1. INTRODUCTION.
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During the modern agricultural practices when the use of resistant varieties, cultural practices or alteration of environment fails in the management of pathogens, the use of chemicals become very essential. It is also known that nearly 35,000 pesticide products are used throughout the world involving about 1500 basic chemical ingredients. In India, production of pesticides during the 1985-86 was 66,440 tonnes and presently 728 pesticidal compounds have been registered under Pesticide Act, 1968 (Veerbhadra Rao and Sharma, 1991). These pesticides are used by the farmers for the management of various crop pests and diseases throughout the country. However, during the last 25 years application of fungicides has plagued with several problems among which development of resistance in the pathogenic organisms is very important (Dekker, 1982). This is because the organism may develop resistance to the chemical in the component of its cells in various ways.

Many examples of fungicide resistance in plant pathogens have been reported from U.S.A., Israel, Japan, Australia and Europe; and also from South East Asia (Grover and Moore, 1961; Shatla and Sinclair, 1963; Uesugi et al., 1969; Bollen, 1971, 1983; Davidse, 1975, 1976; Dekker, 1967, 1976a, 1977, 1981; Dekker and Gielink,

In India, it appears that reports on fungicide resistance in plant pathogens of various crops are very few, although use of fungicides in disease management is increasing day by day (Reddy et al., 1979; Gangawane and Saler, 1981; Gangawane, 1981; Bain et al., 1982; Gangawane and Reddy, 1988; Gangawane and Saler, 1988; Gangawane and Shaikh, 1988a, 1988b; Gangawane and Karepaa, 1989; Sundas and Raj, 1989; Gangawane, 1990; Annamalai and Lalithakumari, 1990; Kareppa, 1990; Gangawane and Waghmare, 1991; Naik and Anilkumar, 1991; Arora et al., 1992; Revathi et al., 1992).

Groundnut (*Arachis hypogaea* L.) is the world’s second largest source of edible oil. Groundnut ranks 13th in the production among the world food crops. On global basis the groundnut occupies about 19 million hectares with 19.5 million tonnes of production and with an average pod yield of nearly 1000 kg/ha. India grows groundnut in about
7.6 million hectares and produces around 6.4 million tonnes (nuts in shells) which are nearly 40 per cent of world's area and 31.7 per cent of the produce. The leading groundnut growing states in India are Gujarat, A.P., Tamilnadu, Karnataka, Maharashtra and Madhya Pradesh which together constitute about 80 per cent area and 81 per cent of production (Mishra and Ghewande, 1983). The groundnut crop is attacked by various pathogens. In India, it is attacked by over 55 pathogens including viruses. Some of the important diseases are leaf spots, rust, necrosis, bud blight, collar rot, stem rot, wilt or dry rot, etc. which affect yield considerably in different parts of India. Stem rot (Sclerotium rolfsii Sacc.) is a sporadic disease in almost all groundnut growing fields. Stem rot is also called as Sclerotium blight, southern blight, thread blight, collar rot, root rot, peg rot, pod rot, depending on the stage of plant growth at which infection occurs (Feaking, 1973). Sclerotium rolfsii is a polyphagous pathogen. Sen (1983) suggested that this pathogen can be managed by about 40 fungicidal compounds. Of these mancozeb, captan, quintozene, benomyl, tridemorph, chloroneb are most important. In addition use of tridemorph in the management of this pathogen have also been suggested (Kulkarni, 1980; Siddaramaiah et al., 1979; Sharma, 1990). Therefore, detailed studies on the resistance of Sclerotium rolfsii to tridemorph was carried out and have been presented in this thesis.
The samples of stem rot (*Sclerotium rolfsii*) of groundnut were collected from different places in Maharashtra during the year 1987-91 (Fig. 1). A total number of 31 isolates were obtained and maintained on potato dextrose agar medium (PDA). One of the isolates (SR-1) was tested for sensitivity against 12 different fungicides having different mode of action. Tridemorph was found to be most effective and hence MIC of tridemorph against 31 isolates was evaluated by food poisoning technique. These isolates were also tested against mancozeb. Most sensitive isolate (SR-1) was further tested against tridemorph. Similarly, pot experiments were also carried out in order to find out efficacy of tridemorph.

Fungicide application programme may influence the development of resistance in the pathogen. Hence, the effect of passage on the agar medium containing tridemorph individually, alternately or in mixture with other fungicides (captafol, mancozeb, carbendazim, thiophanate methyl) having different mode of action was studied. Development of resistance in *Sclerotium rolfsii* was observed due to spontaneous mutation, ultraviolet light (UV) and chemical mutagens such as sodium azide (SA) and ethyl methane sulfonate (EMS). Mutants were classified according to the intensity of tridemorph resistance i.e. highly resistant (HR), moderately resistant (MR) and
FIG. 1   MAP SHOWING THE PLACES IN MAHARASHTRA FROM WHERE THE COLLECTION OF STEM ROT OF GROUNDNUT SAMPLE WAS MADE.
sensitive (S). Highly resistant factor went up to 9 (TEMS-22). Latent period of the pathogen in the presence of fungicide is very important in order to develop symptoms. This was also studied simultaneously. Development of resistance in the pathogen may increase or decrease its virulence. Hence, comparison of pathogenecity in between the wild sensitive and resistant mutant was made. This is possibly due to altered metabolism in the resistant pathogen. Hence physiological characteristics such as effect of carbon, nitrogen, amino acids, salts, micronutrients, vitamins and oxides on growth were studied. Biochemical characteristics like amino acids, enzymes, phenols, crude fat, ash content, calcium, crude proteins etc. of the groundnut infected with the resistant and wild sensitive strains was studied.

Effect of physical factors such as pH, temperature and light on the growth of resistant strain was also studied. In management of groundnut diseases and pests many agrochemicals other than fungicides like insecticides, herbicides, antibiotics, fertilizers, micronutrients and plant products are used by the farmers. It is possible that these chemicals may affect resistance in the stem rot of groundnut. These chemicals may reduce or break the resistance in the pathogen. It is observed that many of chemicals have lowered the resistance and few of them
increased the resistance in the pathogen. Hence synergistic
effects of agrochemicals were studied both in vitro and
in vivo.

Development of resistance in the pathogen against
fungicides is a potential danger when such resistant
pathogen is released into the natural population of plant
pathogenic fungi. It is very necessary to know survival
ability of such highly resistant mutant in the sensitive
population. Therefore, in the absence and in the presence
of tridemorph fitness of resistant stem rot (Sclerotium
rolfsii) isolate was evaluated and its significance in the
management of stem rot of groundnut is also discussed in
the present investigation.