Preface

Plants are devout gift of nature to this aquarius planet earth and endowed with amazing capability to secure the sustained supply of food to mankind. It is a grand old saying “We come on this earth as guests of plants”. Since the beginning of the human race man has completely been dependent on the plants and progressively with the developing civilization, he has learnt to exploit the natural resources and make use of every bit of it, plants might have been the earliest companion of man and would have satisfied his every basic need, the hunger. It is actually the endeavour of man that he is able to control the plants and can extract food from them. Food, shelter and clothing are the three fundamental requirements of man’s life, of which food is the most important. The cultivation of food plants started on the day when the ancient man collected and stored the seeds of certain plants for sowing in the next season. Since then the agriculture and the list of food plants has progressively increased to an astonishing extent. Today man can grow the plants in a desired way, improve the variety and quality of the plants and can save them from various harmful agents, thus making them fit for his consumption. In fact from the start of life to the last breath, almost every aspect of life is deeply associated with plants. The food which is of prime importance for sustaining the life, comes directly from plants.

Rapid increase in human population has necessitated maximum production from crop in existing agricultural lands. For securing maximum crop production, intensive cultivation and latest methods of crop husbandry is most essential to put in to practice. Agriculture is the growing food crops under controlled conditions. The science of agriculture is one of the best examples of applied ecology. Agroecosystem is a man-made ecosystem for crop production. India with 2.4% of world’s geographical area is sustaining about 16% of the global population. India has emerged from a food deficient to a self sufficient status with three-fold increase in food grain production (Bhan and Kumar, 1998).
Agriculture in India is one of the important economic sectors after independence. Agricultural production has been brought about by bringing additional area under cultivation, extension of irrigation facilities, use of better seeds, modern techniques, water management and plant protection. Agriculture contributes a major share in the GDP of the country. The direct share of agricultural and allied sectors in total exports is around 18%. Today India has attained self-sufficiency in food grains sector. The per capita availability of a number of food items in India has increased significantly in the post-independence period despite of increase in agriculture. In order to increase the agricultural production for economic development the governments both central and state have played active role.

Weeds are certainly as old as agriculture, and from the very beginning, farmers realized that the presence of those unsown species interfered with the growth of the crop they were intending to produce. Weeds play a very important role in the productivity of crop vegetation. A weed is plant growing at a place where it is not desired or a plant out of place. Weeds are defined as any useless or troublesome plants which occur without intentional cultivation (Jackson, 1958). Weed, in context of weed crop ecology, is a plant that originated under a natural environment and in response to imposed and natural environment, evolved and continues to do so, as an interfering associate with our crops since the beginning of agriculture and weed infestation is one of the major causes of yield reduction in crops. This recognition led to the co-evolution of agro ecosystems and weed management. Competition between the undesired plants and the crop was to be avoided if reasonable yields were to be achieved. While growing with the crop plant, weeds compete for light, water, space and nutrients with crop plant thus hampering healthy growth and production of the crop. Majority of weeds and crop plants have similar requirements for their growth and development. Weeds cause drastic reduction in crop yield, harvesting is made difficult and soil structure gets affected. The crop seeds get mixed up with weed seeds and considerably reduce the market value of crops. Weeds have always been a great nuisance to the farmers as they not only lower the cost yield but increase the cost of operations as well.
Most of the studies pertaining to yield reduction by weed infestation arbitrarily attributed the yield loss to be due to competition by weeds up to the first half of twentieth century without assigning proper evidence (Rice, 1984). Major losses about 90% are observed in the crops where weeds are allowed to grow along with the crop till harvesting. The yield and quality of crops may be hampered by weeds on a large scale. An eradication of weeds, therefore, either by destruction or prevention of their multiplication is must for better growth and productivity of the crops. On account of this, present work was undertaken to understand the soil condition, floristic composition, phytosociology, rate of primary production and energetics in fully weeded, partially weeded and unweeded conditions of selected crop-fields which display the ecology of crop-weed competition.

Plants occurring in experimental crop-fields were identified and listed in the Table 4.1: with their phenological stages during the crop period following the binomial system of nomenclature. Authorities of the plant names are also given associated with them. Repetition of authorities associated with listed plant name has been avoided in the thesis except few unlisted plants.

Biomass and rate of production for crops and weeds have been estimated separately which give overall picture of experimental cropfields with respect to their usefulness.

Estimation of energy in colorific values for crops and weeds has also been done which reveals the usefulness of experimental cropfields in all the three weeding conditions.

This thesis embodies general introduction appraising the earlier findings and plan of present investigation included in Chapter I followed by site description in chapter II and physico-chemical characteristics of the soils in the chapter III. The floristic composition and phytosociological studies have been described in the chapter IV. It is followed with the account of the plant biomass and net primary productivity measurement of experimental crops in the chapter V and chapter VI deals with the crop-weed ecology of selected agroecosystems while chapter VII describes the energetics of
selected agroecosystems. Finally the entire work has been summarized in the chapter VIII. List of references related to the work are given at the end of the thesis. In working out this research problem, I got the guidance and requisite help from different persons in various ways and the same are acknowledged in the beginning of the thesis.

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