

Emergence of Some Rainy and Winter Season Weeds from Different Soil Depths**S. K. Guru and Govindra Singh¹**

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Effective weed management requires knowledge of soil seed bank dynamics, germination pattern and environmental conditions suitable for seedling emergence (Fraud-William *et al.*, 1984). Weed seed bank affects the weed flora and its density because of the good relationship between the weed flora and the weed seed bank in the soil (Sousa *et al.*, 2003). Weed competition and density of weed seeds in soil vary greatly with the cropping history of the land and farming practices (Buhler *et al.*, 1984). Accordingly, germination as well as emergence of weed seeds from different soil depths is expected to vary greatly. In the present investigation, emergence pattern of some rainy and winter season weed species from various soil depths was studied.

Laboratory experiments were conducted in the Department of Plant Physiology, G. B. Pant University of Agriculture & Technology, Pantnagar with five weed species of rainy season (*Echinochloa colona*, *Celosia argentea*, *Caesulia axillaris*, *Cyperus iria* and *Leptochloa chinensis*) and four weed species of winter season (*Phalaris minor*, *Medicago denticulata*, *Melilotus indica* and *Vicia sativa*). Seeds were sown in small plastic pots (12 cm deep) at five different soil depths viz., surface (slightly pressed into the soil), 2.0, 3.5, 5.5 and 7.5 cm. The soil was oven-dried to kill pre-existing weed seeds, if any, in it. In each pot, 10 seeds of a single weed species were sown at the specified depth and each treatment had three replications. The pots were watered intermittently so as to keep the soil moist or saturated as per requirement of the different species. During rainy season, the pots were maintained at 30±2°C in an incubator. During the winter season, pots were kept at room temperature (maximum 20.8°C, minimum 5.8°C). Emergence of seedlings of individual species was recorded with the progress of time and the average values of three replications

were calculated.

Among the rainy season weeds, maximum emergence (32-33%) was recorded in *E. colona*, *C. argentea* and *C. axillaris* from the surface layers (Fig. 1). There was, however, a sharp decline in their emergence with increase in depth of sowing. Among the three species, seedlings of *C. argentea* were able to emerge from all the soil depths under study. However, the emergence was reduced to 6% at a soil depth of 6.5-7.5 cm. The emergence of *E. colona* was reduced to 10% at a soil depth of 5.5 cm, beyond which, it failed to emerge. On the other hand, seeds of *C. axillaris* failed to emerge from soil depths greater than 2 cm. Among the species, *E. colona* and *C. argentea* emerged faster (3-4 DAS) as compared to *C. axillaris*, which emerged after 14 days. Seeds of *C. iria* and *L. chinensis* did not germinate at all.

In case of winter season weeds, seedling emergence from the surface layers was maximum in *P. minor* (85%) followed by *V. sativa* (80%) and was lower in *M. denticulata* and *M. indica* (30-35%) (Fig. 2). In case of *P. minor*, there was a sharp reduction in emergence percentage with increase in soil depth, about less than 10% at a depth of 5.5 cm. Beyond that, it failed to emerge. On the other hand, in case of *V. sativa*, per cent emergence was found to be unaffected by soil depth. There was not much variation in the emergence of *M. denticulata* and *M. indica* upto a depth of 3.5 cm. At greater depths, however, their emergence was adversely affected. The emergence rate was found to be faster in case of *V. sativa* and *M. indica* (5 days after sowing, when sown in the surface layer) followed by *M. denticulata* (8 days after sowing) and *P. minor* (10 days after sowing).

In general, the emergence rate of rainy season weeds was faster as compared to the winter season weeds.

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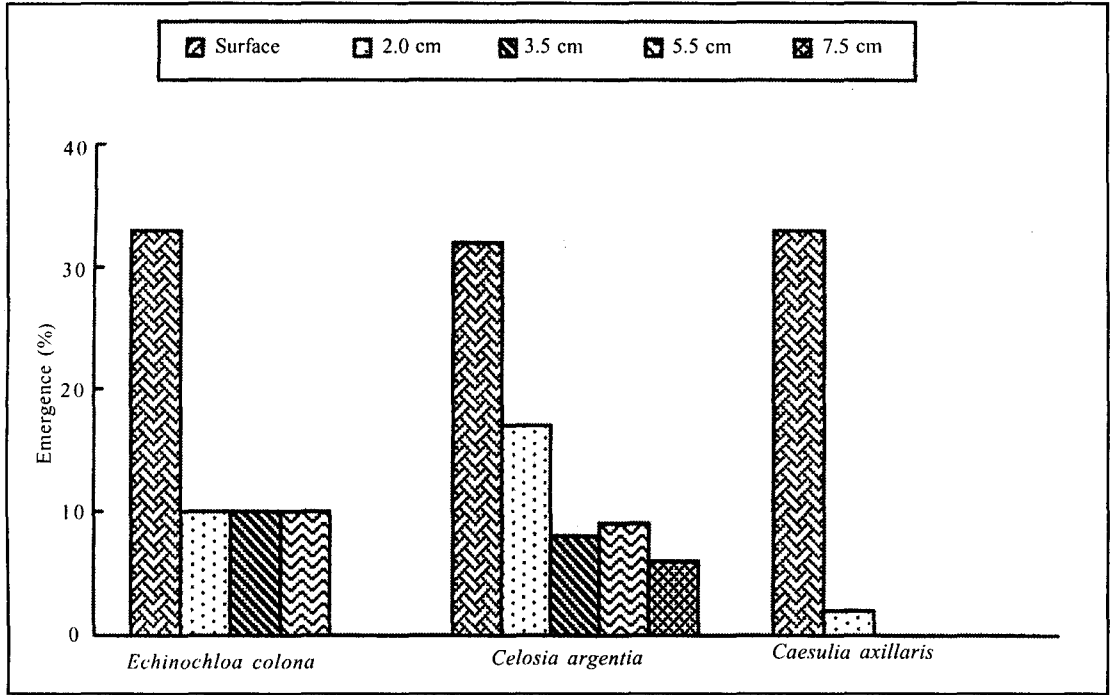


Fig. 1. Emergence of some rainy season weeds from different soil depths.

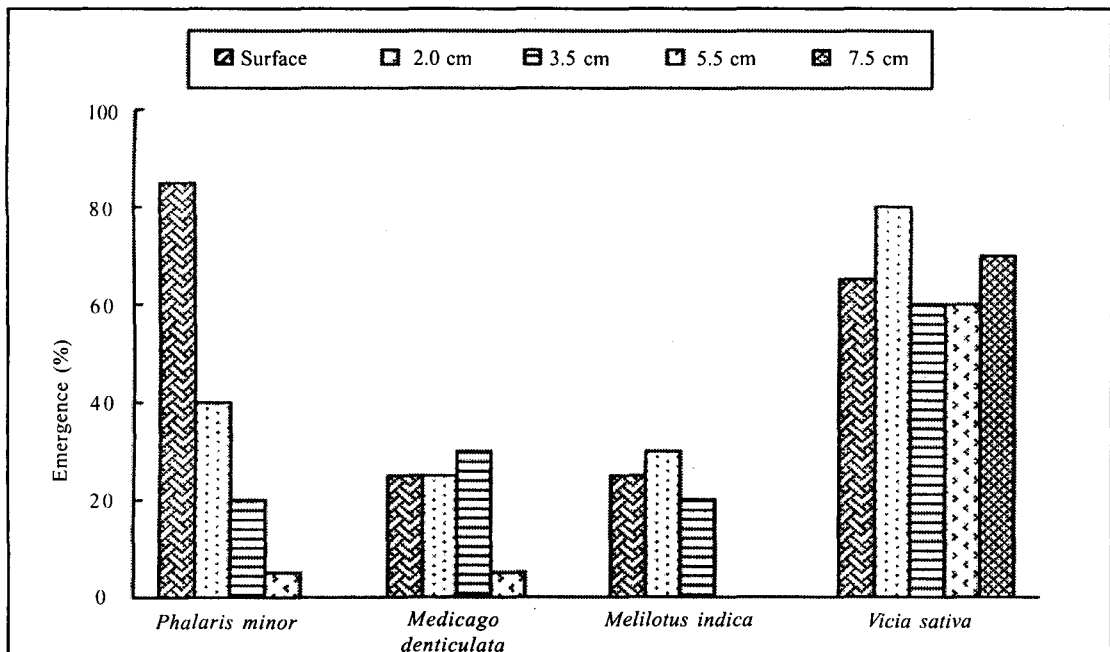


Fig. 2. Emergence of some winter season weeds from different soil depths.

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