

## **Abundance and distribution of weeds in seed banks of vegetable fields of Australia**

Sita Tiwari, Paul Kristiansen, Brian Sindel, Brenda Vo, Michael Coleman & Christine Fyfe

School of Environmental and Rural Science  
University of New England  
Armidale NSW 2351, Australia

Soil seed banks form a key source of weed infestation in vegetable crops as weed seeds can survive in the soil for decades and give rise to weed plants year after year. It is important to understand the overall weed seed bank status and dynamics to design effective weed management strategies. To study the size and distribution of weed seed banks in vegetable fields, a survey was carried out across seven States and Territories of Australia. Soil samples were collected from 36 vegetable farms to a depth of 20cm. Weed seeds for three depth categories (0-5 cm, 5-10 cm and 10-20 cm) from each farm were counted using the seedling emergence method and identified to species or genus level. A total of 43 dicotyledonous and 20 monocotyledonous species were recorded in soil seed banks. The five most widely distributed species were *Portulaca oleracea*, *Chenopodium album*, *Solanum nigrum*, *Polygonum aviculare* and *Echinochloa* spp. which were reported in 39, 33, 31, 28 and 28% of the survey sites respectively. Northern Territory farms had the largest seed bank ( $4,254 \pm 2,452$  seeds  $m^{-2}$ ), while Victorian farms had the smallest ( $925 \pm 179$  seeds  $m^{-2}$ ). *P. oleracea* was the most abundant species with a mean seed bank density of  $466 \pm 236$  seeds  $m^{-2}$  followed by *Eleusine indica* ( $333 \pm 308$  seeds  $m^{-2}$ ), *Echinochloa* sp. ( $183 \pm 82$  seeds  $m^{-2}$ ), *C. album* ( $161 \pm 69$  seeds  $m^{-2}$ ) and *P. aviculare* ( $157 \pm 70$  seeds  $m^{-2}$ ). On an average, dicotyledonous weed species were more abundant ( $1370 \pm 272$  seeds  $m^{-2}$ ) than monocotyledonous species ( $1221 \pm 378$  seeds  $m^{-2}$ ). Monocots were most abundant in the top 0-5 cm layer ( $1,897 \pm 1042$  seeds  $m^{-2}$ ) while dicots were most abundant in the 5-10cm layer ( $1,891 \pm 728$  seeds  $m^{-2}$ ). The preliminary results indicate that weed management strategies in vegetable crops be focused more on depleting the seed bank on the top 10 cm layer.

Key words: seed bank density, dicotyledonous, monocotyledonous, soil depth