CHAPTER IX

SUMMARY
Weeds are the great problem of crop fields. They retard plant growth through the production of some allelochemicals and reduced the quantity and quality of food by competition. Thus it becomes necessary to keep crop fields, free from them. Weed control programme requires a detailed knowledge of the flora of particular field and ecological life histories of the weeds. These informations help the farmer to select proper herbicide for that field as well as exact time of application of these herbicides.

Phytosociological studies indicated that *A. longifolius*, *C. benghalensis* and *Cyanotis axillaris* are the dominating species of 'Kharif' season in the area as they have high frequency and density. However, 'Rabi' season was dominated by *Malilotus indica*, *Anagallis arvensis*, *Asphodelus tenuifolius*.

The autecological observations indicated that this is a short cycle weed competing its whole life cycle within 4-5 months starting from June-end to mid-November. Seeds contained dormancy of about 2-3 months. This was due to after-ripening of seeds. It also contained the seed coat (fruit cover) dormancy as germination improved while fruit cover scarified by mechanical or chemical means. It is impermeable to water. Best germination of *A. longifolius* seeds was obtained at 35°C with storage of seeds at high temperature (45°C) during dry storage. Low temperature treatment has a harmful effect. Washing improved germination of seeds indicated presence of
some germination inhibitor within the seed body. Crop root exudates improved germination of weed. Seeds remain viable for more than 32 months studied.

Plants showed best growth performance in loamy soil and needed adequate water for luxuriant growth as it showed best growth performance in daily irrigation. It appeared as a calcicole species and showed better growth performance with an increased level of calcium in the soil. It is slightly salt loving plant. It could not tolerate high level of nitrate. Frequent clipping is effective to control its vegetative growth.

Different plant parts of the weed had inhibitor but the potentiality of allelochemical was maximum within the seed. Seed leachate of *A. longifolius* retarded germination and seedling growth of various crops and weed seeds. It also checked its own population at high concentrations through seed leachate but at diluted condition promotory effect was observed for self seed germination as well as radicle growth.

As being one of the most dominant weed of the fields, its competition effect was also severe. The cover, duration of competition and density of weed plants is directly proportional to severity of competition. The critical period of competition was observed for 2 to 6 weeks in groundnut
while it was 4 to 10 weeks in sorghum, after crop sowing. The percentage reduction in yield also increased with increased weed density and reached maximum at crop : weed combination of 1:5 per pot. Weed plants emerged late in the crop field did not cause any appreciable reduction in the production. However, plants emerged simultaneously with crop or only a few weeks later were able to low down the yield which was 57.14% and 58.18% in *A. hypogea* and *S. vulgare* fields respectively. It was concluded on the basis of pot experiments that different weeds had differential competitive ability and it depended with which crop they are competing against. *C. axillaris* appeared as the poorest competitor for both the crops studied. *A. longifolius* was the main competitor of *A. hypogea* while *C. benghalensis* did the same for *S. vulgare*.

MCPS was found to be the most deleterious herbicide used against *A. longifolius*. Here germination and seedling growth was totally checked at 100 ppm. Simazine was found to be herbicide with least harmful effect to *A. longifolius*, inspite of this it also promotes the weed growth at very low dilutions. Other weeds like *M. indica, V. hirsuta* and *V. sativa* were most susceptible for EPTC. Application of chemicals at younger stages proved to be useful in comparison to mature plants. It was observed that susceptibility decreased as the plants became older. Plant showed abnormal morphological features while sprayed with post-emergence herbicide. Leaves showed
epinasty, chlorosis and some white or black spots on their surfaces. Stem showed swelling at nodes. The growing tips of branches were curved downward.

**Salient features of the present work:**

1. Weed flora of groundnut and wheat fields was studied.
2. Seed germination of *A. longifolius* in relation to different germination controlling factors was studied.
3. Probable causes of dormancy and methods of breaking it were examined.
4. Growth performance of *A. longifolius* in relation to different environmental conditions was observed.
5. Effect of seeds and various other plant parts leachate on seed germination and seedling growth of associated 'Kharif' crops following 'Rabi' crops and on some weeds was recorded.
6. Competition became severe as the cover, density and duration of competition was increased.
7. Competition was greater when two different but ecologically allied species were competing (interspecific), than the competition existed in between individuals of the same species (intraspecific).
8. *A. longifolius* was the main competition of *A. hypogea* while *C. benghalensis* of *S. vulgare*. 
9. The strong competition of *A. longifolius* was
   *E. geniculata* while *C. axillaris* was the weakest.

10. Lethal doses of all the tested herbicides were obtained
to be different for different weed species.

11. EPTC was the most effective herbicide used.

12. Lethal doses of *MCPA, MCPB, EPTC, Alachlor* and *Simazine*
for *A. longifolius* were 100, 500, 250, 1000 and 1000 ppm
respectively.