Discussion
DISCUSSION

Like human beings and other animals, plants are subject to diseases. In order to maintain a sufficient food supply for the world's population, it is necessary for those involved in plant growth and management to find ways to combat plant diseases that are capable of destroying crops on a large scale. There are many branches of science that participate in the control of plant diseases. Among them are biochemistry, biotechnology, soil science, genetics and plant breeding, meteorology, mycology (fungi), nematology (nematodes), virology (viruses), and weed science. Chemistry, physics, and statistics also play a role in the scientific maintenance of plant health. The study of plant diseases is called plant pathology.

The most common diseases of cultivated plants are bacterial wilt, chestnut blight, potato late blight, rice blast, coffee rust, stem rust, downy mildew, ergot, root knot, and tobacco mosaic. This is a small list of the more than 50,000 diseases that attack plants. Diseases can be categorized as annihilating, devastating, limiting, or debilitating. As the term suggests, annihilating diseases can totally wipe out a crop, whereas a devastating plant disease may be severe for a time and then subside. Debilitating diseases weaken crops when they attack them successively over time and limiting diseases reduce the viability of growing the target crop, thereby reducing its economic value. Plant diseases are identified by both common and scientific names. The scientific name identifies both the genus and the species of the disease-causing agent.

For the past 50 years, the ability to combat plant diseases through the use of modern farm management methods, fertilization of crops, irrigation techniques, and pest control have made it possible for the United States to produce enough food to feed its population and to have surpluses for export. However, the use of pesticides, fungicides, herbicides, fertilizers and other chemicals to control plant diseases and increase crop yields also pose significant environmental risks. Air, water, and soil can become saturated with chemicals that can be harmful to human and ecosystem health.

While early civilizations were well aware that plants were attacked by diseases, it was not until the invention of the first microscope that people began to
understand the real causes of these diseases. There are references in the Bible to blights, blasts, and mildews.

Aristotle wrote about plant diseases in 350 B.C. and Theophrastus (372-287 B.C.) theorized about cereal and other plant diseases. During the Middle Ages in Europe, ergot fungus infected grain and Shakespeare mentions wheat mildew in one of his plays.

After Anton von Leeuwenhoek constructed a microscope in 1683, he was able to view organisms, including protozoa and bacteria, not visible to the naked eye. In the eighteenth century, Duhumel de Monceau described a fungus disease and demonstrated that it could be passed from plant to plant, but his discovery was largely ignored. About this same time, nematodes were described by several English scientists and by 1755 the treatment of seeds to prevent a wheat disease was known.

In the nineteenth century, Ireland suffered a devastating potato famine due to a fungus that caused late blight of potatoes. At this time, scientists began to take a closer look at plant diseases. Heinrich Anton DeBary, known as the father of modern plant pathology, published a book identifying fungi as the cause of a variety of plant diseases. Until this time, it was commonly believed that plant diseases arose spontaneously from decay and that the fungi were caused by this spontaneously generated disease. DeBary supplanted this theory of spontaneously generated diseases with the germ theory of disease. Throughout the rest of the nineteenth century scientists working in many different countries, including Julian Gotthelf Kühn, Oscar Brefeld, Robert Hartig, Thomas J. Burrill, Robert Koch, Louis Pasteur, R. J. Petri, Pierre Millardet, Erwin F. Smith, Adolph Mayer, Dimitri Ivanovski, Martinus Beijerinck, and Hatsuzo Hashimoto, made important discoveries about specific diseases that attacked targeted crops.

During the twentieth century advances were made in the study of nematodes. In 1935 W. M. Stanley was awarded a Nobel Prize for his work with the tobacco mosaic virus. By 1939, virus particles could be seen under the new electron microscope. In the 1940s fungicides were developed and in the 1950s nematicides were produced. In the 1960s Japanese scientist Y. Doi discovered mycoplasmas, organisms that resemble bacteria but lack a rigid cell wall, and in 1971, T. O. Diener discovered viroids, organisms smaller than viruses.
Plant diseases can be infectious (transmitted from plant to plant) or noninfectious. Noninfectious diseases are usually referred to as disorders. Common plant disorders are caused by deficiencies in plant nutrients, by waterlogged or polluted soil, and by polluted air. Too little (or too much) water or improper nutrition can cause plants to grow poorly. Plants can also be stressed by weather that is too hot or too cold, by too little or too much light, and by heavy winds. Pollution from automobiles and industry, and the excessive application of herbicides (for weed control) can also cause noninfectious plant disorders.

Infectious plant diseases are caused by pathogens, living microorganisms that infect a plant and deprive it of nutrients. Bacteria, fungi, nematodes, mycoplasmas, viruses and viroids are the living agents that cause plant diseases. Nematodes are the largest of these agents, while viruses and viroids are the smallest. None of these pathogens are visible to the naked eye, but the diseases they cause can be detected by the symptoms of wilting, yellowing, stunting, and abnormal growth patterns.

Some plant diseases are caused by rod-shaped bacteria. The bacteria enter the plant through natural openings, like the stomata of the leaves, or through wounds in the plant tissue. Once inside, the bacteria plug up the plant’s vascular system (the vessels that carry water and nutrients) and cause the plant to wilt. Other common symptoms of bacterial disease include rotting and swollen plant tissues. Bacteria can be spread by water, insects, infected soil, or contaminated tools. Bacterial wilt attacks many vegetables including corn and tomatoes, and flowers. Crown gall, another bacterial plant disease, weakens and stunts plants in the rose family and other flowers. Fireblight attacks apple, pear, and many other ornamental and shade trees.

The viruses and viroids that attack plants are the hardest pathogens to control. Destroying the infected plants is usually the best control method, since chemicals to inactivate plant viruses and viroids have not proven effective. While more than 300 plant viruses have been identified, new strains continually appear because these organisms are capable of mutating. The symptoms of viral infection include yellowing, stunted growth in some part of the plant, and plant malformations like leaf rolls and uncharacteristically narrow leaf growth. The mosaic viruses can infect many plants. Plants infected with this virus have mottled or streaked leaves; infected fruit trees produce poor fruit and a small yield.
About 80% of plant diseases can be traced to fungi, which have a great capacity to reproduce themselves both sexually and asexually. Fungi can grow on living or dead plant tissue and can survive in a dormant stage until conditions become favorable for their proliferation. They can penetrate plant tissue or grow on the plant's surface. Fungal spores, which act like seeds, are spread by wind, water, soil, and animals to other plants. Warm, humid conditions promote fungal growth. While many fungi play useful roles in plant growth, especially by forming mycorrhizal associations with the plant's roots, others cause such common plant diseases as anthracnose, late blight, apple scab, club root, black spot, damping off, and powdery mildew. Many fungi can attack a variety of plants, but some are specific to particular plants.

The list of fungi and the plants they infect is a long one. Black spot attacks roses, while brown rot damages stone fruits. Damping off is harmful to seeds and young plants. Downy mildew attacks flowers, some fruits, and most vegetables. Gray mold begins on plant debris and then moves on to attack flowers, fruits, and vegetables. Oak root fungus and oak wilt are particularly damaging to oaks and fruit trees. Peach leaf curl targets peaches and nectarines. Powdery mildew, rust, sooty mold, and southern blight attack a wide variety of plants, including grasses. Texas root rot and water mold root rot can also infect many different plants. Verticillium wilt targets tomatoes, potatoes, and strawberries.

Nematodes are tiny microscopic animals with worm-like bodies and long, needlelike structures called stylets that suck nutrients from plant cells. They lay eggs that hatch as larvae and go through four stages before becoming adults. Nematodes have a 30-day life cycle, but they can remain in a dormant state for more than 30 years. Nematicides are chemicals used to control nematode infestations. Marigolds are resistant to nematodes and are often planted to help eliminate them from infected soil.

Nematodes primarily attack plant roots, but they may also destroy other parts of the plant either internally or externally. They thrive in warm, sandy, moist soil and attack a variety of plants including corn, lettuce, potatoes, tomatoes, alfalfa, rye, and onions. However, all nematodes are not harmful to plants. Some are actually used to control other plant pests such as cutworms, armyworms, and beetle grubs.
Susceptible host → No disease
Pathogen → No disease
Favorable environment → No disease
Susceptible host + Pathogen → No disease
Susceptible host + Favorable environment → No disease
Pathogen + Favorable environment → No disease
Susceptible host + Pathogen + Favorable environment → disease
Mycoplasmas are single-celled organisms that lack rigid cell walls and are contained within layered cell membranes. They are responsible for the group of plant diseases called yellow diseases and are spread by insects such as the leafhopper.

Parasitic plants, such as mistletoe, cannot get their nutrients from the soil, but must attach themselves to other plants and use nutrients from the host plant to survive. They weaken the wood of their host trees and deform the branches.

An equilateral disease triangle is often used to illustrate the conditions required for plant diseases to occur. The base of the triangle is the host and the two equal sides represent the environment and the pathogen. When all three factors combine, then disease can occur. Pathogens need plants in order to grow because they cannot produce their own nutrients. When a plant is vulnerable to a pathogen and the environmental conditions are right, the pathogen can infect the plant causing it to become diseased.

Plant disease control is achieved by changing the host plant, by destroying the pathogen or by changing the plant's environment. The key to success in growing plants, whether in the home garden or commercially, is to change one or more of the three factors necessary to produce disease. Disease-resistant plants and enrichment of soil nutrients are two ways of altering the disease triangle.

Weather is one environmental factor in the plant disease triangle that is impossible to control. When weather conditions favor the pathogen and the plant is susceptible to the pathogen, disease can occur. Weather forecasting provides some help; satellites monitor weather patterns and provide farmers with some advance warning when conditions favorable to disease development are likely to occur. Battery-powered microcomputers and microenvironmental monitors are place in orchards or fields to monitor temperature, rainfall, light levels, wind, and humidity. These monitors provide farmers with information that helps them determine the measures they need to take to reduce crop loss due to disease.

Control of plant disease begins with good soil management. The best soil for most plants is loamy, with good drainage and aeration. This minimizes diseases that attack the roots and allows the roots to feed nutrients from the soil to the rest of the plant. Organic methods, such as the addition of compost, can improve soil quality,
and fertilizers can be added to the soil to enrich the nutrient base. Soil pH measures the degree of acidity or alkalinity of the soil. Gardeners and farmers must be aware of the pH needs of their plants, since the right pH balance can help reduce susceptibility to disease, especially root diseases like club root or black root rot.

Other important factors in the control of plant disease are the selection of disease-resistant plants (cultivars), proper watering, protection of plants from extreme weather conditions, and rotation of crops. Disposal of infected plants is important in the control of diseases, as is the careful maintenance of tools and equipment used in farming and gardening. Many plant diseases can easily be spread by hand and by contact with infected tools, as well as by wind, rain, and soil contamination. Plant diseases can also be spread by seeds, and by transplants and cuttings; careful attention to the presence of disease in seeds, transplants, and cuttings can avoid the spread of pathogens.

Crop rotation is an important part of reducing plant diseases. Pathogens that favor a specific crop are deprived of their preferred host when crops are rotated. This reduces the virulence of the pathogen and is a natural way to reduce plant disease. Soil solarization is another natural method used by gardeners to reduce diseases.

Barriers or chemical applications to eliminate pests that may carry pathogens to plants are another method of disease control. The use of chemical pesticides has become standard practice among home gardeners and commercial growers alike. Among the organic chemicals used today are copper, lime-sulfur, Bordeaux mixture, fungicidal soap, and sulfur. After World War II, DDT, a synthetic insecticide, was used to destroy plant pests. Today, the use of this and a number of other pesticides has been banned or restricted because they were found to present hazards to the health of human, wildlife, and the environment.

Successful pathogenicity depends upon three factors viz., pathogen, suitable host and conducive environment. In other words, the invading pathogen must have the innate potentialities to overcome the host barriers and must be in sufficient number; the host must be susceptible to infection by arid establishment of the pathogen; the environmental factors must be congenial for the activity of the pathogen and to the susceptibility of the host. Hence, pathogenicity is the net result of the interaction.
between two components, the host and the parasite under a certain set of environmental factors.

According to Garber (1954, 1956) availability or non-availability of suitable nutrients in host tissue and inhibitory effect of other compounds in the host determine the pathogenicity. Hence the physiological nature of the pathogen and the physiological changes in the infected host are of immense importance in understanding the host-parasite interaction.

Cultural characters of the pathogen were studied on different solid and liquid media revealed that the fungus preferred semisynthetic media over natural and synthetic media for its growth and sporulation. There was relationship between growth and sporulation, although both were favored by potato dextrose medium than to the synthetic media. Best growth was recorded on potato dextrose and host leaf extract dextrose followed by oat meal medium. On the other hand the Barne's medium recorded minimum growth (Table-2.3 &2.4 ). Kanjanasoon and Mathur (1960) and Lonnaids and Main (1973) were also observed good growth of A. alternata on PDA and oat meal medium. Hossain et al., (1997) reported that onion leaf extract and potato dextrose agar media supported good growth and sporulation of A. porri. Osman et al., (1992), Cakarevic et al., (1997) and Ansari et al., (1988) have reported PDA medium was best for growth and sporulation of A. alternata and A. brassicae. Good growth in the above media might be attributed to the availability of nutrients that are available either in sufficient quantities or absence of growth inhibitors. The poor growth in Barne’s medium might be due to the presence of ammonium nitrate as nitrogen source which was not very well utilized by the pathogen.

Regarding sporulation on solid and liquid media, host leaf extract dextrose medium supported maximum sporulation followed by potato dextrose and oat meal medium. Whereas Barne’s medium showed minimum sporulation.

It was frequently observed in nutritional studies that fastidious fungal pathogens prefer natural or semisynthetic media as against synthetic for sporulation. It was possibly due to availability of known essential elements. Lilly and Barnett (1951) in their detailed work observed that growth and sporulation were often poorer in synthetic medium than the one containing some natural ingredients. The results of the
present investigations are also indicate that the media containing natural ingredients supported good growth and sporulation.

In vitro studies were conducted with *A. alternata* to assess the physical and nutritional requirements of the pathogen which in turn could help to understand the host-parasite relationship resulting either in host susceptibility or resistance.

The fungus grew and sporulated over a wide pH ranging from 3.0 to 10.0 with maximum at pH 6.0 but failed to grow and sporulate at pH 2.0 (Table 2.5). This was in confirmity with the results reported by Ashour and Elkhadi (1959) who stated that a pH of 6.0 supported maximum growth of *A.tenuis*. Similarly, Susuri and Hagedorn (1986) reported that *A. alternata* grew over a pH ranging from 3.7 - 7.1, with an optimum pH of 6.5. Similar trend was observed by Zhu-Jianlan et al., (1996), Mallikarjun Gaddanakeri et al., (1998) and Maheswari et al., (2000).

After harvesting the mycelial mat, the final pH of the medium was observed to be between 5.0 7.5 indicating a general tendency of the media to become slightly acidic or neutral, irrespective of variations in the initial pH (Table-2.5). Even in experiments with different carbon and nitrogen sources, the final pH was maintained without much alteration from the initial pH of 7.0 after complete growth of the fungus (Tables 2.8 and 2.9). Thus, the fungus appeared to have an adaptability to grow and sporulate over a wide range of pH. This could be due to its ability to produce adaptive enzymes or other substances to bring the pH to optimum range and then grow normally (Gupta et al., 1978).

An important factor which influences the growth and sporulation of any fungus is temperature. Present study on the effect of temperature on growth and sporulation revealed that the fungus grew and sporulated well at 30 ± 1°C and 25 ± 1°C followed by 35 ± 1°C and 20 ± 1°C , while minimum growth and sporulation was recorded at 10 ± 1°C and completely failed to sporulate at 40 ± 1°C with poor growth (Table 2.6). The growth and sporulation of the fungus decreased at 35 ± 1°C and 40 ± 1°C when compared to 30 ± 1°C. This might be due to the high temperature that could be unfavourable for the growth of pathogen. Therefore, it was assumed that the optimum temperature for growth and sporulation of the fungus was 30 ± 1°C and 25 ± 1°C, It is well known that temperature has a pronounced effect on a number of metabolic processes of the fungi affecting the rate of enzymatic reaction of the
substrate. Several workers have reported the optimum temperature for growth and sporulation of different fungi which lie between 25 - 30°C (Singh and Prasad, 1973; Mathur and Sarbhoy, 1977; Carta et al., 1983; Saeed et al., 1995; Zhu Jianlan et al., 1996; Cakarevic et al., 1997; Hossain et al., 1997; Mallikarjuna Gaddanakeri et al., 1998 and Maheswari et al., 2000).

Another important factor, which influences growth and sporulation of the fungus is light. In the present investigation, maximum growth of the fungus was recorded in alternate light and darkness and least was recorded in continuous light (Table 2.7). Likewise the growth rates of A. brassicae (Gupta et al., 1972; Mukadam and Deshpande, 1979), A. brassicicola (Umalkar and Begum, 1976) and A. helianthai (Srinivas, 1996) were also reduced by continuous light but registered maximum growth in alternate light and darkness. Mendes Costa et al., (1998) reported alternate light and darkness provides greater variation in the number of conidial production in A. alternata.

Growth of the fungus was reduced considerably in continuous light, which appeared to have some deleterious effect on the growth of the fungus presumably due to increase in temperature in continuous light.

Sporulation of many Alternaria sp., was influenced by light intensity and duration (Tan, 1978 and Cotty and Misaghi, 1985). The sporulation of the fungus in the present study was more under continuous darkness (Table 2.7). Prabhu and Prasada (1965) working on leaf blight pathogen of wheat (A. triticina) reported continuous darkness favoured maximum sporulation. They opined that this could be due to certain inherent factors present in the fungus which were either inhibited or not synthesized in the presence of light.

Carbon occupies an unique position among the essential elements required by all living organisms. In addition to being the main structural element, carbon compounds play an equally important functional role in fungi (Lilly and Barnett, 1951). Present studies on carbon requirements indicated that the fungus could utilize all the carbon sources tried for growth and sporulation but failed to utilize citric acid (Table 2.8). The fungus recorded maximum growth in glucose followed by galactose and fructose, but sporulation was maximum in fructose followed by glucose. It clearly showed better utilization of monosaccharides followed by polysaccharide (starch) by
the fungus. However, the growth and sporulation were moderate in all other carbon sources tested except aliphatic alcohol which was significantly inferior. This is in conformity with the work of Lalbihari and Tandon (1968), who reported that *A. tenuis* grew well in all monosaccharides except sorbose and rhamnose. Similarly, Thind (1977) found that monosaccharides were good carbon sources of *A. alternata*. Saeed et al., (1995) observed that glucose supported best growth of *A. alternata*. Smita Ranjan et al., (1998) found that maximum growth and sporulation were observed in glucose followed by sucrose, maltose, lactose, mannitol and starch. Annapurna Kumari et al., (1998) reported that sucrose gave the best mycelial growth and sporulation of *A. brassicae* followed by galactose and maltose. However, moderate growth was observed in mannitol with poor sporulation. Gupta et al., (1978) also reported moderate growth and poor sporulation of *A. alternata* in mannitol. Mohanty and Sethi (1997) observed that mannitol supported good growth of *A. longipes*. On the contrary, Mohapatra et al., (1977) recorded maximum growth of *A. sessami* in mannitol. Organic acids were generally poor sources of carbon for fungi than other carbohydrates. In the present study, non-utilization of citric acid by *A. alternata* may be due to the impermeability of cells to organic acids at physiological pH levels or might be due to the chelation of inorganic ions by certain organic acids like citric acid (Cochrane, 1963).

Studies on the utilization of various sources of inorganic and organic nitrogen revealed that nitrates followed by organic and ammonical sources were effectively utilized by the fungus for growth and sporulation (Table 2.9). Hasija (1970) reported that all these three forms of nitrogen were effectively utilized by *A. tenuis*.

Among the nitrates, the fungus grew and sporulated well in potassium nitrate and sodium nitrate than ammonium nitrate. Similar trend was observed in *A. brassicae* (Annapurna Kumari et al., 1998). Likewise Goyal (1977) found that potassium nitrate and sodium nitrates were effectively utilized for growth and sporulation by *A. tenuis* but Chettannanavar et al., (1988) reported maximum growth of *A. alternata* on sodium nitrate alone. Smitha Ranjan et al., (1998) observed maximum growth of *A. alternata* on potassium nitrate.

Among the organic sources of nitrogen, asparagine proved to be the best for growth and sporulation. Annapurna Kumari et al., (1998) and Smitha Ranjan et al.,

Among the ammonical sources, ammonium oxalate was superior to other forms tried in the present experiment. Similar observations were made by Mohapatra et al., (1977). According to Robbins (1937) that there are no instances in literature in which an organism is able to utilize nitrate nitrogen but unable to utilize ammonical nitrogen.

This does not mean that the fungi which are able to utilize nitrate nitrogen, would grow equally well on various ammonical nitrogen sources. A perusal of (Table 2.9) indicates that the above remarks are true of the present pathogen.

The fungus could not utilize nitrite nitrogen like many other fungi including *A. ricini* (Lilly and Barnett, 1951 and Narahari reddy, 1962). It is of common knowledge that most of the fungi failed to utilize nitrites because of accumulation of pyruvic, nitrous or other acids which were toxic or unfavourable for growth or due to exertion of toxic or unfavourable effects on the pathogen growth (Nord and Mull, 1945; Cochrane and Conn, 1950; Brock, 1951; Cochrane, 1963 and Mohapatra et al., 1977).

The pathogen *Alternaria alternata* was considered to be a facultative pathogen and not an obligate parasite hence, the *Alternaria* has potential toxic producing abilities and extracellular enzyme production capabilities and morphological variations helpful for it to survive on different plants and cause diseases. As it was going to survive on different hosts. During the non availability of ground nut plants it was shifting its survival on the plants which are present in the field and surrounding and when ever it finds the ground nut fields it causes leaf blights. In order to know the survivalence of the pathogen in the non availability of host being facultative it incidences on different plant species and makes them hosts for it.

Among the 30 plant species which were inoculated for the check of its survival as alternate host nearly 17 species are shown initial as well as blighted spots of necrotic flecks. The plant species are *Anisomelus indicus*, *Bauhinia vahlii*,

118
Catharanthus roseus, Centella asiatica, Clitoria ternatea, Croton bonplandianum, Datura stramonium, Helianthus annus, Ipomea cornea, Hyptis savolens, Luffa cylindrica, Leucas aspera, Lycopersicum esculentum, Parthenium hysterophorous, Momordica charantia, Syzygium jambolina, Wrightia tinctoria.

The plant species which remained without showing any disease symptoms are Abutilon indicum, Acacia auriculiformis, Bougainvillea spectabilis, Cassia fistula, Cissus quadrangularis, Crotalaria verrucosa, Muhlenbergia nudicaulis, Ocimum sanctum, Phaseolus aureus, Phyllanthus amara, Solanum melangena, Tephrosia purpurea, Ziziphus mauritiana.

The general tendency of using the fungicides for a disease was also effective. The efficacy of all the five fungicides differed against the growth & sporulation of A. alternata among the fungicides Blitox – 50 and Monceren showed 100 percent growth inhibition at 250mg/ml and 500 mg/ml respectively.

Though the fungicidal control of groundnut leaf blight is effective the fungicidal traces left in will become hazardous for the water table and the plant products as well in order to reduce this control of pathogen by using biological method is seems to be secured and protective for the environment being so the botanicals are taken for the control of pathogen. Nearly 25 species of plant leaf extracts are checked for the control of pathogen. The 25 plant extracts tested in vitro against the growth of Alternaria alternata out of 25 plant extracts Azadirachta indica, Strychnus – nux vomica, Murraya koenigii, Tylophora indica, Terminalia chebula, Pimpinella tirupatiensis. Showed highest growth inhibition of the pathogen where as lowest growth inhibition was observed in Spothrida companulata.

The extracts of Azadirachta indica, Strychnus nux vomica, Murraya koenigii, Tylophora indica, Terminalia chebula, Pimpinella tirupatiensis showed highest growth inhibition of the pathogen and were best control agent of the pathogen further studies are needed to isolate and characterize anti fungal moieties in these for practical disease control.

In order to find the different microbial interactions the studies of Phyllosphere and Rhizosphere is performed and several Fungi identified from rhizosphere plates such as Mucor rouxianus, Syncephalastrum racemosum, Aspergillus flavidus, A.
nidulans, A. niger, A. sulphureus, A. ustus, Penicillium spp., Chaetomium indicum, Neocosmospora vasinfecta, Phoma spp., Trichoderma viride, Gliocladium fimbriatum, Paecilomyces variotii, Curvularia pallescens, and Fusarium spp. The bacteria are Bacillus firmis, Bacillus megaterium and Pseudomonas aeruginosa.

In control soils species of Aspergillus accounted for about 50 percent of all the colonies developed, about 10 percent were Fusarium spp. and various other genera accounted for the rest. This proportion of different fungi was also reflected in the rhizosphere fungal populations of some varieties but in other varieties there is a marked shift in the population resulting in the predominance of one or two species over others. Aspergillus nidulans and A. niger were dominant in the rhizosphere of Rock-1 variety until the plants were 30 days old while during the same period Fusarium spp. predominated over other fungi in the rhizosphere of Samrat and Yerramallelu varieties of groundnut. Species of Fusarium were also dominant in the rhizosphere of Kadiri-1 variety until the plants were 90 days old when Phoma sp. replaced them.

In the rhizosphere studies the fungi screened for antagonist effect against Alternaria alternata was having 've effect except the Aspergillus flavus which is inhibiting the colony growth of Alternaria alternata.

The groundnut cultivars taken for the studies are Rock-1, Kadiri - 1, Samrat, Yerramallelu Varieties. These varieties are inoculated with the pathogenic fungus Alternaria alternata inoculation of the cultivars was done prior to the development of flowers. The thirty five days old plants were inoculated all the time except the control which is maintained for all.

The results observed was Rock-1 variety of ground nut is susceptible(S) which showed 13-15 days for initial appearance of symptoms. Kadiri-1 variety of ground nut shown the initial symptoms in 16-18 days and was moderately susceptible (MS). The Samrat variety of groundnut developed the initial symptoms with in 17-20 days of inoculation and was moderately resistant (MR). Yerramallelu variety of groundnut developed the symptoms in 21-23 days showing maximum days to develop initial symptoms was considered to be resistant (R) cultivar for the present studies.
Though all the cultivars are susceptible basing on the days taken for initial symptoms development is considered to be the pedigree for the resistant cultivar.

Thus, the above results concludes that the leaf blight pathogen can be eradicated by using plant extracts and making the non availability of the above mentioned hosts in the field areas and using the resistant cultivar Yerramallelu as per the result of screening groundnut cultivars.

A disease that destroys active leaf area and reduces photosynthetic capacity is expected to affect the plant's productivity. The results of this work indicate that *A. alternata* is capable of reducing the yield of groundnut, and can be as damaging to sunflower as *A. helianthi* (Allen, S. J., et al., 1981; Balasubrahmanyam, N., and Kolte, S. J. 1980., Carson, M. L. 1985. Kolte, S. J. 1985; Reddy, P. C., and Gupta, B. M. 1977) under certain conditions. Losses in numbers of seeds may be due to fewer plump seeds formed. Since the number of seeds per pod was positively correlated with seed weight; either yield components may serve as a measure of the negative effect of *A. alternata* leaf blight disease on yield of groundnut. Seed weight seems to be more affected by the disease; under the environmental conditions in blight affected areas, the most reliable disease intensity estimation can be obtained when all the leaves of the plant are developed, plants are before anthesis, and when natural degradation of lower leaves has started. Yield losses of up to 65% in number of seeds per plant and 79% in seed weight have demonstrated that *A. alternata* is capable of causing substantial losses under environmental conditions in disease prone areas. The disease may be a serious problem in other areas as well; therefore, it should be further investigated in regions where it has been observed. Data collected in this work did not support the construction of a yield loss model. Such differences are expected due to the high variability of yield among different years in an arable crop. Also, a prediction model of yield reduction should be based on numerous replicates in several areas. The fungus survived on different plants under conditions of its wide host range. In addition to the pathogenic *A. alternata* on groundnut, the same isolates are also turned pathogenic to the plants almost present in near areas of the agricultural fields probably saprophytic. Thus, the actual proportion of germinated conidia which belonged to the pathogenic isolate cannot be clearly estimated. However, the presence of the pathogenic fungus was confirmed by inoculation tests with the groundnut plants.
Conidia retained the ability to germinate within 24 h, even in certain conditions. Germination of conidia increased after August, indicating that inoculum potential may rise at the beginning of the new growing season. Certainly, this fungus was identified as a distinct pathotype of *A. alternata* that is highly pathogenic on sunflower also (Lagopodi, A.L., and Thanassoulopoulos, C. C. 1996). *A. alternata* has become a serious pathogen on various crops due to its ability to produce host-specific toxins during pathogenesis (Nishimura, S., and Kohmoto, K. 1983. Nishimura, S., Vance, C. P., and Doke, N. 1987) and the sunflower pathotype of the fungus also was found to produce pathotoxins (Nishimura, S., Vance, C. P., and Doke, N. 1987.). It appears that *A. alternata* is a threatening pathogen of oil crops under certain conditions. Further on this disease is needed on the effects of crop rotation.

The extract of effective medicinal plants inhibiting on the fungal growth must be tested *in vivo* and further purification and finding out of the active principles may lead to effective control of the leaf blight disease.

Isolation of different strains of *Alternaria alternata* from each mandal of all the groundnut growing districts of Andhra Pradesh and their use by the plant breeder for resistant varieties will help further in controlling of this disease.