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VEGETATIVE VIGOUR (OECD 227)

About the author

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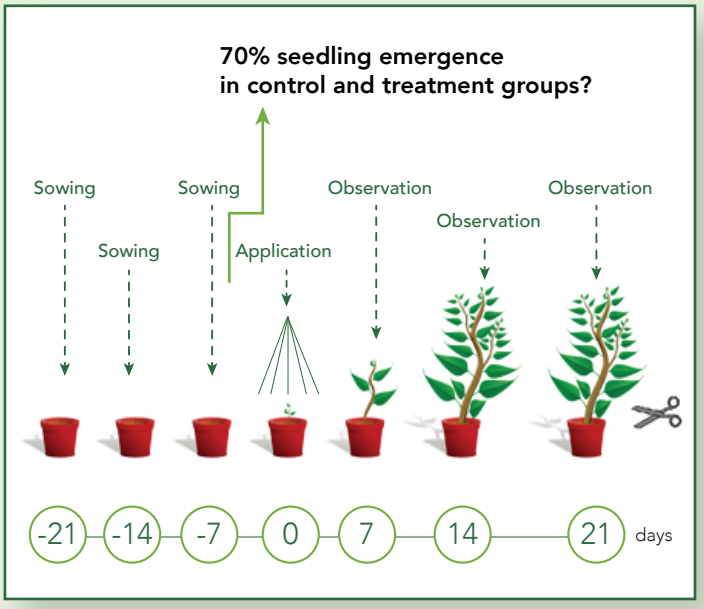
Minal is a Senior Research Officer in the Ecotoxicology Section. She has good experience of conducting aquatic and terrestrial studies. She has professional experience of more than 15 years.

Increasing agricultural production demands the use of chemicals like pesticides and insecticides. The over usage of these chemicals due to lack of knowledge has played havoc with the environment and human health.
It has several deleterious effects on crop production and hence, the toxicity of these chemicals should be assessed for appropriate use.

Agriculture is the dominating land-use in the EU member states covering nearly half of the surface area. Using herbicides to reduce weed competition in agricultural areas can adversely affect Non-Target Terrestrial Plants (NTTP) growing in field margins. According to the EFSA Scientific Opinion on NTTPs, an important protection goal is to maintain the biodiversity of plant species in agricultural areas. EFSA recommends including also non-crop species mentioned in OECD guidelines (OECD 208 and 227) in the testing and assessing not only vegetative but also generative endpoints during the plant life-cycle such as flowering and seed production.

The objectives of this study were to evaluate the feasibility of assessing generative endpoints of crop and non-crop species for NTTP regulatory testing under greenhouse conditions and to assess if generative endpoints are more sensitive than vegetative endpoints.

Recently, JRF has validated the effects of boric acid on terrestrial plant vegetative vigour growth rate response. The Vegetative vigour test is defined as the evaluation of the potential effect of the test item on higher plants during an early critical stage of their development in which the test item is sprayed on the plant and leaf surface (after 2- to 4-true leaves stage) with calibrated sprayer. An unexposed control group was kept for comparison.



Post-sowing, plants were observed daily for emergence and growth (seed up to 2-4 true leaves stage). Post-test item application, each replicate pot was observed daily for mortality and phytotoxicity for 21 days.

EVALUATION PARAMETERS

At the end of the study, the parameters monitored and recorded are as follows:

Shoot length was measured at test initiation prior to exposure. At the end of the test, individual lengths of plant shoots of surviving plants were measured. The shoot of each plant was harvested from the soil surface and then measured.

After shoot lengths were measured, plants were dried, cooled at room temperature, and weighed. Total plant biomass (i.e. dry weight) was measured and recorded.

OUTCOMES

Based on rate-response values for the shoot length inhibition, biomass inhibition, and survival of the plants, it can be concluded that boric acid application shows a rate-dependent inhibitory effect on the seedling growth of cucumber, mung bean, wheat, and corn plants.

References:

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