# INTRODUCTION

## - o - INTRODUCTION - o -

The pesticides contaminate the entire ecosystem especially freun water marine and edaphic systems. some of the organochlorine pesticides dissipate faster in soil. More than 90% of dissipation occurs in one crop season and almost completely by the next season (Katnpal 1988). Some of the insecticides leave no residue at all. Some organophosphorus pesticides also disintegrate completly after a few months and carbomate insecticides leave only trace of residues. The inorganic materials like lime, arsenic, wood ashes etc., besides organic mixtures such as asphalt, tannins, vinegar, paris green an arsenic compound was used in 1865 against colarado potato beetle followed by lead arsenate in 1885 used as an orchard spray (Gangawane and Deshpande 1985). The use of principal pesticides such as sulphur arsenicals, plant products like nicotine, pyrethrum and oils, resins etc. Came into existence during 1890 to 1920. From 1920s to the early 40s the above mentioned pesticides with improved preparations were in use (Boyce 1976).

In India 126 insecticides are manufactured, out of which 24 fungicide, 54 different pesticides. Food and Agriculture organization India report India consumes only 0.2%. Pesticides of total production. In U.S.A. and Canada 35% and In Japan 9% pesticides. When we spray pesticide on plants 0.1% pesticide

is enough to kill the pest and 99.9% will be waste thrown out in environment and this causes pollution and also harmful to human health hazards. The pesticides which are plant originated not poisonous to human being.

The birth of modern insecticide occured during world war II begining with DDT, which opened a new vista and philosophy for development of synthetic organic compounds as pesticide This was soon followed by the discovery of BHC. Schrader's discovery of organophosphorus materials of which became available after world war II and chlorinated hydrocarbons by Diels-Alder reaction greatly stimulated chemical methods of pest control. Gradually other groups of pesticides were developed for commercial use and newer products are continually appearing in the market. The relatively stable, long lasting broad spectrum organochlorine pesticides were most effective, but have several disadvantages with respect to deleterious effects on the environment and brought most of them into disfavour and hence partly replaced by organophosphorus and carbonate pesticides.

DDT is a common contaminant in water and it has been estimated in quite appreciable concentrations (Pillai and Aggrawal 1979). Pesticides are also estimated in air and rain water. Organochlorine pesticides contaminate the food and other commodities also. The pesticides which are commonly

used are carbaryl endosulfan, synthetic pyrethroids, dimethoate, fenitrothin, malathion, methyl parathion, monocrotophos, phosphamidon, quinolhpos and some antibiotics. Normally thin skinned vegetables are highly affected. They accumulate pesticides above the maximum permissible levels.

Although in India, less amounts of pesticides used in vegetable and fruits, the amount found to them is quite high compared to western countries, where lot of pesticides are used. Yet so little or only traces are estimated in the vegetable and fruits (Kathpal et al, 1981, Buchel, 1983) In order to meet the needs of human population most of the land has been utilised to accomodate them which has resulted in agricultural set back. This set back has been improved by introducing new high yielding hybrid varieties of crop plants. However, unfortunately most of them have been proved to be very susceptible, to different types of pests. Now to control these pests, pesticides are the main weapons in the farmers armoury of defence and hence the use of pesticides has become customary.

According to wood et al (1969) the problems of pest control have been trust on us in a new and much more difficult way than in the past. This is because some pesticides have proved to be poisonous to humans and warm blooded animals (Duggan and Duggan, 1974) and have caused many deaths, usually through improper or careless use. There have been many epidemics of poisoning by pesticides in foods. In USA in 1970 there

were about 275 accidents during aerial spraying of pesticides involving 30 deaths (Green et al 1987).

In the developing countries, particularly the illiterate rural people use the pesticides indiscriminately, unmindful of the concept of time,(time of harvest), space (quantity/acre) and quality. This has posed a great danger to humanity. According to a report of central Bureau of investigation (CBI) Government of India, 4536 persons died in 1965 alone on account of carelessness in handling poisonious substances (Viswaswaraiah et al, 1975). Shinde (1979) has also reported 104 deaths in Kerala occured, due to the consumption of organophosphorus contaminated wheat by spillage. The people suffered from retching and vomitting on consumption of food on banana leaves sprayed with copper sulphate in Kerala (Shinde 1979) and an out break of epilepsy among over 150 people (Hindu 1976) in Sitapur, Lakshmipur, Kheri and Hardoi districts of U.P. due to eating wheat mixed with BHC has been reported. Apart from this, though irrefutable evidences of damage to humans caused by residues of DDT picked up from commercial foods appears still to be lacking there are clear indications that DDT will passt the placental barrier and appear in new born children (Wassermann et al 1965). DDT stimulates production of the female sex hormone oestrogen and certainly affects the sex harmone of birds and rats. The

greatest human tragedy has occured due to leakage of methyl isocynate from storage tank of Union Carbide Company, Bhopal (India) causing more than 3,000 fatalities and blindness to number of people (Gopala Krishnan and Kavi, 1984). Of course this accident was not due to consumption of pesticide but due to carelessness of pesticide manufacturing company.

Another problem caused due to pesticides is contamination of total environment by the entry of pesticides into a variety of cycles in soil, air, water and food. It is obvious that only a minute fraction of the pesticide applied is required for supression of the target pest. The remainder 99.9% is essentially wasted and enters the environment in a variety of ways (Metcalf 1986).

Another serious problem has been the development of resistance in pest populations to pesticides and the rapid resurgence to other pests after chemical treatment. These problems combined with the distruction of vast number of valuable parasites, predators, pollinators and other useful arthropods by pesticides, made it clear that the time has come to face the threats posed by excessive use of pesticides. According to Hussey and scopes (1985), leaf miners, aphids and white flies possess genes conforring resistance to the wide range of chemicals applied to control them. Inconveniently, such new 'strains' appearing more rapidly than man's ingenuity can develop new compounds.

In case of green alga like scenedesmus incrassatulus. when we increase the concentrations of pesticides (such as dimethoate and Thimeton) in the medium, there was a decrease in the level of both chlorophyll and carotenoids. Both pesticides caused a considerable decrease in the level of proteins and carbohydrates lesser number of cells was noticed in colonies grown in plates having medium supplimented with more than 0.1 percent concentrations of pesticides. Growth and survival of alga was completly innibited at concentrations above 0.075 and 0.5 ppm respectively. (C.S.R. Jampani and D.S.Kumari 1988)parathion was the 1st member of the group organophosphorus to be widely used as a contact insecticide in agriculture and has a wide spectrum activity being effective against aphids, catterpillars, spider, mites, etc.

From the recent reports it appears that the pesticides are not only harmful to human beings but are also harmful to crop plants on which they are applied. Hence the biological control is useful to control the pests. As reported by Hussey and Scopes (1985) a reputable cucumber grower can increase the yield by 25% using biological control to control red spider mites rather than using normal routine of 23 pesticide sprays. This clearly indicates that pesticides reduce the yield. However, the complexities of such yield losses, apparently due to toxicites to plants are not as yet understood. Apart from this

SHRI. BALASAHEB ... LIBRARY
SHIVAJI ... KOLHAPUR

there are also reports that pesticides cause insult to genetic material (Sharma 1986). These insults may be genic, chromosomal and or genomic leading to mutagenicity, clastogenicity and turoagenicity. Besides this pesticides are also found to be affecting seedling growth, pollen fertility and seed set which are important factors in agriculture.

From the above foregoing discussion it is clear that if the indiscriminate use of pesticide will remain continued furtner then we may have to face the above mentioned problems which will certainly produce unmanagiable cumulative effects on the total ecosystem. further it seems inevitable that the ultimate solution to our environmental pesticide. Problems must be a compromise which will use the smallest possible quantities of pesticides, combined with other control measures so that environmental pollution by pesticides is kept at a minimum.

To achieve this and to arrest the imminent danger of ecological breakdown of the genetic systems in the agro systems, which necessarily hurts human welfare, a perspective approach in dealing with pesticide problem is alarmingly important. The objectives of present investigation therefore was to examine the physiological effect of organophosphorus pesticide on safflower.

- 0 - 0 - 0 - 0 - 0 -