DISTRIBUTION OF SEEDS OF *MIMOSA INVISA* MART (GIANT SENSITIVE PLANT) IN SOILS AND FACTORS AFFECTING GERMINATION

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ABSTRACT

This study was conducted to investigate the distribution of seeds of *Mimosa invisa* in the soil seed bank so as to develop effective control measures against this noxious weed. The specific objectives were to examine the distribution of seeds of *M. invisa* in 0-30 cm of soil depth; and, determine the effect of acid scarification, boiling water treatment, heat treatment, pH, planting depth and brine stress on germination and emergence of *M. invisa* seeds

The experiments were laid out in a completely randomized design with four replications. Soil cores were collected from cultivated and fallow fields from the Nigerian Institute for Oil Palm Research (NIFOR) at three depths (0 – 7, 7 – 15 and 15 – 30 cm), processed and placed in germination trays 34 x 22 x 4 cm in the screenhouse for germination. Bulked seeds collected from oil palm plantation and fallow fields in NIFOR were used in investigating the effects of acid scarification, boiling water treatment, heat treatment, pH, planting depth and brine stress on germination and emergence of *M. invisa.* Data collected were subjected to analysis of variance and means compared using Least Significant Difference (LSD) at 5% level of probability, Shannon and Wiener index was used to estimate the weed species diversity.

Results showed that there were no significant differences in the seed populations of *M.invisa* between depth of 7 to 15 cm and 15 to 30 cm in both cultivated and fallow fields. Although only significant ($P<0.05$,Fcal. = 196.16) on 0 to 7 cm depth in the fallow fields, the distribution of *M .invisa* seeds follow the same trend in soils of cultivated and fallow fields, decreasing down the depth ($P<0.05$, Fcal. = 196.16). However, seeds of *M. invisa*

were significantly higher ($P<0.05$, Fcal. = 196.16) in fallow fields than in cultivated fields. Seeds of other weed species such as *Panicum maximum* Jacq., *Chromolaena odorata (L.)* R. M. King and Robinson, *Cyperus species, Aspilia africana* (Pers.) C.D. Adams and *Boehavia coccinea* Mill were found in the seed bank along with *M. invisa*. Shannon — Wiener diversity index showed that seeds of weed species were more diverse in the seed bank of cultivated than in the seed bank of the fallow fields. Percentage germination of *M. invisa* seeds treated with sulphuric acid were significantly higher ($P<0.05$, Fcal. = 1071.47) than those treated with hydrochloric and nitric acid at the different concentration rates of 0, 25, 50, 75 and 100%v/v of the acids used. Germination of *M. invisa* seeds was higher when seeds were immersed in boiling water for 2 minutes and no germination occurred when immersed in boiling water for 14 minutes. Germination of *M. invisa* increased with increase in temperature from 0°C (1.44%) up to 90°C (87%) and was totally inhibited at 110°C. *M. invisa* emerged better at soil depth of 0 cm (87%) and 5 cm (22.64%). *M. invisa* germinated over a wide range of pH (4 to 10), with the highest germination occurring at pH 6 (72.56%). While germination of *M. invisa* seeds was totally inhibited at 300 mM NaCl, over 80% germination occurred between 0 and 60 mM NaCl.

In conclusion, seeds of *M. invisa* in the soil seed bank were found distributed through the 0 to 30 cm depths studied. Other weed species were found in association with *M. invisa* in the soil seed bank and the weed species diversity was greatest in the cultivated fields. Acid scarification, boiling water treatment and heat treatment were all effective in dormancy release of *M. invisa* seeds. Emergence of *M. invisa* was best at a planting depth of 0 cm. *M. invisa* germinated over a wide range of pH and NaCl solutions.