

Weeds of Cultivation

‘Weed’ is a very common and popular word in the English language, generally meant for unwanted plants on a crop-field, but is used with a much variable cases to indicate ‘unwanted’, ‘weak’, ‘unrelated disturbing element’ etc. In linguistics even man in some profession are sometimes referred to as weeds. However, in plant science, particularly in its applied branch Agriculture, the word refers to a large array of unwanted plants growing in the fields of cultivation.

3.1 What is a Weed?

Weeds are unwanted and unappreciated plants growing within the cultivation of a particular crop plant. Even if a paddy plant grows in the wheat field – that will be regarded as a weed. So, any other plant, if not grown purposefully, interfering with the growth and yield of a cultivated crop-plant, whether useful or useless, are treated as weeds. And, for the improvement of the cultivation of any crop it is essential to remove weedy plants from the land under cultivation.

They grow in the fields where they generate formidable competition with the cultivated plants for nutrients, space, air, light, moisture particularly during drought and thus reduce crop yields. Weeds harbour insects and diseases for which they serve as alternate hosts. These apart they restrict the normal development of crop plants due to growth of creepers and thorny weeds.

However, the word ‘weed’ is also referred to numerous other plants, growing any where and is disturbing our normal activities, including our health. *Parthenium hysterophorus*, an exotic but widely naturalised herb, growing abundantly almost everywhere, is much hazardous to our health and is one of the commonest ‘exotic weeds’ in the warmer parts of this country.

Ill effects of weeds are greatest in agriculture as they form an important factor in the management of land and water resources for crop production. The losses caused by weeds exceed the total loss from any other type of agricultural pests like insects, nematodes, diseases, rodents etc. (Subramanian *et al* 2005). Of the total annual loss of agricultural produce from various pests in India, weeds account for 45%, insects 30%, diseases 20% and other pests 5%. In hybrid maize, in the early stages of crop growth the weeds remove nine times more of Nitrogen, ten times more of Phosphorus and seven times more of Potassium (Rajan & Sankaran 1974).

3.2. Sources of Weeds

Weeds are neither strangers nor a special group of plants, which grow only in cultivated fields. In fact, most of these plants are coming from the local vegetation growing naturally around the agricultural land (Ghosh *et al* 2004; Subramanian *et al* 2005). The environment in a crop field is not at all hospitable for the growth of other plants. But, weedy plants can survive there due to their wide adaptive features and broad ecological amplitude. Their efficiency for very high rate reproduction, tolerance to extreme disturbances, quick dispersal methods, variable periods of dormancy in seeds, etc. made them successful in competing with the cultivated plant in the field. Climate in major parts of India encourage the growth of therophytic plants. And, most of the weeds are therophytes and early reproducers.

3.3. Concern for Weeds

Weeds cause loss of crop production. As early as in 1938, Luthra calculated the loss upto the 30% of expectation in Punjab. But, sometimes it increased to the extent of nearly 90% of expectation (Tiwari 1953-'54; Thakur 1954). These plants create or modify the habitat in such a manner which does not favour the proper growth of crop plants by utilising space and nutrients for their own growth. Like all other crop fields, Tea Gardens are also greatly affected by weeds and causing qualitative and quantitative loss of crop (Mustafee 1981, 1998; Ghosh *et al* 2004).

From this type of observation different workers realised the importance of studying ecology of weeds [Pammel & King 1910; King 1966; Datta & Banerjee 1976; Datta & Chakraborty 1983]. Ghosh *et al* (2004) listed the harmful effects of weeds in the following manner:

1. In young tea, weeds remove as high as 270 kg Nitrogen per ha.
2. Some species of weeds serve as hosts for pests (Red spider, Tea mosquito bug, Root knot nematode, etc.)
3. Eden (1961) reported 9 % crop loss due to soft weed competition in tea in Sri Lanka
4. Cramer (1967) estimated (14-15 %) crop loss in tea world wide due to weeds

5. 6 – 12 % crop loss due to competition by weeds in South India [Venkatramouni 1964]
7. Weeds compete with crop not only for nutrients but also for moisture and light
8. Some weeds grow on tea bushes absorb nutrients and fuse with the tissue of tea plants
9. Epiphytic ferns and orchids also affect tea plants due to their luxuriant growth
10. Some weeds, specially climbers, grow over the tea bushes and reduce the speed of plucking
11. The foetid smell of some weeds can also reduce the quality of tea; etc.

Realising the problem numerous workers, round the globe, given much thought over the effective control of weeds in different crops (Takur 1954). Weed control in tea is also studied by many workers including Sharma (1977), Sharma & Satyanarayana (1978), Rahaman (1975), Mustafee (1988, 1994, 1998) and others.

3.4. Need for Surveying Weed Flora

Realising the problem many authors, in different times, tried to explore the weed flora in different crops [Salisbury 1942; Chakraborty 1957; Datta & Maity 1964; Tripathy 1964; Mahapatra *et al* 1965; Baker 1972; Sharma 1978, 1981, 1983; Neogy & Rao 1980; Datta & Chakraborty 1983; Hore *et al* 1985; Acharyya *et al* 1997; Bandopadhyay 1972]. Tea gardens are also much infested in weeds specially in Northeast India (Mustafee 1972, 1988). Late Prof. A.C. Datta (of Cotton College, Gowhati) established one rich and beautiful 'Tea-Weed Herbarium' at the Tocklai Tea Research Centre at Jorhat, Assam. (Dutta 1983)

Not only in this Eastern and Northeastern part of the country, similar works have been done also in the Nilgiris. In all these areas existences of a rich flora inside the plantations (Harikrishnan 1978; Ramachandran 1978; Haridas & Sharma 1972; Haridas & Venkataramani 1972; Rahman 1975) have been recoded.

There is much difference between the floras of Assam or other states of Northeast India and Darjiling (including Terai) and, it is expected that the weed flora also will be quite different as weedy plants come mostly from the local floras and enters the crop field through different channels. So, it should be the first duty to explore the weed flora of these tea gardens to prepare a proper management plan.

Weeds are neither strangers nor a special group of plants, which grow only in cultivated fields. In fact, most of these plants are coming from the local vegetation. But, they can survive in the tea gardens due to their adaptive features and broad ecological amplitude. Most of the weeds are suppose to be high reproducers i.e. with high reproductive potential.

A sound knowledge in the weed flora for different crops in a region is extremely important basically for weed management. The strategies for weed management should be crop friendly in one hand but should be effective against weeds. And, not only is the flora, proper knowledge on the phenology, methods of dispersal, mechanism of pollination for different weed species also extremely important for this purpose.

3.5. Usefulness of Weeds

Weeds of agriculture are no doubt harmful. But, many of these are also having some beneficial effects or aspects [Fukai 1940; Fox 1942; Ghosh *et al* 2004]:

1. Weeds minimise the force of falling raindrops
2. Check soil erosion on sloping land mainly in hilly terrains
3. Many weeds have medicinal importance
4. Some of the weeds used as food and fodder
5. Weeds add good amount of humus into the soil
6. Weeds retain the actual soil structure or even improve the situation
7. Some weeds fix atmospheric nitrogen in soil
8. Weeds help to maintain a balanced structure of ecosystem
9. Some weeds provide food and shelter for numerous local animals; etc.

So, weeds are not useless plants. They are useful not only for the proper maintenance of ecosystem but also for the human society.