

SURVIVORSHIP AND SEED PRODUCTION OF *MELILOTUS INDICA* ALL. POPULATION IN WHEAT FIELDS

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Survival and seed production of *Melilotus indica* All. was studied in a wheat field. 63% mortality of seedling population was observed in the first two weeks and the established plants showed 100% survivorship until senescence. Although the established plants exhibited considerable plasticity rather than mortality in response to the competition for light and nutrients with wheat plants, yet they produced sufficient number of seeds for the next growing season.

Keywords : Competition; Seed production; Survivorship; Weed.

Melilotus indica All. is a dominant weed of rabi crops of North-West region of India belonging to sub-family papilionatae of leguminosae. It infests the established wheat crop and its population density remains so high that it may reduce the crop production substantially. In the present study an attempt has been made to evaluate the survivorship and seed production of *Melilotus indica* in wheat field.

Seedlings of *M.Indica* emerge usually four days after the first irrigation of wheat crop and complete their life cycle upto the first week of March when wheat crop is ripening. The study was carried out in an agricultural farm on Pushkar Road near the Regional College of Education (NCERT), Ajmer. From a part of the study site wheat plants were removed and six permanent quadrats of 1M² size were laid. In three quadrats wheat plants were allowed to grow and in other three wheat plants were removed. A cohort of *M. indica* seedlings was marked in each quadrat in the month of December after 20 days of wheat sowing

and four days after first irrigation of the crop. The seedlings were labelled with the help of wax coated tags and their fate was followed at weekly intervals. The height of *M.indica* plants was measured 10,25 and 40 days after the emergence of seedlings and seed production was estimated in the first week of March.

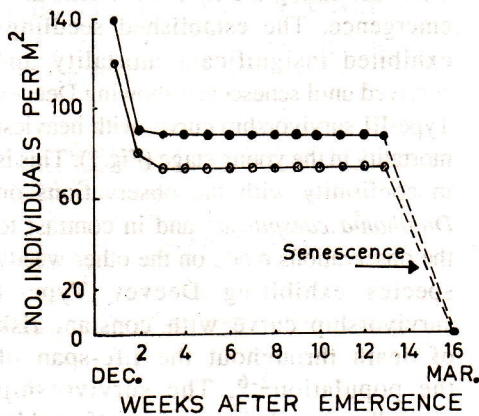
The seedling population of *M.indica* experienced heavy Juvenile mortality and 63% of the seedlings in both the treatments were lost during the first two weeks after emergence. The established seedlings exhibited insignificant mortality and survived until senescence showing Deevey Type-III survivorship curve, with heaviest mortality in the young stage (Fig.1). This is in confirmity with the observations on *Danthonia caespitosa*¹ and in contrast to the observations made on the other weedy species exhibiting Deevey Type-II survivorship curve with constant risk of death throughout the life-span of the population²⁻⁶. The survivorship of seedling population was not affected by

Table 1. Seed production by *Melilotus indica* plants when grown with and without wheat. (\pm SE)

Parameters	Grown with wheat	Grown without wheat
Number of inflorescence per plant	19.1 \pm 2.8	66.4 \pm 17
Number of pods per inflorescence	11.2 \pm 1.4	14.8 \pm 0.8
Number of pods per plant (one seeded)	228.5 \pm 65.5	973 \pm 244
Number of seeds per M ²	20110 \pm 1520	73621 \pm 6886

Table 2. Height (cm) of *Melilotus indica* plants when grown with and without wheat. (\pm SE)

Days after emergence of seedlings	Grown with wheat	Grown without Wheat
10	2.24 \pm 0.05	2.24 \pm 0.05
25	3.05 \pm 0.27	2.75 \pm 0.07
40	12.66 \pm 0.72	8.61 \pm 0.39

Fig. 1. Survivorship of *Melilotus indica* plant population when grown with wheat (○) and without wheat (●).

the wheat crop because wheat plants were at the first leaf stage. So the competition between wheat and *M. indica* was not an important factor at this stage (Fig. 1). The established plants of *M. indica* survived the whole growing season in both the treatments. However, there was considerable reduction in the seed production of *M. indica* grown with wheat plants (Table 1). The weed plants showed greater plasticity instead of mortality under competition stress caused by wheat plants. The competition between wheat and *M. indica* plants was mainly for light and nutrients. The greater height of *M. indica* plants when grown with wheat suggests the severity of competition for light (Table-2). Nevertheless, the production of 20110 seeds per M² under conditions of severe competition indicates the ability of the weed to survive in the wheat fields. The perpetuation and recurrence of *M. indica*

population in wheat crop may be due to its following characteristics:

1. *Melilotus indica* completes its life cycle before the wheat crop matures so that sufficient amount of water remains in the soil because of irrigation.
2. The established plants of *M. indica* exhibit greater plasticity rather than mortality in response to competition stress when grown with wheat.
3. The ability of *M. indica* to produce enormous quantity of seeds even under competition stress conditions.

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