on yield (quantity and/or quality).
- In instances of low levels of pest control or variable pest control, yield data may be required to show the benefit of the product.
- Where a plant protection product impacts yield, and a specific label claim is made e.g., ‘prolonging the retention of green leaf area’, then yield data are required to support the claim.

2.2 | Yield assessment in crop safety (selectivity) trials

As detailed above, crop safety data for different types of fungicides and insecticides is often derived from effectiveness trials, only occasionally coming from specific crop

safety trials. It is therefore important to determine the situations in which yield data from crop safety trials are required.

2.2.1 | Phytotoxicity

If phytotoxicity is observed in effectiveness or crop safety trials, this needs to be investigated further, and trial yields should be provided, unless a case for crop safety can be made (see EPPO Standard PP 1/135 *Phytotoxicity assessment*, table 1). Additionally, for some novel plant protection products e.g. plant defence inducers, it may be useful to assess if there is no adverse impact on the yield even if no phytotoxicity is seen.

2.2.2 | Measurements of quality and components of yield

For some pests on pome fruit, e.g., *Venturia inaequalis* (VENTIN), there may be an adverse effect on the

fruit i.e. russetting (this is separate to any symptoms of phytotoxicity) and assessment of harvested fruits is required. See EPPO Standard PP 1/135 *Phytotoxicity assessment* (section 10) for additional notes for individual crops.

2.3 | Harvested material for other assessments

For some crops it is important that harvested material is available for testing for 'other' crop aspects, e.g., taint, propagation, transformation etc. (see relevant EPPO PP 1 Standards on these aspects). This is not yield per se but rather a requirement for harvested material to be available for further testing, e.g., for PP 1/26 *Foliar and ear diseases on cereals* if a mycotoxin reduction is claimed then a quantification of mycotoxin content in harvested grains is required.

When yield data (quality or quantity) are required, reference should be made to PP 1/135 *Phytotoxicity assessment* (section 10) for details of what parameters should be measured.