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5th TURKISH PHYTOPATHOLOGICAL CONGRESS

The Turkish Phytopathological Society held its fifth Congress in conjunction with the Scientific and Technical Research Council of Turkey in the Provincial Museum Building and the rooms of Agricultural Faculty at Antalya-Turkey, October 18-21, 1988.

A total of 385 persons from various agricultural and related establishments in Turkey registered for the joint the Congress including the most of the Turkish Phytopathological Society members. In the course of Congress mentioned, 119 scientific papers on several phytopathological topics were presented.

Congress Organizing Committee :

Mehmet YILDIZ

Oktay YEGEN

Semih ERKAN

S. Tarık DEMİR

Emin ONAN

Mualla ARI

Hatice ÖZAKTAN

İsmail ULUKUŞ

Kamil YELBOĞA

ABSTRACTS OF PRESENTATIONS AT THE FIFTH TURKISH PHYTOPATHOLOGICAL CONGRESS

The Effects of the Mosaic Disease on Total Soluble Solidle, Color, Ascorbic Acid, and Titration Acidity of Tomatoes Grown in Glasshouses of Antalya Province

E. DEMİR (49) G. ERDİLLER (3)

In this experiment, samples were randomly taken from four tomato varieties that were both showing disease symptoms and seeing healthy. These samples were tested by indicator plants and serology. According to the results; Dario (F-150)F_1, Vivia (F-172)F_1, Alia (F_1) and the Salima F_1 varieties were found infected by TMV. The analysis tests have been made in order to determine of the color, total soluble solidle, titration acidity and the ascorbic acide ratios of the infected and the healthy varieties. In the TMV infected Dario (F-150)F_1 the percentage of vitamin C was 62,06 %, titration acidity 60 %, total soluble solidle 33,66 %. In Vivia (F-172)F_1, the percentage of vitamin C was 81,64 %, titration acidity 47,5 %, and the total soluble solidle 39.4 %. In TMV infected Alia F_1 the percentage of vitamin C was 33,3 %, total soluble solidle 24,5 % and titration acidity ratio was low as 16.9 %. The same results in the TMV infected Salima F_1 were 64,4 % in vitamin C, 56.4 % in total soluble solidle and 31.0 % in titration acidity.

The Detection of Cucumber Mosaic Virus (CMV) by Dot-Elisa Method

F. ERTUNÇ (18)

In this research, Y (yellow) and Z (Zinnia) strains of cucumber mosaic virus (CMV) were detected by using the Dot-ELISA method in which nitrocellulose membrane was used as solid state. Investigations were conducted in order to compare DAS-ELISA and Indirect ELISA by either using crude saps of infected tissues or purified preparations of both strains. Antiserum production was done according to an earlier method and partially purified gammaglobulins were conjugated with alkaline phosphatase enzyme. Commercially prepared affinity puried goat anti-rabbit IgG (conjugated with alkaline phosphatase) was used

in Indirect ELISA tests. Controls were performed with healthy tobacco sap (**N. tabacum** var. Samsun NN) and no reaction was observed at all. Application of Indirect ELISA to Dot-ELISA has proved better results compared to DAS procedure and dilution end points of Z and Y infected crude saps were detected as 10^{-2} - 10^{-3} respectively, whereas, detectable minimum amount of purified preparations was 0.1 ng/dot.

The Preliminary Investigations as to Virus Diseases on Eggplants

S. ERKAN (9) Ü. YORGANCI (9)

During the survey in 1984 and 1985 over the Southern and Western parts of Turkey, the leaf samples were collected from eggplants with virus-like symptoms as stunting, deformation and mottling on leaves, and reduction in size of leaves. According to their symptoms on test plants, physical properties, serological reactions in agar and particle morphology, tobacco mosaic virus «TMV» and eggplant mottled dwarf virus «EMDV» were detected in leaf samples. It was observed that TMV was the most common virus in eggplants, followed by EMDV. The latter has been described, in details, for the first time on eggplants in our Country through the present study.

Studies on the Incidence of Seed-borne Viruses on Certified Seeds of Tomato, Pepper, Eggplant and Onion in Aegean Region

Y. ÇİÇEK (36) Ü. YORGANCI (9)

In this study, seedlots of tomato, pepper, eggplant, lettuce and onion received by the Provincial Control Laboratory of İzmir for the purpose of being certified were evaluated for the existence of seed-borne viruses. Particularly for diagnosing sap-transmissible viruses, lesions on specially selected systemic and local-lesion indicator plants and serology (micro- precipitation and ELISA) were used to detect seed-borne viruses. The results indicated that seed specimens of tomato. pepper and eggplant tested were found to be contaminated with tobacco mosaic virus (TMV) at percentages of 98.1, 18.4 and 7.4, respectively. Seed specimens of lettuce were also found to be infected

with lettuce mosaic virus (LMV) or cucumber mosaic virus (CMV) by 42.3 %. With regard to onion seeds, it was not possible to detect any viruses. Among the detection techniques applied, ELISA was found to be inexpensive, reliable and rapid seed test which might be of great benefit for seed certification and control.

The Biological and Serological Studies with Tobacco Mosaic Virus Strains Isolated from Various Cultivated Plants

Ü. YORGANCI (9) S. ERKAN (9)

In the present study, 11 isolates (4 from tomato, 3 from tobacco, 1 from chrysanthemum, 1 from eggplant, 1 from freesia and 1 from pepper) which had been detected to be the strain of tobacco mosaic virus in the previous investigations were comparatively examined from the stand point of their reactions on several test and cultivated plants and their serological properties. It was observed that these isolates having fairly different symptoms on cultivated plants caused similar symptoms on all test plants except for pepper. Moreover, it was determined that the serological properties of isolates in question were almots the same.

Investigations on Vein-clearing and Vein-yellowing Type of Symptoms on Cotton and Tobacco

M.A. YILMAZ(7) D. ÖZASLAN (43) G.P. MARTELLİ (45)

Cotton is a important export crop in Çukurova region. Virus-like sympoms, vein yellowing and mild type of leaf crumpling were observed on cotton plants. It was considered that this disorder might be caused by whiteflyborne viruses. The viruliferous whiteflies (50-100) were transfered from cotton to Turkish and White Burley tobaccos. Vein-clearing and vein-yellowing type of symptoms were observed on Samsun and White Burley tobaccos after 15 to 20 days of inoculation acces period. Thin sectioned tobacco and cotton cells revaled that they were infected by Gemini virus. This type of cytological alteration (fibrillar rings in the nucleus) suggest that this virus may belong to subgroub B of Geminiviruses.

Potato Leaf Roll Virus (PLRV) by ELISA Test on Early Growing Potato Cultivars in the Çukurova Region of Turkey

M.A. YILMAZ (7) S. BALOĞLU (7) Y.Z. NAS (21)

Because of economic affairs and environmental conditions the early potato production has been increased in Çukurova region. Several viruses attack potato and reduce the yield potential. One of the important virus diseases among them is PLRV. There has been some classical work on potato virus diseases, dealing with distribution, incidence and identification in Turkey but recent development in serology, like Enzyme-Linked Immunosorbent Assay (ELISA), has not been used to make survey and find out the incidence of PLRV. Therefore the ELISA test was used to make survey PLRV in the early potato cultivars in Çukurova region. The study was carried out on the samples collected from 10 (1987) and 12 (1988) different area in the region. The PLRV was found between 1.6 - 12.14 % and 0.8 - 17.68 % in 1987 and 1988 respectively. PLRV was not detected on the potato samples of Yenice and Incetarla in 1987.

Investigations on the Effects of Protein Biosynthesis Inhibitors on Some Plant Viruses

S. AKSOY (52) G. ERDİLLER (3)

By this study, the effects of the antibiotics like the biosynthesis inhibitors as chloramphenicol (CAP), cycloheximide (CH) and absorbsiyon and penetration inhibitor as amantadine (A) on the multiplication of beet mosaic virus (BtMV), tobacco mosaic virus (TMV) and tobacco necrosis virus (TNV) in local lesion hosts and lesion sizes were investigated. Following their development in test plants, viruses were isolated and then mechanically inoculated to the local lesion hosts together with the inhibitors and when the lesions became prominent, countings were made and their diameters measured. The application rates of the inhibitors were 50-100 µg/ml for CH and A, and 500-1000 µg/ml for CAP. CH effected TMV to induce lesion formation a day earlier than the others, whereas a day later for TNV. CH was found to be the most effective in inhibition of virus multiplication. CAP increased the TMV lesion size with respect to the others. Although a difference was found in average lesion numbers and sizes with BtMV, TMV and TNV comparing inhibitor applications and controls, statistically it was insignificant regarding F values. By the method used in this study, the inhibitors tested were found insufficient in inhibition of BtMV, TMV and TNV multiplication in plant tissues.

Host Range, Seed Transmission, Purification and Serology of Cowpea Mosaic Virus on Leguminosae

D. ÖZASLAN (43) M.A. YILMAZ (7)

Cowpea mosaic virus is one of the important virus disease of Leguminosae family in Turkey. In this research, host range, rate of seed transmission and serological properties of cowpea mosaic virus were investigated. It was found as a severe strain of cowpea mosaic virus.

The Effects of Different Concentrations of Nutrition Solutions on Soybean Mosaic Virus (SMV) in Soybean Plants and Physiological Changes Occurring in the Plant

N. ÖZMEN (16) G. ERDİLLER (9)

In this research the prevention of common soybean mosaic virus by using fertilizers was investigated. The nutritient solutions containing different concentrations of nitrogen (N), phosphorus (P) and potassium (K) were prepared separately and mixed with the vermiculite where soybeans were grown, then the effect of soybean mosaic virus was investigated. The following results were observed: the effect of the virus was less for 80 ppm nitrogen (N_2) in the nitrogen series, 90 ppm phosphorus (P_3) in the phosphorus series and 40 ppm potassium (K_1) in the potassium series. Furthermore, the respiration of infected and healthy plants and also the amounts of chlorophyl of infected and healthy plants leaves were measured. With the same doses, the respiration of infected plants was found to be similar to healthy plants and the amounts of chlorophyl were increased statistically significantly in infected plants.

Virus and Virus-like Diseases Affecting Grapevines and Growing Virus-free Grapes in the Aegean Cost

T. AZERİ (24) Ü. FİDAN (24)

The clones of **Vitis vinifera**, American rootstocks (110-R, 99-R, 5-BB, 41-B, Lot, 420-A) and root knot nematod resistant rootstocks (Harmony, Salt Greak, 1616, 1613, Dodrige) have been indexed since

1980 for detecting grape virus and virus like diseases by using woody indicators such as R.St.George, Mission, LN-33, Baco 22 A, Pinot noir, and the host plants. The indexing results in this experiment revealed that, most of the grapevines were infected by fanleaf, arabis mosaic v., fleck, asteroid mosaic, vein necrosis and rogese wood (stem pitting=legno riccio and stem grooving), leafroll, yellow vein and TMV viruses were also detected in indexing test. Flovescence doree, enation and corky bark diseases were not observed in the field survey and indexing test. Heat therapy was also carried out for obtaining virus free grape clones. Totally 15 virus free Sultana plants were obtained by thermotherapy and indexing. The therapy and indexing have been performed for the American roctstocks.

Citrus Budwood Certification Program of Turkey and Its Problems

A. ÇINAR (7)

Since 1960s there has been some efforts to establish a citrus budwood certification program in Turkey but with no success. Seven years ago, the Department of Plant Protection of Çukurova University had started with an effort to produce virus and virus-like pathogens free budwood of citrus in cooperation with the Ministry of Agriculture, Forestry and Rural Affairs. The virus and virus-like pathogens being problem on citrus trees in Turkey are as follows; exocortis, xyloporosis-cachexia, psorosis-A, blind pocket, concave gum, impietratura, cristacortis, gummy bark, gummy pitting, taracco pit, satsuma dwarf, wood pocket, etc. At present the disease-free budwood could be produced by using the techniques of thermotherapy and in vitro shoot-tip grafting. But the lack of enough financial support, the encouragement of establishing new laboratories, educating new working groups in the research institutes having responsibility, and organization of the nurseries undertaking the production of disease-free budwood, etc. make the success of the program questionable. This program is being carried out within our framework of cooperation under the responsibility of the Ministry.

Preliminary Results of the Existence of Virus and Virus-like Diseases on Candidates Citrus Trees in Turkey Citrus Improvement Programme

A. ÇINAR (7) M. GÜLLÜ (21)

In frame of citrus selection and certification project of Turkey, 36 candidate trees from different citrus species and cultivars were determined in order to establish the rate of trees affected with tristeza, psorosis, exocortis and xyloporosis-cachexia. Thirty four candidates from them were indexed in the Department of Plant Protection of Çukurova University. The work is still not completed. The aim of this report is to publish the preliminary results of the existence of virus and virus-like disease discovered on the candidate citrus trees. In addition, the observed visual symptoms of some virus and fungal diseases on those trees were reported. According to the primary results of indexing, it was found out that all 34 candidate trees were free from tristeza. Twenty nine of them were found to be infected with only one but 22 trees with also two of the above mentioned patogens.

Unreported Virus Diseases of Citrus Trees in Turkey

M. GÜLLÜ (21) A. ÇINAR (7)

In order to identify and find out the contamination rate of citrus virus and virus-like diseases on East Mediterranean region, it has been carried out wide area surveys from 1985 to 1988, and symptomatologically examined about 50.000 citrus trees in this period. In the results of observations, it was first time reported the presence of gummy bark (pholem discoloration of sweet orange) virus disease in sweet orange varieties on grafted only sour orange root stock. Up to date the presence of never reported another virus disease in citrus is Tarocco pit that affected on native sweet orange varieties whose origines are unknown. Another important citrus virus disease in our country is wood pocket, also called lignocortosis or lime-blotch, affected interdonato lemon variety. Presence of this disease in our contry was first time revealed in terms of wide area surveys.

The Detection of Psorosis Disease by Indexing Citrus Varieties in Eastern Mediterranean Area

N. ÖNELGE (7) A. ÇINAR (7)

Citrus industry in Turkey has been expanding rapidly in spite of many factors limit citrus production. Viral diseases require a special attention since the lack of any chemical control methods. Many viral diseases showing similar symptoms on young leaves called psorosis group and the existence of some of them in the region was proved by survey studies. In this study it was aimed to prove the existence of psorosis group in Eastern Mediterranean basis. The performance of indicator plants was also studied. Existence of one or few viral diseases of prorosis group was revealed simptomatically, and indexed on sweet orange variety Parson Brown, sour orange and Kara mandarin. Crinkly leaf virus was tried to transmit by mechanically cowpea **(V. sinensis)** and bean **(P. vulgaris)**. Indexing studies indicated that trees selected for indexing were carrying at least one diseases of psorosis group. Symptomless trees were also not free from viral diseases. Indicator plants showed schock, vein banding, oak-leaf, patchy spots symptoms of psorosis group, nutrient deficiency, and crinkle leaf symptoms. Crinkle leaf was also transmitted mechanically to cowpea and bean. The results indicated that all trees selected for indexing were contaminated with viral diseases of psorosis group. Therefore no trees should be user as a fondation material without being indexed.

Purification by Density Gradient Centrifugation Methods and Detection of Citrus Tristeza Virus by ELISA Test

S. BALOĞLU (7) M.A. YILMAZ (7)

Tristeza, one of the most destructive virus diseases of citrus, carries a great potential of danger for citrus production especially growing in the eastern Mediterranean region of Turkey. Because very sensitive species, sour orange, is used extensively as a rootstock and infected as a inoculum source and vector insects are present in the region. CTV was purified by CsCI density gradient centrifugation method from the bark and fruits albedo in which the virus concentration was obtained 0.75 mg/ml. The titer of the antiserum was found to be 1/64 in the tube precipitin tests. Out of 112 trees, which were selected from 8 localities, 71 gave positive results by ELISA test. The bark tissue and sample collected during spring months (especially in May), gave the best results for ELISA test. Keeping the samples -20°C for 6 months were found to be useable for testing.

Transmission of Citrus Impietratura Virus Disease to Lemon Trees

Y.Z. NAS (21) M.A. YILMAZ (7) S. BALOĞLU (7)

The research was conducted at the Plant Protection Research Institute from 1987 to 1988 in Adana. Impietratura virus disease was succesfully transmitted to grapefruit trees (**C. paradisi** Macf.) but no was transmitted to lemon trees (**C. lemon** (L.) Burn.). On the other hand, the symptoms caused by Impietratura virus disease was observed on the lemon fruits in a few orchards. In order to make a decision, if Impietratura virus disease was transmitted to the lemons and symptoms were caused by the virus on this host, the research will continue.

Investigation on the Causes of Fruit Dropping of Apricot and Plum Trees in Ankara Province

G. ERDİLLER (3)

According to the observations during summer months in 1986 in orchard of Agricultural Faculty and Pink House garden in Ankara, it was recorded some colour changes with ringlike and stripelike lesions in yellow and pale green colour on the leaves and fruit abnormalities on apricot and plum trees. Taste changes and high acid ratios has been found out in diseased fruits. Ringlike yellow spots were seen on the seeds of diseased apricot fruits. First symptom of the disease was excessive fruit dropping in the gardens. According to the results in the mechanical inoculation and serological tests such as precipitation and radial diffusion assays in 8 of apricot and 11 of plum varieties the causal agent was found to be a virus. Tokaloğlu variety of apricot was found very susceptible while the Early Stark Delicious tolerant to virus disease named as Plum Pox virus.

The Inoculation of Bacterial Canker Agent of Tomato to Seed and Determination of the Resident Phase in the Plant Tissues

H. ÖZAKTAN (9) H. SAYGILI (9)

In this research, it was proved that the bacterial canker agent of tomato (**C.m.pv.michiganense**) infested into the seed. It was thought

that the best method was the vacuum infiltration between the methods of seed inoculation. But, the certain symptoms of the disease couldn't observed in the plants growing from the inoculated seeds. This fact may be depend on either environmental conditions; or may be also related to the existence of a population of **C.m.p.v.michiganense** in a resident phase in tomato plants. It has been determined that there was a population of bacteria varied from 10^4 to 10^8 CFU/gr plant, in the plants which weren't observed the symptoms of the disease, and thus, it was thought that the disease could be determined at the earlier growth stage.

The Bacterial Disease of Tomato Caused by **Pseudomonas cichorii** in Turkey

G. DEMİR (24) M. GÜNDOĞDU (24)

Tomato pith necrosis was first observed in Fethiye in the summer of 1986 and then, in other areas growing tomatoes in green houses. Symptoms of the disease were brown pith necrosis, stem lesions or sudden wilt of tomato plants. Twenty-five bacterial isolates obtained from the infected plants were examined. In a preliminary observation all of them were shown to be members of the genus **Pseudomonas,** but according to LOPAT tests none of them resembled **P. corrugata.** The morphological, cultural, biochemical, physiological and pathogenicity characters of all isolates were studied and compared with **P. corrugata, P. viridiflava** and **P. cichorii.** On the basis of the cultural, morphological, biochemical and pathogenicity characteristics of twenty-five isolates of the bacterium, it was identified as **P. cichorii.** The data from the present study, the recommendations for disease control included removal of all severely infected plants and avoiding the some cultural practices (high humidity, close planting etc.).

Studies on the Serological Identification of Some Bacterial Diseases in Tomato

A. UÇKAN (36) H. SAYGILI (9)

This study aimed at the serological identification of phytopathogenic bacteria that cause serious damage to tomatoes grown in Aegean

of Turkey. The phytopathogenic bacteria, studied, were: **C.m.pv.michiganense, P.s.pv.tomato, X.c.pv.vesicatoria.** Antigens of these bacteria were prepared as follows: **C.m.pv.michiganense**-2: $3x10^{10}$ cells/ml., 96 hours, 1 hour+100 C. **P.s.pv.tomato**-1: $2x10^{9}$ cells/ml., 48 hours, formaline (0,1%-0,2%.) **X.c.pv.vesicatoria**-6: $1,4x10^{9}$ cells/ml., 48 hours, unheated. Rabbits were tested firstly for the suitability to immunization and then, they were injected according to the immunization schedule. At the end of immunization period, their bloods were collected, centrifuged and finally antisera were prepared. With slide agglutination test, spesific reactions were observed in a short time and species-level identification of bacteria was possible. With tube agglutination test, bacteria species were also identified quickly. Tube precipitation test; as being very sensitive, spesific and precise, was utilized to identify. In tube Oudin test and tube Oakley-Fultharpe test, results were highly satisfactory. No significant results were obtained from radial diffusion and Mancini tests on plate. As the Ouchterlony test on plate was applied to the research material, specific reactions that made the species-level identification possible were noted. Furthermore, by above-mentioned methods, the following bacteria were also evaluated: **A. tumafaciens, C. sepedonicum, E.c.pv.carotovora, Ps.pv.viridiflava, X. campestris.**

Characterization of **Xanthomonas campestris** pv. **malvacearum** Isolates from and Resistance Tests of Turkish Cotton Cultivars

M.A. ZACHOWSKI (46) Ö. ÇINAR (7) K. RUDOLPH (46)

Leaves of cotton with typical angular water soaked spots were collected within 3 years (1985, 1986 and 1987) in different regions (Adana, Antalya and Izmir) of Turkey. From these more than 100 isolates of the pathogen **Xanthomonas campestris** pv. **malcavearum** were obtained. Bacterial suspansions (5 x 10^5 CFU ml^{-1} in sterile boiled tapwater were infiltrated into the first true leaves of 10 different cultivars of the set of differentials of upland cotton (**Gossypium hirsutum** L.). The plants were incubated in a growth chamber (day: 12 h. 20.000 lux in plant height, 26.5°C, 75 % RH; night: 19°C, 85 % RH). Six differential cultivars reacted susceptible, which characterized all the bacterial isolates as race 7. (Ca. 1/10 of all isolates split into mutants when inoculated in the incompatible cultivar «Stoneville 20»). These mutants caused water soaked spots on «Stoneville 20» and, thus, belonged to the highly virulent race 10. The 12 most important cotton cultivars grown in Turkey, including «Deltaphine 15/21» and «Caro-

line Queen 201» were highly susceptible towards the Turkish isolates of **X. malvacearum**. In order to reduce losses by this disease it is suggested to incorporate resistant genes into the cotton cultivars grown in Turkey. The disease incidence can also be minimized by delintig cotton seed with sulphuric acid and by growing cotton in rotation with other crops regularly.

Preliminary Studies on Potato Scab (**Streptomyces scabies** (Thaxt) Waks. et Henrici) in Ege Region

S. KAYA (50) M. GÜNDOĞDU (24)

Through this study. some aspects of potato scab such as control methods, the effect on the yield and the relation between the disease and ecological factors have been studied. The results from the studies of three years showed that the treatment of soil and tubers with some chemicals (Brassicol, Difolatan and Dithane M-45) was effective on the control of the disease. In order to prevent the present disease, four waterings with the interval of two weeks and six waterings were the interval of a week gave satisfactory results. Furthermore, it was observed that the applications of certain fertilizers with green manuring was preventive for the disease.

Bacterial Diseases Determined on Food Legumes in Aegean Region

G. DEMİR (24) M. GÜNDOĞDU (24)

170 growing areas were surveyed in Izmir, Aydın, Balıkesir, Denizli, Çanakkale and Uşak Provinces to determine the bacterial disease causing harm broadbeans, peas, beans and cowpeas. From the results of surveys carried out at two different stages of growth (at seedling and maturing) between the years of 1984-1986, it was found that there were a few bacterial brown spot (**Pseudomonas syringae** pv. **syringae**) and widely halo blight (**P. syringae** pv. **phaseolicola**) and common blight (**Xanthomonas campestris** pv. **phaseoli**) on beans in Balıkesir. It was observed that **P. syringae** pv. **syringae** and **P. viridiflava** caused

bacterial blights on peas. It was seen that bacterial blight (**X. campestris** pv. **vignicola**) causing blights on leaves, stems and pods on cowpea was only present in one growing-areas. Identification of the bacterial isolates have been done by the morphological, biochemical and pathogenicity features. Bacterial pathogens from especially peas and cowpeas are isolated for the first time in Turkey.

The First Evidences of the Natural Transmission of the Stubborn Disease in the East Mediterranean Area

A. ÇINAR (7) K. ÇAĞLAYAN (7)

One of the most important disease of the citrus in the East Mediterrenaean area is stubborn, reasonable to the remove of citrus orchards in their most productive stage. The introduction of this disease to Turkey is probably due to imported young citrus trees or budwoods. In the following years the disease have been disseminated to the country due to lack of knowledge and planning on the production. Although it has been thought the use of infected buds is the most important reason of widespread of the disease, it has been realized that vectors are another cause for it. In this study the possibilities of natural transmission of stubborn disease has been studied. In order to observe natural transmission, **Vinca rosea** L., which are indicator plants for stubborn, have been put into the infected citrus orchards both in Adana-Karataş and İçel-Alata. However the natural infected plant has been found only in Karataş with atypical symptoms and **S. citri** has been isolated from that plant. Infected periwinkle plant has been tested by ELISA (Enzymelinked Immunosorbent Assay) to interpret atypical symptoms and it has given positive result but very weak reaction. It remains the mix-infection possibility and to prove this idea isolation of virus-plaques has been tried a lot of plaques have been observed on the solid culture of **S. citri**. In addition to this results the studies with electron microscope showed that there are some mycoplasma like organisms (MLO) in the phloem of the plant. All these studies showed that the reason of atypical symptoms on that **Vinca** plant is the mix-infection of **S. Citri** + Virus + MLO. **S. citri** was isolated from one of the **Exitianus capicola** Stal., collected from the fields. According to those results the first evidences of the natural transmission of stubborn disease in the East Bediterranean area, which lead to the future work, have been found.

Isolation and Identification Using Serological Methods and One Dimensional Gel Electrophoresis of **Spiroplasma citri**, Causing Citrus Stubborn Disease

K. ÇAĞLAYAN (7) A. ÇINAR (7)

The stubborn disease, caused by **Spiroplasma citri** a mycoplasma like organism, is one of the most important problems which effects the citrus production in the East Mediterranean area of Turkey. In this study it has been aimed that cultivation of **S. citri,** the causal agent of stubborn disease, followed by the ELISA test in order to prove the results of the isolation and symptomatologic observation as well as identifying the isolates using serology and one dimensional electrophoresis. As a result the symptoms with the details of stubborn disease has been defined in this area. **S. citri** has been cultivated from the Navel oranges like Washington, Parent, Atwood and Skaggs Bonanza; Valencia orange, local orange, Fremont and Encore mandarins, grapefruits and Mineolo tangelos. Using ELISA, it has been confirmed that those varieties have been infected by stubborn pathogen. By using ELISA and the one dimensional gel electrophoresis in different citrus have been confirmed to each other and also known isolates of **S. citri.** Hence followed that all the isolates are exactly identical and also identical to known isolates of **S. citri.** Thus **S. citri** isolates of Turkey can be studied in the same group as other **S. citri** isolates from citrus.

Elimination of Virus and Virus-like Pathogens from Navel Cultivars

A. ÇINAR (7) Ş. TAMER (7)

The purpose of this work was to obtain virus-free budwood material from the cultivars of Atwood Early Navel, Carter Navel, Parent Washington Navel and Skaggs Bonanza Navel infected spontaneously or artifially with psorosis like viruses, tristeza, exocortis, xyloporosis-cachexia and **Spiroplasma citri.** For this aim, three different techniques including themotherapy, in vitro shoot type grafting and the combination of both were used. For hot-air treatment, the budded navel cultuvars on the sour orange were firstly preconditioned at 29-39°C alternating temperature for 8 weeks. There after they were held at the alternating temperatures by 16 weeks at alternating temperature of 40°C for 16 hr/day and 30°C for 8 hr/night. After all **Spiroplasma citri** and Xyloporosis-cachexia were inactivated. Through in vitro shoot

type grafting, the other four diseases except psorosis could be eliminated. Psorosis could be inactivated with in vitro shoot type grafting only 47 %. The application of the combination of both techniques raised the success of freeing the plants infected with psorosis from 47 % to 73 %.

Studies on the Interaction between **Pseudomonas tolaasi** and certain Unidentified Pseudomonads

K. BENLİOĞLU (22) T.F. PREECE (44)

Pseudomonas tolaasi has been cited as the causal agent of bacterial blotch disease of cultivated mushrooms. A sharply defined white line of precipitate forms in Pseudomonas Agar F (Difco) between the opaque white colonies of **P. tolaasi** and the translucent colonies of a known reacting strain of Pseudomonas spp. This visible interaction has been utilized in a specific and reliable method for the identification of **P. tolaasi.** The studies reported in this paper form part of work aimed at understanding whether the cells of **P. tolaasi** affect those of **Pseudomonas** spp. in liquid culture, and how the cells making up colonies of **P. tolaasi** and **Pseudomonas** spp. are affected by the white line precipitate in agar plates. The white line production in agar has not any effect on the cells of **P. tolaasi** and the reacting bacteria, and their colony structure. However, the quantitative recovery of these two bacteria from liquid culture containing different inoculum concentrations has shown that the growth of **P. tolaasi** is not affected while Pseudomonas spp. tend to be suppressed.

Investigations on the Stolbur Disease of Tomato in Marmara Region

A. NOGAY (25)

In the present study, it was tried to determine the rate of disease incidence of stolbur in the various tomato cultivars growing in Marmara region, the influence of transplanting dates on the incidence of disease and stolbur vectors, the effect of vector control by chemicals on the rate of stolbur infection and the yield. For these studies, the field experiments were set up in Bursa (Yenişehir, Karacabey) and

Edirne (Enez). At the studies determining the infection rate of stolbur, it was observed that none of 21 tomato cultivars investigated were resistant to stolbur and there was no significant differences between their susceptibilities. The grafting experiments in greenhouse confirmed this observation. As a result of the experiments determining the relationship between disease and the sowing date of the seedlings revealed that in the field plots of tomatoes transplanted at the end of April or beginning May both the incidence and severity of the infection were lower in comparison to later transplanting dates and early sowings have economic importance as a control measure. At the studies of the vectors, 23 different leafhopper species belonged to the families of Cicadellidae, Cixiidae, Cercopidae and Delphacidae were collected. Among them, **Hyalesthes obsoletus, Aphrodes bicinctus** and **Macropteles** sp. have been reported as vectors of stolbur by some workers in the literature. We suggest that it can be benifical to investigate whether **Empoasca decipiens** found at the highest ratio is vector or not. In the experiments concerning the control of vectors, Gusathion, Dipterex and Malathion were sprayed against the leafhoppers and their effects on the rate of disease incidence of stolbur were found 35.18, 44.00 and 47.43 % respectively. Furthermore, the effect of chemical control on the yield were determined. The chemicals mentioned caused the yield to increase at the rates of 25, 40 and 20 % respectively. Taking these results into consideration, it was discussed that whether the vector control has economic importantance or not.

Studies on the Symptoms, Damages and Disease Incidence of Mycoplasmalike Oganisms (MLO) on Potato Cultivars in Erzurum Region

S. AÇIKGÖZ (4)

Diseases caused by mycoplasmalike organisms (MLO) in Erzurum region are at an important level to affect the potato production in this region. In the region the disease progress was determined on eight potato cultivars by periodic observations starting from the emergence stage and it was found that in Merkez, Pasinler and Oltu provinces the disease increased in Agust and it continued rapidly in September. Witches broom, aerial tuber, gummy tuber and purple top-roll symptoms caused by MLOs were observed on İsola, Marfona, Famosa and Granula potato cultivars. The measurements made to determine the yield loss caused by MLOs on four potato cultivars, showed that these diseases reduced the tuber yield in compare to healthy plants. The

number of tubers produced by diseased plants were higher but their sizes were smaller than the healty plants. On the other hand the rates of starch and crude protein were lower in tubers of diseased plants than that of healty plants. In normal sprouts the rate of protein was lower but the starch was higher than hairy sprouts.

The studies on the Detection by the Method of Gallocyanine-chromalaun Staining of the Mycoplasma Diseases of Potatoes

E. ÖZSEZGİN (9) Ü. YORGANCI (9)

In the present study, it was investigated the usebility of the method of gallocyanine-chromalaun on the detection of the mycoplasma diseases of potatoes. So, the tubers of some potato cultivars with the symptoms of hair (threadlike) sprouts were obtained from Regional Agricultural Research Institute Menemen for this work. As control, the healthy potato tubers were used. Data from the experiments by the light microscope showed that many sieve tubes in the phloem zone around two sides of xylem in the infected plants were stained light to dark blue in color with gallocyanine-chromalaun, Considering the base of the method in question, it follows from this evidence that the tissues were infected with mycoplasma like organisms. According to the findings obtained, in order to detect the infection of mycoplasma-like organisms in potato samples, the method of gallocyanine chromalaun staining is a way giving the results in a short while and without many optical equipments.

Studies on Fire Blight (**Erwinia amylovora** (Burr.) Winslow et al.) of Pome Fruits

Y.E. ÖKTEM (22) K. BENLİOĞLU (22)

Fire blight is one of the most destructive bacterial diseases of pome fruits. It was firstly detected in 1985 on pear trees, grown in Sultandağ of the Afyon province in the West Central Anatolian Region. Isolation methods, pathogenicity tests and other characteristics were searched and antiserum was prepared against it. In 1987 the disease was also detected in Isparta and Burdur though in a limited area. It was observed that apple, pear and quince trees were attacked but the harm on pear and quince trees were found to be extremely severe. Consequently, the necessary quarantine measures are applied and an eradication program has been initiated. Application of cupper compounds are being used as a means of chemical control.

Trichoderma species Determined in Turkey

S. İREN (3) S. MADEN (3) Y.Z. KATIRCIOĞLU (3)
K. ERZURUM (3)

Trichoderma species of Turkey were determined by examining 32 isolates taken from various places and the review of literature. The collected isolates were grown on 2 % malt extract agar at 25°C in darkness for two days, then 1 day in the laboratory in diffused light, and examined for conidiophore and phialide structures. Spore size and ornamentation were determined from the cultures kept 14 days under near ultra violet light. Identification of the species was made according to the findings of some workers. The distribution of the 32 isolates was as the following: 10 **T. harzianum,** 9 **T. viride,** 7 **T. pseudokoningii,** 4 **T. hamatum** and 2. **T. koningii.** The formerly determined species in Turkey were also the same ones as above. The origin of the most of the **Trichoderma** species was soil and related materials, although some of them were obtained from seeds, fruit and onion bulb rots.

Some Parasitic Fungi Determined on the Flora of Gülveren Village (Erzurum-Şenkaya)

A.Ü. TAMER (2) Y. ALTAN (20) F. GÜCİN (17)

This paper gives a list of 47 species of parasitic fungi from Gülveren Village (Erzurum-Şenkaya). Out of these, 4 species belong to the class Oomycetes, 7 to Ascomycetes, 24 to Basidiomycetes and 12 to Deuteromycetes. 25 species of parasitic fungi have been recorded as new hosts for Turkey. And, 10 species are added to the Turkish parasitic fungal flora with the present study.

Efficiency of Callus Ages on Embryogenesis in Tomato Plants

F. PALA (7) A. ÇINAR (7)

The aim of the research was to find out suitable callus age for optimum shoot formation via determining relationships between the ages of callus which are obtained from tomato plants. c.v. Supermarmende, and shoot formation abilities. For this aim after cotyledon and leaf particles were cultured in callus culture media for 2 and 3, 4, 5

weeks they were subcultured, in shoot formation medium. According to the data obtained from countings of subculture medium after 4 weeks, amounts of callus leading to the shoot formation were more in cotyledon calli. The most shoot formation rates of cotyledons and leaves were obtained to be 33.67 % at 3 weeks old callus particles and 9 % at 2 weeks old calli, respectively. As the callus was grown old, their shoot formation abilities were decreased and 5 weeks old leaf calli could not form any shoots.

Studies on the Sporulation of the Early Blight Agent (**Alternaria solani**) of Tomatoes

S. BENLİOĞLU (22) N. DELEN (9)

Alternaria solani, the causal agent of early blight disease of tomatoes, has recently been of great importance in Turkey. It is rather difficult to induce sporulation of **A. solani** and some **Alternaria** spp. on artificial media by the conventional methods. Over a hundred publications deal with sporulation of **A. solani on** artificial media. Plant pathologists and breeders use conidia of the fungus for fungicide resistance and as inoculum to screen plants for resistance to fungus. There has not been done any work on this subject in Turkey as yet. In this study, 9 different artificial media: potato dextrose agar (PDA), tap water agar (TW), corn meal agar (CMA), Czapek (oDx) agar (Cz), malt extract agar (MEA), S-medium, V-8 juice agar (V-8), vegetable juice agar (V-88), tomato juice agar (T) in combination with 4 different light and temperature conditions were tested for the inducing sporulation of **A. solani** in vitro. V-8 juice agar, tomato juice agar and vegetable juice agar promoted extensive sporulation of **A. solani** when the fungus was incubated successively at 23°C for 6 days dark, 26°C for 12 h light and 18°C for 12 h dark. It was confirmed that the sporulation of different **A. solani** isolates may be induced by the above mentioned media and light-temperature conditions.

Obtaining Resistant Lines Against **Fusarium oxysporum** f.sp. **lycopersici** (Sacc.) (Syn. and Hans) by Somaclonal Variation in Tomato Plants

A. ÇINAR (7) F. PALA (7)

In order to resistant plants to **Fusarium oxysporum** f.sp. **lycopersici** were obtained, resistant lines to fungus's toxin, fusaric acid and

its culture filtrate were selected in vitro. In the result of experiments, in 5 different culture media studied for direct somatic embryogenesis, the highest shoot formation per cent of leaf, cotyledon, hypocotyl and internod explants were obtained from leaf particles in Linsmaier-Skoog (LS) culture medium containing 1.126 mg/lt BAP. For shoot rooting, 5 different culture medium were studied and as a result MS culture medium involving 0.1 mg/1 NAA was suitable for its rooting. For obtaining resistant lines to **F. oxysporum** f.sp. **lycopersici** by somaclonal variation and direct somatic embryogenesis shoots were obtained from leaves in shoot medium involving fusaric acid or its culture filtrate in different concentrations. The number of shoots were gradually decreased as concentrations of stress factors in media were increased.

The Course of Infection in Tomatoes by **Colletotrichum coccodes** (Wallr.) Hughes Isolated from Potatoes

M.T. DÖKEN (4)

Colletotrichum coccodes (Wallr.) Hughes which is widely distributed in the soils of Erzurum Region-Turkey was isolated from the roots of potatoes. The infection of the isolate in the plants and fruits of Red Claud and Yeşilköy 72 Yalova tomato varieties was observed on account of symptom exhibition and host-pathogen interaction. The infection initiated in the underground parts of the seedlings advances as slow intracellular hyphal development and sclerotia formation. The invasion of cortical cells lead to breakdown of the cortex which may become detached from the central cylinder espacially in young roots, while in thick main roots and in lower stem the development of the fungus is usually limited in the outer layer of cortex. The symptoms of the above ground parts of the plants appear as slight wilting usually at the begining of fruit ripening in which case the roots and the lower stem are completely covered by sclerotia. Fruit infections occur on ripe fruits only through wound inoculations. However in green fruits the fungus remains latent until fruit ripening. In fruits the hyphae proceed intracellularly to every direction in epidermal and paranchymatous tissues and produce sclerotia near surface as a result the tissues disintegrates and consequently decay. One week after inoculation initial symptoms exist as small circular sunken spots on ripe fruits, then they enlarge and become dark in time. The infection of this isolate which completely rots the fruits cause its main damage on fruits rather than plants.

Determination of the resistance of Eggplant Cultivars to **Verticillium dahliae** Kleb.

N. FİLİZ (28)

This study was conducted at Aegean Agricultural Research Institute between 1986-1988. The aim of this study was to determine of the resistance of both local and foreign cultivars or lines to **Verticullum dahliae** The isolate has been obtained from Regional Plant Protection Research Institute, Bornova. In this experiment dipping method for inoculation was used whe the eggplant seedlings reached the 3 or 4 leaved stages. **V. dahliae** isolate was developed in sucrose-nitrate medium with 10 days period and seedlings were dipped for 15 minutes. After 1 month from inoculation, seedlings were evaluated for disease incidence using 0-4 scale. As a result, the resistance situation of 39 materials were determined. None of them were found to be resistant to **V. dahliae.** The disease incidence of some cultivars or lines were determined to be slightly resistant.

Establishing the Pathogens of Strawberry Root Rot Disease in Çukurova Region of Turkey

A. ÇINAR (7) H. PALA (7)

Strawberry has received a special interest recently by growers of Eastern Mediterranean of Turkey. Strawberry is propagated by planting runner plants obtained from old and diseased strawberry fields, which causes about 30 % death due to root-rot annually. Since there has been found no record in Turkey on causal agent, it was aimed to study the primary and secondary pathogens. To determine the root rot causing pathogens, root isolations were made from 10 different strawberry fields for one year and sixty four fungal isolates belonging to 25 genera were found. The most common of these were **Aspergillus, Fusarium, Rhizoctonia, Alternaria** and **Macrophomina.** The primary pathogen was found to be **Rhizoctonia solani, Fusarium** spp. and **Macrophomina** sp. were also the secondary pathogens.

Determination of Susceptibility of some Cotton Varieties Against Cotton Wilt Disease Caused by **Verticillium dahliae** Kleb.

A. KARCILIOĞLU (24) H.B. KABADAYI (30) E. ONAN (24)
E. SEZGİN (24) İ. NAZA (30)

Cotton wilt disease is one of the most important problems on cot-

tons in Aegean Region. The effective control methods are cultural practices and to grow the resistant varieties. The aim of this study was to get the resistant varieties which are fertile and the adaptation for the region conditions. The study was carried out in the pots and fields between the years of 1985-1986. 18 cotton varieties were tested to **V. dahliae**. The pot experiments were performed in Regional Plant Protection Research Institute. For this study, the pots were infested with inoculum of **V. dahliae** grown on oat culture. At the end of the vegetation stage. counting is done by cutting the plants one by one. The field experiments were done in the field naturally infested in Nazilli Cotton Research Institute. Counting was done according to 0-3 scale. It was determined the disease-ratio and the disease incidence of cotton varieties. ST-250/1, ST-250/2, and ST-266/2 out of 18 varieties tested were found to be tolerant.

Investigations on the Incidence of Tobacco Charcoal Rot Disease **Macrophomina phaseolina** (Tassi) Goid. In the Aegean Region, Its Pathogenicity and Susceptibility of Turkish Tobacco Cultivars

G. ARCA (28) M. YILDIZ (9)

It is known that studies on **Macrophomina phaseolina** have not been sufficient in Turkey. With this study it was aimed to determine the incidence of the disease, pathogenicity and the reactions of selected local cultivars to the fungus. According to surveys carried out in İzmir, incidence of the disease was estimated to be max. 95.5 % in Ödemiş and max. 90.21 % in Tire for the years 1985 and 1986, respectively. For two years, means of incidence was 53.75 %. The fungus was isolated from 362 out of 504 diseased specimens collected in the region (71.82 %). 52 selected isolates showed variation in pathogenicity and they could be classified depending on these characteristics. These isolates connected with six tobacco cultivars incited the disease between 0-100 %. Data taken on single basis and whole, it was concluded that isolates were differed in terms of their virulences, which could also be used for grouping. Cultivars were classified into two disease incidence groups being 25 to 60 % and 61 to 100 %, based on the results of reaction tests. 24 tobacco cultivars/lines tested against the pathogen were found to be susceptible. The relationship of the interactions between the cultivars and isolates were examined and it was concluded that the cultivars varied in susceptibility but the isolates had same effect.

Studies on the Relation Between the Host and Pathogen of the Sunflower Downy Mildew (**Plasmopara helianthi Novot.**)

E. ONAN (24) E. ONOĞUR (9)

Oil seed sunflower is of very importance plant in Turkey. Downy mildew (**P. helianthi** Novot.) can be a limiting factor to sunflower production with favorable climatic conditions. In the recent years, as in the other crops, many cultivars of sunflower have entered into Turkey. For this reason, 72 cultivars and lines of sunflower have been tested for reaction to downy mildew. 17 cultivars out of 72 are in the resistant group. These are Elia, Floram 305, Floram 60, Hyb. 219/79/Gi, Hyb. 13/80, Mirasol, NS-H-15, NS-H-27, Primasol, Rodeo, Romsun-90, Romsun-59, Start, H-1, 15 7775 S and IS-7116. To understand the reactions of the resistant cultivars, fungal development in sunflower seedlings resistant and susceptible to **P. helianthi** has been examined. There are mycelium and oospores in the sections of the root and hypocotyl of all resistant cultivars, but no fungal structures in the sections of the epicotyl. In the susceptible seedlings, the pathogen tends to colonize the whole plant. In the resistant cultivars, it is seen that **P. helianthi** never reaches the upperstem tissues. With the macroscopic observations, there are necrosis and sparse sporulation on cotyledons or no symtoms on them. Phytoalexins have been also examined in the resistant and susceptible seedlings to find whether they play a role in downy mildew resistance. It is understood that they are not play any role in the resistance.

The Relation between the Quantitative and Qualitative of the Inoculum and the Disease Severity of The Sunflower Downy Mildew (**Plasmopara helianthi** Novot.)

E. ONAN (24) E. ONOĞUR (9)

The relation between zoosporangia concentrations and severity of sunflower downy mildew is found in the literature, but this relation is determined according to sporulation on the cotyledons. Then, deficient sides of this valuation method are revealed by studies. On the other hand, it is not carried out a research on the oospores concentrations. In the study, it is valuated the severity of downy mildew by using a scale covering all symptoms of the disease. The suspension containing 3-600.000 zoosporangia/ml cause the disease severity varying between 0% and 100 %. It is seen that there is a close relation

between the disease symtoms and zoosporangia concentration. High zoosporangia concentration cause damping off on the seedlings. Low zoosporangia concentration lead to latent infections and necrosis on leaves. Zoosporangia concentration less than 3 zoosporangia/ml may cause infection. In the pots infested with the hypocotyl having oospores varying between 50 mg (about 2500 oospores) and 400 mg (about 20.000 oospores) the disease severity is between 10,36 and 52,24 % at sowing immediately, between 13,02 % 47,44 % at sowing 10 days later and between 12,48 % and 54,90 % at sowing 20 days later. Sporulation concentration on the cotyledons are between 0 and 72.000 sporangia/ml depending on zoosporangia concentrations. There is a relation between the zoosporangia concentration and sporulation on the cotyledons. Even if spores are removed, sporulation continues on the same cotyledons.

Studies on the Morphology-Pathogenicity and Distribution of **Alternaria alternata** (Rr.) Keissler Isolated from the Leaves of Potatoes Grown in Erzurum Region

M.T. DÖKEN (4) E. DEMİRCİ (4)

In Erzurum Region-Turkey leaf spot disease of potatoes usually appears widely in the second half of August. The disease which begins to develop from the leaf margins as necrotic lesions consequently dries up the whole leaf. The causal fungus obtained by single spor isolation from the leaves was determined as **Alternaria alternata** (Fr.) Keissler (syn. **Alternaria tenuis** Nees.). The disease cycle, symptom exhibition were studied and **A. alternata** was proved as being the causal agent of this disease. By pathogenicity tests carried out by inoculating the isolate to the leaves of Diamant potato cultivar. The surveys in order to determine the distribution and the ratio of the disease in the region revealed that the disease ratios in Erzurum Plain, Pasinler Plain, Narman and Oltu were 9.10 %, 8.36 %, 9.50 % and 6.60 %, in order. In laboratory the morphological features of **A. alternata** were studied in vivo and in vitro. A variation was determined between two conditions from the stand point of conidium morphology. Conidia which produced in chains in both circumstances are bigger and the beak on the apex is longer in natural conditions. On the other hand a negative correlation was recorded between conidium size and temperature.

Preliminary Studies on Fungal Storage Rot Agents of Potatoes in Izmir

S. ÖZ (24) O. YALÇIN (24) F. EVCİL (24)

Through this study, carried out in 1987, in 50 storages, 558 samples have been examined to find out fungal rot agents of potatoes in Izmir. 622 isolates have been obtained. 76.89 % was **Fusarium** spp. of the examined isolates. It is found that **Fusarium oxysporum** Schl. em Snyd. et Hans., **Fusarium sulphureum** Schlectendahl, **Fusarium solani** (Mart) Sacc. et Hans., **Fusarium solani** var. **caeruleum** (Lib.) Sacc., have great potential in term of pathogenicity. The most encountered species was **F. oxysporum, F. solani, F. sulphureum. F. solani** var. **caeruleum** followed by **F. oxysporum, Fusarium culmorum** (W.G. Smith) Sacc, **Fusarium sambucinum** Fucliel. **Rhizoctonia solani** Kühn caused infection in low rates. So, they are identifed not important in Izmir. **Pythium** has been observed as causing soft rot, but not wide spread species in potato storages of Izmir.

Etiology and Importance of Black Point Disease of Wheat Grains in Çukurova Region

M. BİÇİCİ (7) A. ÇINAR (7)

Recently, black points that have reached to high ratios especially at the part of embryo and endosperm of wheat grains have called attention for Balcalı 85, Ata 81, Cumhuriyet, and İzmir 85 cultivars which have been grown in Çukurova. The black points on grains have caused to shriveled and poored grains, low market price or some difficulties when grains have been sold. Also, according to the situation of originated from some fungal metabolities, this kind of black points may be a question of possibilities to be toxic against mankind and animals. Some fungi like **Phoma, Alternaria, Fusarium** and **Epicoccum** were isolated from wheat grains whick have some possibilities of carried for this kind of risks in the region. However, **Phoma** was isolated profusely and it consisted of 90 % of growing colonies. Although the ratio of black pointed grains have varied according to the cultivars, it was determined between 4-18 %.

The Relation between Physiological Disorder and Nutrient Elements in Wheat Growing Areas in Denizli Province

M. ÖĞÜT (24) Ö. CANÖZER (32) C. SAYDAM (24)
N. ÖZİLBEY (32) A. AKSALMAN (32)

Some symptoms such as yellowing, redish, browning and drying on leaves and stunting, tillering reduction and head formation stopping with plant itself generally in the early stages of the growth have been observed in recent years in some towns and villages of Denizli. In order to overcome these problems zinc applications had been carried out by the farmers. Through study the problem have been reviewed by leaf and soil analysis. The results indicate that in all growing areas there is no problem with deficiency of the major elements in addition to that Fe available. Fe and Zn are low in the soil but Fe is very high with all plant samples and Zn is low with the above mentioned plants.

The Effect Of Nitrogen, Phosphorus, Potassium on Septoria Leaf Blotch of Wheat (**Septoria tritici** Rob. et Desm.) and Susceptibility To Septoria Infection of some Varieties and Lines of Wheat

C. SAYDAM (24) M. ÖĞÜT (24) M. COPÇU (51)

The effect of different NPK levels on the incidence of Septoria leaf blotch were investigated in Koçarlı (Aydın). The variety Penjamo-62 was used and the fertilizers were applied at the different levels. Total of (P) and (K) were applied before sowing, but (N) was used at three growth stages in equal quantity: a. before sowing as amonium sulphate, b. when the plants are 2 growth stage of the Feekes scale and c. 4. growth stage as amonium nitrate. The reactions of some wheat varieties and lines to Septoria leaf blotch were carried out in the field conditions with 88 varieties and lines and in the greenhouse with 91 varieties and lines. According to the results of the studies; it was found that there were close relation between macro nutrient elements and diseases severity. When N-fertilizers were especially increased, diseases severity increased. If potassium was increased, diseases severity decreased, on the other hand, it was seen that phosphorus did not effect on diseases severity. In the reaction studies, Fernese, Libellula, Compodora, Mara, Contomurzatta were found to be resistant, and Cumhuriyet 75 and the lines tested were found to be susceptible.

Reactions of Various Common (**Triticum aestivum** L.) and Durum (**T. durum** Desf.) Wheat Cultivars and Lines Against Leaf and Ear Disease which is Recognized in Field Conditions in Çukurova

M. BİÇİCİ (7) İ. GENÇ (8) Y. DEDE(7) T. YAĞBASANLAR (8)

The leaf and ear diseases were examined in yield trials of bread and durum wheats in 1987-88. It has been studied that reactions of totally 227 wheat cultivars and lines included in 15 different yield trials were recognised against powdery mildew, rust, septoria, bunt and loose smut diseases caused by **Erysiphe graminis** DC. f.s. **tritici** E. Marchal, **Puccinia** spp., **Septoria tritici** Rob. ex Desm., **Tilletia foetida** «Wall.» Liro, **T. caries** «DC» Tul. and **Ustilago tritici** (Pers.) Rostr., respectively. It was determined that about 25 and 10 % or a few of the cultivars and test lines were found to be susceptible against powdery mildew, loose smut and bunt diseases, respectively, during the observation heading and ripening stages. Bread wheat cultivars and lines were found to be much susceptible against loose smut but drum wheats had been less affected by this disease. The environmental conditions although having the higher precipitation than the long years average were not able to get the level which bring out the reaction of these wheat cultivars and lines against the rust epidemics in both years. Also, It has been studied to determine any relation between plot yields and disease severity of each cultivars and lines.

The Investigations on the Establishment of Damage Degree and the Distribution of Barley Stripe (**Pyrenophora graminea** Ito and Kurib.) in Central Anatolia and the Reactions of some Barley Varieties Against the Disease

E. DAMGACI (22) İ. AKTUNA (22)

Barley stripe (**Pyrenophora graminea** Ito. and Kurib.) recently has become an important pathological problem in Turkey. The survey studies were carried out in 11 provinces of Central Anatolia on this subject for the first time, and 71, 21 and 58 barley fields were investigated in 1984, 1987 and 1988, respectively. The disease was found to be widespread in all provinces and the rate of diseased plant was 4.7 %, 5.5 % and 4.2 % in these years. Furthermore, the rate of plants which had no fertile heads or headless was determined, such plants were 3.3 %, 4.7 % and 4.2 % respectively. Therefore, in these years the crop losses caused by the stripe disease was estimated at these rates. In the study of variety reactions, 11 native and 6 foreign bar-

ley were tested against the stripe using two different inoculation methods, the conidium-mycelium suspension in partial vacuum and the autoclaved wheat methods in greenhouse and field conditions. The disease wasn't observed in field trials because of late sowing (April 25th, 1983). In greenhouse trials, Zafer 160, Kaya 7 794, 69 147 and P 17-27 varieties were found as susceptible in both inoculation methods. Of other varieties, Gem C-1, Yıldırım and 814 25-1 were infected by only autoclaved wheat method. From the foreign varietes, only Vantage was infected by stripe.

Studies on Determination and Methods of Fungal Flora in Maize Seed

H. AKTAŞ (22) B. TUNALI (22)

The widely used methods in establishing the existence of pathogens and determination of fungal flora in seed are routine blotter method and agar nutrition media. In both methods, the seed germinated in 8-10 day incubation period, radicle and coleoptile developed, sometimes they were observed mixed. It is known that there are some troubles even in investigations with stereo-microscope. In order to prevent these disadvantages and to examine more samplesby spending less time under stereo-microscope, freezing blotter method utilized for barley seed was used for maize seed in this study. For this purpose 12 different methods were used. Differences between the methods were determined and various effects of using different methods on fungal flora were observed.

Fungal Disease of Corn and their Incidence in Samsun

G. HATAT (14) S. MADEN (3)

As a result of the surveys performed in July-October 1987 in order to determine the fungi causing diseases on corn plants in Samsun, it was found that the most common disease was Northern leaf blight caused by **Helminthosporium turcicum**. The incidence of the disease was 95 % and it was observed to be more severe after silking. Another disease caused severe infection at the same period was Curvularia leaf spot. The incidence of the disease was 42 % and caused by **C. lunata** and **C. inaequalis**. **Helminthosporium carbonum**, the causal agent of

the Helminthosporium leaf spot, had an incidence of 8.3 %. The common rust of corn **(Puccinia sorghi)** was more severe in the inner towns and its incidence was 8.4 %. Corn smut **(Ustilago maydis)** was found in almost all of the fields investigated, and the incidence of this disease was calculated as 14 %. At two fields, a few plants infected with head smut fungus, **Sphacelotheca reiliana**, was also determined. Stalk rot diseases caused by **Fusarium** species was especially found at the coastal region but their incidence was very low. The most isolated fungi were **F. moniliforme** and **F. graminearum**. In addition, **F. moniliforme, F. graminearum, F. culmorum, F. oxysporum, Alternaria** spp., **Cladosporium** sp., **Epicoccum** sp., **Penicillium** spp. and **Aspergillus** spp. were isolated at different rates from the infested grains obtained from the rotted ears.

Distribution and Pathogenicity of **Stemphylium botryosum** Wallrot which Causes Damage on Alfalfa Leaves in Central Anatolia

G. TUNCER (22) S. İREN (3)

Investigations in principle alfalfa growing areas of Central Anatolia were carried on from 16.5.1983 up to 10.6.1984 and the surveys were made to find out the diseases that cause damage between the two harvest periods. All the alfalfa plants grown on a total amount of 2547 da field (180 samples taken from 1.8 % of the total cultivated area) were counted in this study. Stepped sampling survey, method had been used in this study. Since the crop has been sown by drill, countings and samplings had been made in the diagonals of the field, picking 50-150 plants as one sample in every 5-10 steps. **Stemphylium botryosum** Wallr. frequently occurs in warm and humid climatic conditions and densely planted stands. Oval or circular, dark brown lesions with slightly coloured centers occur on the leaflets. Dark brown spots enlarge and form light or dark brown coloured zones. **S. botryosum** has not been found on alfalfa growing areas of Turkey up to this study and it was not mentioned in any publications so yet. But, asa results of this research it was found that it is common and found as 12 % in Kırıkkale (Ankara). This fungus occurs in humid and warm climatic conditions. The survey started in May and Kırıkkale was then first survey area. **S. botryosum** was found to be very common in Kırıkkale, because of the warm and humid weather conditions during May, comparing with the other survey areas. The isolates during the greenhouse trials showed a pathogenicity ratio in between 1.88 % - 13.23 %.

The Preliminary Studies on the Turfgrass Diseases in Turkey

F. KİLİT (9) M. YILDIZ (9) N. DELEN (9)

In this study, it was examined that the pathogenic characters of the different fungi, were isolated from the seeds and the infected turfgrasses. Different pathogens as **Rhizoctonia** spp, **Curvularia** spp, **Fusarium** spp, **Alternaria** spp and **Helminthosporium** spp were isolated from the diseased turfgrasses. The rate of these pathogens were 68.3, 68, 56, 14 and 5 % respectively. On the seeds, it was determined that mostly **Penicillium, Aspergillus, Alternaria** species, in addition to the many other fungi. It was also isolated **Helminthosporium** species from the Bermudagrass. The great number of fungi isolated from diseased samples and seeds were tested on the **Festuca, Poa, Lolium, Agrostis** and Bermudagrass, turfgrass verieties for finding out their pathogenicities. In the pathogenicity tests, two different inoculation methods were applied on the clipped turfgrasses. According to the pathogenicity tests; **Rhizoctonia, Fusarium, Helminthosporium** and **Curvularia** species were determined as the most virulent fungal organisms. After these tests, two **Rhizoctonia** spp, two **Curvularia** spp, one **Helminthosporium** sp, and **Fusarium** sp, as virulent isolates were selected and tested on several turgrass varieties which were obtained from the four seed companies. Each of the turfgrass varieties were shown different sensitivities to the above mentioned pathogens.

Untersuchungen über die Verbreitung und Rassen von **Colletotrichum lindemuthianum** (Sacc. Magn.) Br. et Cav und die Reaktionen einige Bohnensorten gegen die Krankheit

S. İREN (3) H. SORAN (13)

Um die Verbreitung der Krankheit in der Türkei festzustellen wurde die Anbau gebiete untersucht Dabei wurde festgestellt, dass die Krankheit bei allen Anbaugebieten zusehen ist. Bei den gesammelten Colletotrichum Isolaten wurde die Rassen von Lambda, Kappa und Delta bestimmt. Die türkischen und auch einige auslaendischen Bohnensorten wurden gegen die Rassen von Kappa, Lambda und Delta getestet.

Estimation of Yield Loss due to Ascochyta Blight in Chickpea

H. DALKIRAN (31) M. ALTINYAY (31) S. ALBUSTAN (31)

Ascochyta rabiei is one of the important limiting factor of seed yield in chickpea and the responce of chickpeas to the disease changes with the varieties. Field Crop Improvement Center, different chickpea lines have been tested against Ascochyta blight in order to detect varieties showing resistance or tolerance to the disease. In 1987, a study was initiated to observe the yield levels of different chickpea varieties when they were protected by fungicide and diseased by artificial inoculation of disease spores. The results of the first year of the study showed that the yield losses were 2-10 % in resistant, 20 % in tolerant and up to 30 % in susceptible varieties. The study is now going on.

Fungal Diseases of Lentils in Southeastern Anatolia

A. SAĞIR (23)

The lentil **(Lens culinaris)** fields in Adıyaman, Diyarbakır, Mardin and Şanlıurfa provinces were surveyed in 1985-1986 to determine the fungal diseases and their distribution rates. The surveys were conducted in seedling stage on March and flowering-podding stage on May. In these two stages totally, 109 and 104 fields were examined, respectively. Root and crown rot, wilt, stem lesion and leaf spot diseases were recorded in these surveys. The distribution rate of the diseases and their pathogenes were changed according to the stages of the plants. The rate of the diseases were 26.0 % in seedling stage and 11.4 % in flowering-podding stage. In seedling stage **Phoma medicaginis** (39.58 %), **Peronospora lentis** (27.08 %), **Ascochyta lentis** (8.33 %), **Fusarium acuminatum** (4.58 %), **F. oxysporum** (1.25 %), **Alternaria** sp. (9.58 %), **Cladosporium** sp .(6.25 %) and **Helminthosporium** sp. (3.33 %); in flowering-podding stage **P. medicaginis** (34.38 %), **P. lentis** (2.75 %), **A. lentis** (0.68 %), **F. acuminatum** (15.17 %), **F. oxysporium** (13.10 %), **F. solani** (5.51 %), **Uromyces fabae** (1.37 %), **Alternaria** sp. (17.24 %) and **Cladosporium** sp. (9.65 %) were isolated. These fungi were isolated from different parts of the plants; **Fusarium** spp. from root and crown, **P. medicaginis** from root, crown, stem, leaf and pod, **A. lentis** from stem and leaf, and the other fungi from only leaf. Pathogenicity tests were made as a pot experiment in green house. Estimations were made one month after the inoculation and all fungi caused a disease in the plant except **Cladosporium** sp. and **Helminthosporium** sp.

The Important Cumin Diseases in Central Anatolia

S. KOCATÜRK (22)

Cumin (Cuminum cyminum) is an industrial plant which has taken part in cultivation and rotation programs for the last 10-15 years. In this study, the important fungus diseases, proportion and causal agents were estimated in seedling and flowering periods in Ankara, Konya and Eskişehir provinces. It was estimated that root-rot diseases were between 0.96 and 2.50 % in the seedling period according to the provinces. **Alternaria** and **Fusarium** spp. were isolated from the diseased plants. In flowering period blight, wilting and withering symptoms were 0.56 - 7.82 %. **Alternaria** spp. were isolated from blighted, **Fusarium** spp. and **Alternaria** spp. from wilting and withering plants. Three **Alternaria** isolates belong to the seedling and also three belong to the flowering were estimated as pathogens. The **Fusarium** isolates from seedlings were not pathogen but five **Fusarium** isolates belong to the flowering period were the pathogen of cumin plants.

Studies on the Physiology of **Phomopsis viticola** Sacc. Causing Dead-Arm of Grapevine

M. ARI (24) C. SAYDAM (24)

Dead-arm caused by **Phomopsis viticola** Sacc. is one of the important diseases of the grapevine in Aegean Region. The effects of the different carbon, nitrogen sources and pH levels on the daily-growth, dry mycelial weight and sporulation of the fungus have been investigated. Dextrose, lactose and glicose, asparagine, ammonium sulphate, sodium nitrate have been used as carbon and nitrogen sources, respectively. The pH levels used were 5, 6 and 7. The studies indicated that the best carbon and nitrogen sources were dextrose, glicose as carbon, asparagine and ammonium sulphate as nitrogen sources. The highest daily-growth, dry mycelial weight and sporulations have been obtained by pH 6 among the tested pH levels.

Preliminary Studies on Eutypa Disease (**Eutypa lata** (Pers: Fr. Tul.) Syn.: **E. armanicae** Hansf et. Carter) of Vineyards in Aegean Region

M. ARI (24) A. KAPKIN (24)

The prevalence and the existence of Eutypa disease (**Eutypa lata (Pers: Fr) Tul**) (Syn: **Eutypa armeniacae** Hansf et. Carter) in vine-

yards in Aegean Region have been determined through the surveys, carried out in the months of April-June two consecutive years, 1986-1987. In the first year, isolations were done from the diseased samples and isolates obtained were compared with the original isolate. In addition, from the surveys in İzmir and Manisa it follows that the prevalence of the disease was average 72.29 % and its existence was average 13,46 % in İzmir; 78,51 % and 11,73 % in Manisa respectively. In the second year, from surveys done it was found that the prevalence of the disease was 58,27 % and its existence was 8,08 % in Denizli; 66,65 % and 8,74 % in Uşak; 100 % and 32,5 % in and 3,58 % in Aydın; 66,66 % and 3,21 % in Çanakkale respectively.

Studies to Obtain Resistant Lemon (**Citrus limon** L.) Lines to Mal Secco (**Phoma tracheiphila** Kanc. et Ghik.) by Using **in vitro** Culture Techniques

N.K. KOÇ (7) A. ÇINAR (7)

In this study, the possibilities to obtain of lemon lines to be resistant to mal secco were studies by using of tissue culture techniques. Stem segments of in vitro sown **Citrus limon** var. Kütdiken were cultured on Murashige and Skoog (MS) basal medium, supplemented with different concentration of 6-benzylaminopurine (BAP) and kinetin. Regeneration of large number of shoots were observed on a medium with 2 mg/1 BAP+1 mg/1 kinetin in 8 weeks. Addition of **Phoma tracheiphila** culture filtrate to the MS culture medium which was supplemented 2 mg/1 BAP+1 mg/kinetin the shoot insilitation was strongly prevented after % 50 culture filtrate concentration. The developed shoots were rooted on MS medium containing 3-indolebutyric acid (IBA), naphthaleneacetic acid (NAA) or a combination of both auxins in 6 weeks. The best rooting was obtained on a medium with 2 mg/1 NAA. After transfer to soil, 50 % of the plants survived.

Pathogenicity of Pear Fungal Storage Rot Agents on Golden Delicious Apple Cultivars

M. GÜRER (22) S. MADEN (3)

Pathogenicity of pear fungal storage rot agents, determined in Ankara province, on Golden Delicious apples cv. were investigated by

placing mycelial-agar disc 5 mm in diameter to toles opened on the fruits and incubating them in polyethylene bags at 22°C. Almost all the fungi, isolated from decayed pear fruits, caused a similar rot on apple. From the tested fungi, **Monilinia fructigena** and **Rhizopus stolonifer** caused 12.70-11.95 mm. in diameter rot per day; **Botrytis cinerea, Aspergillus niger, Diplodia mutila, Penicillium expansum, Alternaria tenuissima, Cytospora chrysospermi, Trichoderma harzianum** caused 6.92-4.25 mm. in diameter rot perday; **Fusarium acuminatum, Aspergillus parasiticus, Fusarium equiseti** caused 3.30-2.32 mm. in diameter rot per day; **Penicillium verrucosum** var. **cyclopium, Ulocladium atrum, Cladosporium cladosporoides, Trichotecium roseum, Fusarium sambucinum, Fusarium semitectum, Fusarium xylarioides, Epicoccum purpurascens** caused 1.35-0.05 mm in diameter rot per day.

Bio-ecology of Walnut Anthracnose Agent (**Gnomonia leptostyla** (Fr.) Ces et de Not.) in Central Anatolia Region

H. COŞKUN (22) S. İREN (3)

Walnut anthracnose, caused by the fungus (**Gnomonia leptostyla** (Fr.) Ces et de Not.) is an important walnut disease that causes serious spots on foliage, leaf stalk, young shoots and fruits in Central Anatolia Region during wet seasons in spring in every year, and many walnut trees (from seedlings to mature trees) to lose most of their leaves by midsummer. The biology of walnut anthracnose agent was studied in a valley in Ankara (Beypazarı) (altitude of 700 m) and in a plateau in Kırşehir (Kaman) (altitude of 1250 m). The population dynamics of the causal agent related with climatical and ecological factors were studied also from 1983 to 1985. Thus, primary ascospore and conidia shootings and their continuance according to plant phenology, temperature, relative humidity and raining were examined and primary symptoms, spots occurrance and conidial shootings related with secondary infections were observed. As a result, the primary infection source perithecia were found to complete their development by the end of March in both locality and primary ascospore shootings were observed by the first half of April. There was a difference of 7-14 days between shooting periods in the localities. First infections begun when the leaves reached the 3/4 width of their normal size. First necrotic spots were observed in the first half of May in Beypazarı, and 15-21 days later in Kaman. Secondary infections were caused by conidia and spots occurred in the first half of June in Beypazarı and 7-21 days later in Kaman.

The Distribution of VA. Mycorrhizal Spore Population in Various Soils of Erzurum

K. GÜR (15)

Of the various mycorrhizas reported, the most widespread one is the so-called vesicular-arbuscular mycorrhiza (VAM) type. The endophytes causing the infections mostly belong to the phycomycetes genus **Glomus.** The extent to which spores of VAM fungi present in a soil reflect the inoculum potential of that soil and also the spores do appear to be the most likely propagule for VAM survival over adverse climatic periods. This study was undertaken to determine the number and type of VAM spores present in various cultivated and virgin soils of Erzurum province. The number of VA mycorrhizal spores extracted from virgin soils significantly ($P \leq 0.01$) exceeded the number of spores extracted from cultivated soils by 6.7 - 65,8 times. One-year of summer following an Erzurum soil previously planted to barley significantly ($P \leq 0.01$) reduced the VAM spore population in that soil to 62 % of the level found in the Erzurum soil planted to barley. Similar results were obtained in a Hasankale soil at the beginning of the growing season. Spore populations in a virgin (native grassland) soil did not increase overall during the growing season although large fluctuation in the population levels were observed. However, spore population levels in a cultivated soil (barley) increased once the crop became established and eventually surpassed population levels found in adjacent virgin soil. Of ten spore types isolated from the soils, only six spore types were identified and their names were as follows: **Glomus monosporus, G. macrocarpus, G. coledonius, Giaspora gilmorei, Acaulospora** sp., and **Sclerocystis rubiformis.**

Investigation on Eatable Fungi which can Grow on Woods in Different Ecological Conditions

M. ABATAY (40)

In this study wood decaying fungi which can grow standing on live and dead, trunks of forest and fruit trees, cut wood, stump and log, with other types of fungi which can grow on wood materials have been investigated. Furthermore the cork shapes, eatability properties, distribution and hosts of this fungi, decay types, growing conditions and symptoms have been studied. Some of the important eatable fungi which have been found are given below: **Armillariella mellea, Armillaria** spp., **Auricularia** spp., **Clavaria stricta, Collybia velutipes, Pholiota** spp., **Polyporus** spp., **Tricholompsis edodes, Exidia glandulosa, Fistuline hepatica, Hericium erinaceum, Lentinus lepideus, Lycoperdon pyriforme, Mycena galericulata, Marasmius oreades, Pleurotus ostreatus.**

Wood Decaying Fungi Found in some Provinces and their Surroundings in the Eastern Anatolia

F. GÜCİN (17)

In this study, some wood-decaying fungi specimens growing on living, dead erect or fallen tree trunks and stumps, on logs or pieces of wood also on the waste of some other plants were collected on botanical excursions to some provinces of Eastern Anatolia like Elazığ, Malatya, Bingöl, Muş and Erzurum between the years 1980-1986. Later they were examined in the laboratory and 31 different species growing in the same way have been determined. Most of the species belong to the Aphyllophorales (17 species) and to the Agaricales (13 species) and the remaning one belongs to the Auriculariales. Wood-decaying macrofungi found in the region has been listed in this paper. Most of them are saprophytic wood-decaying fungi which may become parasitic in some cases. The others are either saprophytic or parasitic.

Phytopathological Problems of Plane Tree of Yeşilyenice (**Platanus orientalis** L.) and White Poplar Tree of Turhal (**Populus alba** L.) and their Control Means in Amasya and Tokat

A. ÇITIR (6)

Because of their rarity, beauty and their huge dimensions monumental trees offer aesthetics value of their locations. It is possible to see such trees in many parts of the World as well as in Turkey. Among them an Oriental plane tree (**Platanus orientalis** L.) which is located in Gölbaşı park of Yeşilyenice town of Amasya region, a white poplar tree (**Populus alba** L.) in the campus of Turhal sugar refinery plant and a hybrid poplar tree (**Populus nigra x P. tremula tokatica**) in Tokat region are the subject of this study. As the results of prejudices, monumental trees are considered untouchable and need no protection and care. Nevertheles like any other living creature such trees are also vulnerable to infection of some abiotic and biotic disease agents. Generally they are burned up by lightning or they are suffocated and dried up to death as a result of unproper landscape improvement works. It is determined that wrong landscape works implemented in two stages caused burial of 150 cm depth of the largest plane tree of Turkey and covered up with an insolating cement layer of 20 cm thick in Yeşilyenice. On the other hand species of wood rotter fungi **Polyporus albellus** on plane tree and **P. radiatus** on white poplar tree were identified. In order to restore of healthy conditions for the both troubled monumental trees some works have been implemented. This work cover breakage of cement layer, around the plane tree, providing aeration and dreneage; pruning, healing of large cavities and wounds, root grafting and fertilization.

Problem of Broomrape in Tomato Plantation in Marmara Region of Turkey

Y. NEMLİ (9) H. DEMİRKAN (9)

The aim of this study was to identify the species of broomrape which damages tomato plants and to describe its distribution and density in this region. Broomrape whick attack tomato plants in this region is **Orobanche ramosa** L.. According to the literature findings, this species has many hosts and it can damage tobacco, tomato, eggplant and some other cultivated plants. Therefore, it seems that this parasite may cause severe damage in the cultivation in future. The density of this parasite was found to be high in Karacabey, Mustafa Kemalpaşa and in their some villages (2-4 broomrape/per plant). However, in Gönen, Balıkesir and Yenişehir, it was lower than in the places mentioned above (2-4 broomrape on every plant out of 50).

Economical Chemical Control of Weeds in Vegetable Growing Areas as: Herbigation

M. COPÇU (51)

In the vegetable (tomato, pepper, eggplant) growing areas one of the main important phytopathological problems is weeds, especially after irrigation periods. Chemical weed control is the essential way for the solution. Registered products have been used as ppi (preplant incorporation), pre.em and post.em. application during early stages of the crops. In the vegetable growing fields the main occurence and damage of the weeds are after irrigations and at this time it can be said that it is difficult or even impossible weed control by handling or mechanically. Therefore in this study the main purposes of the field trials were presented as determination of effective and economical (acceptable for the growers) weed control possibilities during or after irrigations. In the former studies (1985-86) the effectiveness and crop tolerances of Dual 500 EC (metolachlor, 50 %) registered on Cotton, Soyabean and Sugarbeet, were investigated as (ppi) and (post planting) application techniques in the pepper and tomato fields in the different localities of the Aegean Region. The results of these field trials showed that it was very effective (against yellownutsedge and common purslane were 91.8 % and 95.4 % respectively) and there was not any adverse effects on tomato, pepper and eggplant plant growing and production. The optimum dosage was obtained as 4 l/ha in these vegetable growing conditions. On the other hand by these

application it was not determined any certain advantages for Dual 500 EC for the vegetable growers because of very intensified soil cultivations until irrigation and it can be said that it is possible to control weeds by mechanically in this period. In the further studies the effectiveness and avaliability of the Herbigation techniques were investigated in tomato and eggplant fields (1987). The main weed problems were yellownutsedge **(Cyperus esculentus)** and common purslane **(Portulaca oleracea)**. The basic specimens of this technique were the distribution of the chemical as 4 l/ha dosage by the variability of unit irrigation time (min./ha) by applying through gravity flow irrigation system. At the end of these studies Dual 500 EC were to be safely, effectively and economically applied through irrigation system in the vegetable growing areas.

Weeds in Second Crops (Soybean, Corn, Groundnut and Sesame) Fields, their Density and Distributions in Mediterranean Region of Turkey

E. ULUĞ (21) İ. KADIOĞLU (21)

A survey study on weeds was started in 1984 as a part of «national second crops project» in Mediterranean region. This survey has been carried out only in the provinces where the second crops including soybean, corn, groundnut and sesame cultivations are important and wide spread such as Adana, Antalya, İçel, Hatay and Kahramanmaraş. Survey planning have been done by the method of splited sampling. Evaluation have been made according to the balanced average method, thus the density of weeds have been indicated on base of districts and provinces. According to their presence and absence at sampling points, infestation area and rate of weeds have been determined for second crop fields. According to the results of survey in general, the widespread and dense weeds have been determined in above mentioned host fields as stated below;

a) Soybean : Nutsedges (**Cyperus** spp), jungle rice (**Echinochola colonum** (L.) link.), Johnson grass (**Sorghum halepense** (L.) Pers.), Common purslane (**Portulaca oleracea** L.) and Cocklebur (**Xanthium strumarium** L.).

b) Corn : Johnson grass, common purslane, jungle rice, nutsedges, and cocklebur

c) Groundnut : Nutsedges, Common purslane, jungle rice, pigweeds (**Amaranthus** spp.)

d) Sesame : Heliotrop (**Heliotropium** spp), nutsedges, croton (**Chrozophora tinctoria** L) and Johnson grass.

The Studies on Weeds and Their Control Methods in Second Crop Area in Aegean Region

A. ÖZKUT (24) İ. SERİM (24)

This study was carried out on sesame, corn and soybean as second crop in order to determine weeds and their control methods in İzmir, Aydın and Manisa. The survey studies were done in İzmir, Aydın and Manisa. According to splited sampling method in sesame, corn and soybean 74,93 and 51 fields (totaly 218) were observed in Aydın, İzmir, Manisa provinces respectively. During the survey studies 31 weed species were determined. **Amaranthus albus, Amaranthus retroflexus, Chenopodium album, Convolvulus arvensis, Cynodon dactylon, Cyperus rotundus, Digitaria sanguinalis, Echinochloa crus-galli, Portulaca oleracea, Setaria** spp., **Sorghum halepense** and **Xanthium strumarium** were the most important weeds. Some chemicals were tested against weeds in soybean and sesame fields at Menemen in İzmir. The experiments were made according to randomized block designe with 3 replicates. Evaluation was made by 1-9 E.W.R.C. scales. Trifilin (2 l/ha), Sencor (0,5 kg/ha), Afalon (1,5 kg/ha), Diurex (1,5 kg/ha), Gesegard 500 FW (3 l/ha) were tested. Treflan was applied as pre-sowing and than incorporated to the soil. The others were applied after seedling to the soil surface. **A. albus, A. retroflexus, C. album, P. oleracea, Raphanus raphanistrum, Tribulus terrestris** and **Solanum nigrum** were observed in the test field. Trifilin was effective against all of the weeds except **S. nigrum.** Afalon, Diurex and Sencor were effective against all of the weeds except **T. terrestris, S. nigrum.** Gesegard was effective against all of the weeds except **T. terrestris.**

The Effect of Seeding Time, Tır (Deep Furrow) Seedling Method, Type of Wheat Varieties and Plant Population on Weed Density on Van Area

N. YILMAZ (19) A. GÜNCAN (18)

The tir seedling method had been used since 5000 years in Van area. In this method sowing is done into deep furrows, 15-18 cm in depth from soil surface. This method especially is important to increase wheat yield in volcanic soils and dry areas. In this study, the effect of seeding time, the tir seeding method, type of wheat varieties and plant population on weed density is examined. In this research **Euclidium syriacum** (L) R. Br., **Roemeria hybrida** (L) D.D., **Papaver dubium** L., **Bunium paucefolium** and **Secale cereale** L. were examined

and counted separately, the remained weeds in the same group. The obtained results has shown that in Van area, density of weed (except **S. cereale**) was lower in wheat plots seeded on 15 th of August than in wheat plots seeded on September 4 th, September 19 th and October 4 th. The weed density was lowest on the plots seeded on October 19 th especially the density of **S. cereale** was minimum. On the other hand weed density in the increased plant population (more than 400 seed per square meter) was higher than decreased plant population (200-300 seed per square meter). Weed density was lower in the plots seeded by the tir seeding method than normal seeder. 305 Yayla wheat variety had best competition ability among others, 220/39 Köse and Tir wheat varieties (**T. aestium** spp.) against weed types.

Effect of Nitrogeneous Fertilizers on Wheat and Weed Species under Herbicide Applied and Non-Applied Conditions. II. Effect on Growth and Density of Some Weeds

Y. NEMLİ (9) N. ERYÜCE (10) D. ANAÇ (10)

Effect of different forms of nitrogeneous fertilizers on the density of different weed species, and growths (heights and dry weights) were studied. A field trial was conducted three years successively with «Cumhuriyet 75» wheat variety in seven nitrogen combinations and three replications. Statistical data showed that average densities of **Sinapis arvensis** L., **Medicago** spp., **Lathyrus** spp. and **Bupleurum rotundifolium** L. were significantly important. In plant heights standpoint, **S. arvensis, Veronica hederifolia** L., **B. rotundifolium** L., **Vicia narbonensis** L. and in dryweights standpoint **V. hederifolia** were as well as statistically significant. Futhermore, the «F» value concerning both the density and plant height of **Avena fatua** L. were found important in 2,4-D applied and non applied conditions.

Investigations on the Wild Oat (**Avena sterilis** L.) - Wheat of Competitions and Control Possibilities in Wheat Fields

İ. KADIOĞLU (21) A. ÇADIR (7) F.N. UYGUR (7)

Ten percent of wheat production areas and twelve percent of wheat production of our country have pleaced in Çukurova region. Wild oats (**Avena** spp) is one of the most economical harmful annual grassy weeds of cultivated lands in many areas of the world. Wild oats which have been distributed in many ways and have caused significance damages are also an important problem for our region.

In this investigation, the plots and the fields competition studies on the wild oat were made. In the plot competition studies, effect of various densities of wild oat on height, growth root and dry weight of wheat plants in different periods were investigated. In the field competition studies, effect of various densities of wild oat on development and yield components of wheat were searched. It was determineted that density of three and five wild oat/square meter could effect wheat plants in some properties. In the field conditions wild oats were removed in different stage and effect of these treatments on development and yield elements of wheat were determineted. It was found that the best treatment was removing wild oats in 2-4 leaf stage. In the control studies, effect of mechanical control (burning straw, deep and superficial cultivation just after harvest, deep and superficial cultivation just before sowing) and chemical control (dichlofob-methyl) combinations on the wild oat density and yield element of wheat were investigated.

Distribution and Infection Rates of Skleton Weed Rust (**Puccinia chondrillina** Bub. and Syd.) in Wheat-Fallow Fields of some Provinces and its Possible Use in Biological Control of Skleton Weed (**Chondrilla juncea** L.)

A. ERCİŞ (22) S. İREN (3)

In this study carried out through 1985-1987, the identification characters of skeleton rust is investigated, infection rates in provinces of different ecologies (Ankara, Antalya, Burdur, Erzincan, Erzurum, Isparta, İzmir, Konya, Kütahya, Manisa, Mersin, Samsun, Sinop and Sivas) were determined, and host-specificity tests were done to establish its biological control potential. From the survey results, it was understood that the rust existed in all these provinces differing in infection rates in 1.1-16.2 %. Disease severities in provinces were found to be changed within 2.0-4.6 when evaluated with 1-6 scale. In some localities the severities were 5 or 6, and the rust was observed strictly to supress the growth of its host. In host-specificity tests the rust was tested against 25 plant species including some cultural plants like sunflower, safflower, field mariold, hollyhock and daisy, and no pustule formation was observed. An infection rate of 85 % and severities of 3-4 were observed on narrowleaf and intermediate forms of skeleton weed, whereas broadleaf form was found to be resistant to the used rust isolates. By this study, it was performed that the rust has a great potential for the biological control of skeleton weed also for our country, but also concluded that the skeleton weed forms especially the broadleaf or similar forms should previously be determined and the rust isolates that will be effective also on these forms should be used.

Distribution and Infection Rates of Canadien Thistle Rust (**Puccinia punctiformis** (Strauss) Roehrl.) in Wheat-Fallow Fields of some Provinces and its Possible Use in Biological Control of Canadien Thistle (**Cirsium arvense** L.)

A. ERCİŞ (22) S. İREN (3)

Canadien thistle is an important perennial weed of wheatfallow fields of high water contents as well as of other irrigated crops. Since they mostly propagate with their creeping roots, they reach soon high populations in fields, they enter and cause much reduction in crop yields. In this study carried out through 1985-1987, the identification characters of Canadien thristle rust was investigated infection rates in provinces of different ecologies (Ankara, Antalya, Burdur, Erzincan, Erzurum, Isparta, İzmir, Konya, Kütahya, Manisa, Mersin, Samsun, Sinop and Sivas) were determined and host specificity tests were done to establish its biological control potential. From the survey results, it was understood that the rust existed in all these provinces differing in infection rates in 5.2-12.5 %. The rust is systemic and causes much damage in its host. It was observed that primarily infected plants could not flower and form seed. But the seconder infections were found to be uneffective on the host. In host-specificity tests the rust was tested against 25 plant species of botanically related to Canadien thistle including some cultural plants like sunflower, safflower, field mariold, hollyhock and daisy and no infection was observed. The Canadien thistle plants, check plants, were infected by 80 %. By this study, it was performed that the rust has a great potential for the biological control of Canadien thistle plants, but also concluded that the spread of the disease was low and methods were needed to increase the spread of the disease.

Weeds in Lentil Fields, Their Density and Distributions in Mediterranean Region of Turkey

E. ULUĞ (21) İ. KADIOĞLU (21)

Lentil as a crop has of economic importance because of its high food richness. It is also exported and recently it is grown instead of fallowing as well as regular rotation system However, several weeds attack to this crop which has very poor competition by them. Survey planning have been done by the method split sampling. Evaluation have been made according to the balanced average method, thus the density of weeds have been indicated on base of districts and pro-

vinces. According to their presence and absence at sampling points, infestation area and rate of weeds have been determined for lentil fields. According to the results of survey, in general the widespread and density of weeds are as follows, respectively; corn cleawers (**Galium tricorne** whit.), wild oats (**Avena** spp), mouse ear chick weed (**Cerastium dichotomum** L.), field wood ruff (**Asperula arvensis** L), Corn poppy (**Papaver rhoeas** L), Shepherd's needles (**Scandix** spp), wild mustard (**Sinapis** spp), wild wetch (**Vicia** spp.), field Chomomille (**Anthemis** spp), ball mustard (**Neslina paniculata** (L) Desv), peavine (**Lathyrus** spp); although some weeds such as field madwort (**Alyssum campestre** L), catchfly (**Silene** spp.), timothy (**Phleum pratense** L), tuberous crane's-bill (**Geranium tuberasum** L.), Volunteer cereals and woad (**Isatis tinctoria** L.) were dense in some district.

The Herbicides Used in Lentil Fields in Turkey and Their Effects on Nodulation

S. ÇETİNSOY (22)

The trials were arranged randomised block design with three replicates. Organic matter of soil was poor (% 1,95) and pH was 7.78. A native lentil cv. (Sultan) was sown and the seeds were contaminated with a native strain (m. 1045 of **Rhizobium leguminosarum.** Weed control and hand-weeding were added to the characters. Prometryne 500 FW (2 and 2.5 l/ha), linuron 50 (2 and 2.5 kg/ha), methabenzthiazuron 70 (2 and 3 kg/ha), metribuzine 70 (0.25 kg/ha), ethofumesate (3 l/ha) and pronamide (3 kg/ha) were applied as pre-emergence. When lentils reached 5-10 cm height prometryne 500 FW (1 l/ha), ethofumesate (3 l/ha), pronamide (3 kg/ha), linuron 50 (0.4 kg/ha), methabenzthiazuron 70 (2 kg/ha), phenmedipham+desmedipham 16.5 (4 l/ha) and dinosebacetate % 47 (4 l/ha) were used as post-emergence. Another trial was conducted with diclofob-methyl (2 l/ha), fluazifob-buthyl (1 l/ha) as post-omergence and prometryne 500 FW (3 l/ha) as pre-emerence+diclofob-methyl 2 (l/ha) as post-emergence. At fully flowered stage of lentils, 10 plants from each plot were taken and dry weights of their noduls, roots and shoots were evaluated. At harvest, the effectivenesses of herbicides on yield were determined. Prometryne (2 and 2.5 l/ha), methabenzthiazuron (2 and 3 kg/ha), linuron (2 and 2.5 kg/ha), metribuzine as pre-emergence, ethofumesate as pre-emergence and post-emergence increased yields and dry weights of noduls, roots and shoots. These herbicides can be used to control annual weeds among lentils. Diclofob-methyl, fluazifob-

buthyl increased amounts of total nitrogen and dry weights of noduls, roots and shoots but these increases were not found istatistically significant, because narrow leaved weeds were less than broad leaved ones. They can be advised to control narrow leaved weeds. Methabenzthiazuron, prometryne, linuron, dinosebacetate, phenmedipham +desmedipham as post-emergence were found to be phythotoxic. Pronamide does not control annual broad leaved weeds and these weeds showed density in our plots. This herbicide and prometryne+diclofob-methyl did not significantly increase yield and dry weights of noduls, roots and shoots. The use of prometryne+diclofob-methyl was not found as practical. Pronamide can be used to control **Cuscuta** spp.

Weeds and Their Control in Lentils in Some Provinces of The Southeast Anatolia Project

A. UZUN (24)

Weed surveys were carried out in lentil in the Southeast Anatolia Project area by the split sampling method. Evaluation have been made according to the balanced average method. The total numbers of weed species were 47, 30, 56 and density were 130, 95, 67 per m^2 in Diyarbakır, Şanlıurfa and Mardin provinces, respectively. Densely and wide spread weeds were **Galium tricorne** With, **Avena sterilis** L., **Scandix pecten-veneris** L., **Lathyrus** spp., **Ranunculus arvensis** L., **Geranium tuberosum** L., **Turgenia latifolia** (L.) Hoffm., **Cephalaria syriaca** (L.) Schard., **Isatis tinctoria** L. Chemical control trials were made in Diyarbakır for broad leaved weeds and in Mardin province for grassy weeds. Trials were set up according to randomised block design with 3 replications. Chemicals were sprayed by knap-sack sprayer. Gesegard 500 FW (prometryn, 50 %), Tribunil 70 WP (methabenzthiazuron, 70 %) 150-200 ml/da, Afalon (Linuron 50 %) 250 g/da, Sencor (metribuzine 70 %) 25 g/da as pre-emergence and Aretit Flussig (dinoseb acetate 50 %) 400 ml/da as post-emergence were tested to control broad leaved weeds. Although some of them Although satisfactorly controlled the broad leaved weeds, all of them were found as phytotoxic at different rates to lentils. Fusilade (fluazifab-butyl, 25 %), Fusilade Super (fluazifob-p-butyl 12,5 %), Gallant (Chaloxyfobethoxyethylester 12,5 %) and Furore (fenoxaprop-ethy 12,5 %) at 80 ml/da applied before tillering stage of annual grass weeds, controlled 86-97 %, but after tillering stage 100 ml/da dosage were effective as 100 %. Illoxan 28 EC (diclofop-methyl 28 %) at 150 ml/da controlled **Avena sterilis** L. at the rate of 91 %.

Integrated Weed Control for Wheat Under Dryland Conditions of Central Anatolian Plateau

N. DURUTAN (31)

In recent years, in the area of weed control as well as other areas of plant protection emphasis is placed on either «chemical» approach or on «non chemical» approach that include biological and physical control methods. However, it was seen that the most dependable results can be achieved by combining various methods that supplement each other in other words by using «integrated control» method. It is clear that the crop management system should be compatible with the ecological properties of a region. Since moisture is the most important factor limiting the yield in the Central Anatolian plateau, the efficient use of water is the guiding principle in determining the package of practices. In accordance with this principle Field Crops Improvement Center has been conducting research since 1970's to determine the proper management package suitable for the conditions of the Central Plateau. The data indicates that every component of the management package contributes to weed control at a certain degree. Practices like soil tillage, seeding time and rate, variety, fertilization and rotation system influence the weed density, remarkably. It is possible to decrease the weed density with properly chosen practices which are recommended for the conditions of the Central Anatolian plateau.

Determination of Germination Rates of Barnyardgrass (**Echinocloa** spp.) and Sedge (**Cyperus spp.**) Seeds by TTC Method

A. UZUN (24)

Viability and germination rates of barnyardgrass (**Echinochloa** spp.) and annual sedge (**Cyperus** spp.) seeds were investigated by the TTC (triphenyl tetrazolium chloride) method. Barnyardgrass seeds are bisected longitudinally through the embryo by the razor blade and annual sedge seeds are pricked with a needle above embryo in the distal end of seed. In order to staining, one-half of the barnyardgrass seed immediately placed in a 1 percent, and sedge seeds in a 2,5 percent solution of TTC for 24 hours at 24 ∓ 1°C, in the dark conditions. Determinations were made by using the half of seed of barnyardgrass and taking out the embriyo of annual sedge seed were drawn on the base of variation in staining intensety on the 2x50 seeds. It was establisted by the TTC method that the germination rates for **E. macrocarpa, E. crus-galli, C. fuscus** and **C. difformis** were 99, 81, 72 and 96 %, respectively.

Weeds Causing Problem in Fodder Crops in Van and Its Environs and Their Distribution

I. TEPE (18)

In this study, we aimed at determining the weeds causing problem among fodder crops (alfalfa and seinfoin) in Van and its around. About 76 weeds have been defined in fodder crops and their distribution are something like 80.95 weeds in per m^2. Around Van-Gevaş area, the rate of weeds was found to be the highest (136.85) and towards inner parts, a decrease was observed. The weeds commonly seen were, respectively, **Bromus tectorum** L., **Plantago lanceolata** L., **Adonis aestivalis** L., **Geranium tuberosum** L., **Poa bulbosa** L. and **Galium tricornutum** Dandy. In addition, in many alfalfa fields, it was observed that **Cuscuta** sp. was one of the most serious problem. Also it was observed that the rate of weeds in alfalfa was highest than the rate of seinfoin.

Weeds in Cumin Fields and Their Chemical Control

M. KURÇMAN (22)

Cumins are becoming a widespread crop in the Central Anatolia. It is sown after the wheat harvest in the next spring. Studies indicated that weed competition in cumins can reduce the yield at an average of 25 %. The following are the weeds found in cumin fields, ranked from high to low density: **Gypsophila pilosa, Amaranthus retroflexus, Chenopodium album, Salsola kali, Rezeda lutea, Sinapis arvensis, Anthemis arvensis, Chondrilla juncea, Sisymbrium officinale, Heliotropium europeum, Lactuca scariola, Convolvulus galiticus** and **Vaccaria** sp. Several herbicides at various rates has been tested on these problem weeds as pre and post emergence. Safety on the following crop, wheat, was also observed in the test sites in the coming season. It was found that Trifluralin could be applied PPI (Pre Plant Incorporated-incorporation into 5-6 cm) at 720 gai/ha rate. Limuron and Prometryne (500 FW) could be used pre emergence (post sowing) at 1500 gai/ha and 100 gai/ha rates, respectively with 500 L/ha spray volume. Linuron could be also used post emergence at 750 gai/ha rate when weeds are 2-3 leaf and cumins are at 4-5 branchlet stages.

A Study on Allelopathic Effect of Radish (**Raphanus sativus** L.) Sap on Johnsongrass **Sorghum halepense** (L.) Pers.

F.N. UYGUR (7) T.F. KÖSELİ (7)

The effect of the radish root sap on the growth of rhizome nodules of Johnsongrass (**Sorghum halepense** (L.) Pers.) was studied. **In vitro** experiments, carried out at 26+2°C, have shown that the growth of rhizome nodules, grown in radish sap, was 5 times less than when grown in distilled water. In controlled pot experiments, where sand was used as the growing medium, it was found that the growth of nodules when 200 ml of radish sap was applied was 70 % less than in the control pots. When normal soil used instead of sand, nodule growth was 50 % less. The effect of radish sap on the growth of Johnsongarss rhizomes is suggested to be two fold: The first is that it includes some inhibitory substances which retard the growth. The second, is that the radish sap stimulates multiplication of soil borne pathogens, eg. Fusarium spp. which exist on the rhizomes of Johnsongrass. In this work the existence of an allelopathic effect of radish sap on Johnsongrass rhizomes growth was investigated.

Untersuchungen zu manchen biologieschen Eigenschaften von Laeusekraut (**Pedicularis comosa** L.)

Z. ÖZER (5)

Diese Arbeit wurde durchgeführt, um einige biologische Eigenheiten von Laeusekraut (**Pedicularis comosa** L.) zu untersuchen. Die auf den Versuchsaeckern des Versuchsgutes der landwirtschaftlichen Fakultaet (Atatürk Üniversitaet Erzurum/Türkei) gesammelten Samen, ober-und unterirdischen Teile von Laeusekraut wurden an der Universitaet Hohenheim, İnst. f. Phytomedizin untersucht und folgende Ergebnisse erhalten.

1. Laeusekraut Samen keimen sowohl bei Licht als auch im Dunkel bei einem Minimum von 2-3°C, einem Optimum 5-25°C und einem Maximum von 30°C.

2. Bei den gaschromatografischen Untersuchungen wurde in den Pflanzen, Saccharose, Sorbit, α - Glucose, β - Glucose, Fructose und Inosit festgestellt.

3. Vom Rosettenstadium der Pflanzen bis zum Anfang der Blütezeit erfolgt eine fortwaehrende Steigerung der löslichen Kohlenhydrate, nach der Samenausbildung fallen sie auf ein Minimum. Bei den Wurzeln dagegen ist der lösliche Kohlenhydratgehalt im Rosettenstadium hoch, in der Samenausbildung am niedrigsten, nach der Samenausbildung steigt der Kohlenhydratgehalt wieder an.

The Effect of Some Weed Control Applications on Rhizome Development of **Cynodon dactylon** (L.) Pers., **Cyperus rotundus** L. and **Sorghum halepense** (L.) Pers.

F.N. UYGUR (7) S. TUNAR (26) Ö. ÇINAR (7) W. KOCH (47)

Bermudagras (**Cynodon dactylon** (L.) Pers.), Nutgrass (**Cyperus rotundus** L.) and Johnsongrass (**Sorghum halepense** (L.) Pers.) are the most important weed species in Çukurova region. From the result of practice applications it was found that different soil cultivation methods affected the growth of these weeds different. Consequently this study, presented here gives a detailed assesment of 11 different methods of weed control which include new and old ones, in a citrus orchard on the growth of these weeds on and under soil surface. The results show that the soil, covered with black PVS along each row, prevented the growth of the rhizomes of the three species both on and under soil surface. Muwing, discarro and hoe stimulated the growth of weeds. When these methods were combined with herbicide application there was no reduction in weed growth. However, using only herbicide were positively effective. Using the mixture of Bromocil and Glyphosat has given the best result. In this study it has been shown which methods are more effective on the control of these three species. The economics of herbicide application, however, has not been considered.

The Control of Weeds in the Rows of Trellis System Vineyards and its Effect on Quality and Quality of Yield

A. ERTEM (27) İ. İLHAN (27) S. KADER (27)

This experiment was carried on Round Seedless grape variety which grafted on 110R American rootstock, trellis system, from 1983 to 1988. In this investigation, effect of herbicides and cultivation were compared against the weeds in the rows of trellis system vineyard. Also, the effect of control of the weeds on the quality and quantity of yield were determined. In this research, terbuthylazine + terbumeton (750 g/da)-as pre-amergence herbicide-, glyphosate (215 cc/da), fluazifopbutyl (200 cc/da), paraquat (80 cc/da) and MCPA (160 cc/da)-as post-emergence herbicide- with undervine weeder (undervine cultivator plow)-as soil cultivation- were used against the weeds. All treatments increased the yield compared to control, but custer number, average cluster weight and acidity didn't affect. However, differences between treatments were reported in the cane yield, total soluble solids and 100 berry weight. When the herbicides were used under proper conditions, phytotoxicity was not seen on the vines.

Investigations on Using Some Vegetable Oils as a Solvent in EC Type of Herbicide Formulations which were Made Up «Isooctylester» Active Ingredients

S. AĞAR (22) S. TOROS (3)

In this study, it was determined that the oils of **Glycine max**, (L) **Merril, Brassica napus** L. subsp. oleifera, **Gossypium herbaceum** L. and **Brassica rapa** D.C. seeds were capable of dissolving isooctylester active ingredient which has local production and is used against weed in cereal. EC formulations prepared with emulsifiers that are different chemical structure at different ratios were added with the aim of providing water compatability to the oil + isooctylester mixture. Suitability of emulsifiers were determined by applying emulsion stability tests to the formulations with standard hard and soft water. Biologic activity tests were carried out 17 formulations with suitable properties. In the result of biologic activity tests, it has been found that formulations including vegetable oils had equal activity and even more active than comparison pesticide.

Biological Control of Tomato Fusarium Wilt Disease Using **Trichoderma harzianum** Rifai Aggr. in the Greenhouse

S. YÜCEL (21) A. ÇINAR (7)

In this study, the effect of application of **Trichoderma harzianum** against Fusarium wilt disease of tomatoes has been studied. In order to reduce the population of pathogen firstly soil solarization (Solar pasterization) has been used, afterwords **T. harzianum** has been inoculated to the soil. Six isolates have been selected from the tested 24 microorganisms against **F.o.f.sp.lycopersici** for the pot experiments. One Trichoderma isolate **(T. harzianum)** reduced the disease incidence more than 40 % was selected as promising agent. Antagonist applied to the soil (150 g/m² bran+sawdust) previously pasteurised by solar energy. The application of the antagonist have especially been given a positive results in the areas where the pathogen was less evident. The incidence of the disease in the antagonist applied parcels have been found as follows: 24.83 % in the methyl bromide (MB) treated parcel, 28.60 % in the solarized parcel, and 42.40 % in the control parcel. The yield of tomatoes in the MB treated, solarized and control parcels has been found 82.92, 81.94 and 71.14 kg/parcel respectively.

Investigations on Possibilities of Biological Control of Powdery Mildew of Cucumber

M. ALKAN (48) G. TURHAN (9)

Powdery mildew is one of the most important cucumber disease. Although there are some fungicides which can succesfully control this disease, due to the fact that chemical control has harmful side effects especially in the greenhouse growing areas, biological control studies have gained popularity nowadays and many hopefull results were reported. In this study which is the first research on the biological control of powdery mildew of cucumber in Turkey. 118 isolates belonging to 23 genera of fungi isolated from the leaves of cucumber, squash, sugar melon and water melon have been investigated in respect of their effects on the spore germination and germ tube development of **Erysiphe cichoracearum** D.C. ex Mérat with the aid of a special method. The inhibitive effects of the most isolates have been determined, while some of them appeared to be ineffective and the others had a stimulating effect on the pathogen. **Myrothecium** and **Phoma** proved to be the most effective genera. Four of the five isolates belonging to the first, and six of the isolates of the second genus possessed a strong inhibitive effect on the spore germination of the pathogen. The other genera having more or less inhibitory activity were **Penicillium, Aspergillus, Trichoderma, Fusarium, Alternaria** and **Ulocladium.** Furhermore some isolates of **Botrytis. Gliocladium, Scopulariopsis** and **Torula** showed strong antibiotic effects on the pathogen.

Ein Modellversuch Zur Erklärung Die Gründe Des Misserfolgs Bei Der Biologischen Bekämpfung Von Bodenbürtigen Pflanzenpathogenen

G. TURHAN (9)

Aus der weit verbreiteten Erscheinung des Antagonismus zwischen den Mikroorganismen liess sich der Konzept «biologische Bekämpfung» entwickeln. Könnte es wohl möglich sein, als eine Alternative zur üblichen chemischen Bekämpfunf, die Pflanzen durch Einsatz von Antagonisten vor Pathogenen zu beschützen? In diesem Zusammenhang sind bislang viele Mikroorganismen-Arten in vitro auf ihre Wirkung gegenüber verschiedenen Pathogenen und auf ihre Verwendbarkeit weltweit untersucht worden. Obwohl die Antagonisten im Labor und im sterilen Boden für hoffnungsversprechend gehalten wurden, waren

die im Naturboden erhaltenen Ergebnisse jedoch nicht genug befriedigend. Überlegungen über die möglichen Ursachen dieses Misserfolgs sind mehrfach meist theoretisch angestellt und diskutiert worden. Die vorliegende Arbeit wurde speziell geplannt, um die Gründe des Misserfolgs der biologschen Bekämpfung im Naturboden anhand einiger Parade-Beispiele aufklären zu können und die Anforderungen für eine erfolgreiche Bearbeitung dieser Fragestellung norchmal zu diskutieren. Mit Hilfe von Doppel- und Dreierkulturmethoden wurden die ausgeprägten wechselwirkungen zwischen Pathogenen **Pythium debaryanum, Sclerotinia sclerotiorum, Rhizoctonia solani, Sclerotium rolfsii)** und Antagonisten (**Acrophialophora levis, Aspergillus** sp., **Gliocladium virens, Neocosmospora vasinfecta** var. **africana, Thichoderma harzianum, Trichoderma** sp., **Streptomyces** sp.), sowie Zwischenbeziehungen bestimmter Antagonist-Paaren dargestellt und auf dabei entstehenden Probleme hingewiesen.

Determination of Antagonistic Microorganisms against White Rot Disease Caused by **Sclerotinia sclerotiorum** (Lib) de Bary

A. AKSAY (7) M. BİÇİCİ (7) Ö. ÇINAR (7)

Sclerotinia sclerotiorum (Lib) de Bary causes the white rot dideases on vegetables grown under plastic cover in the East Mediterranean Region. In this study, the biological control possibilities have been studied against the pathogen to control the rot disease. The antagonistic ability of 134 microorganisms isolated from soil and sclerotia were tested against this pathogen in the laboratory and the pot trial. Four isolates of **Trichoderma**, 1 **Penicillium**, 4 **Pseudomonas**, 4 bacteria and 13 actinomycetes were proven to be hyperparasites of the pathogen. It was also found that 3 **Trichoderma** and 2 **Streptomyces** isolates were played important role in destroying of the pathogen sclerotia. The isolates of **Trichoderma** were the most effective and reduced disease in the pot trial.

The Antagonistic Effect of a **Bacillus** sp. against some Bacterial and Fungal Plant Pathogens and Some Antagonistic Fungi

İ. ULUKUŞ (29)

Bacillus spp. are very important as biocontrol agents of plant diseases. The species of the genus **Bacillus** form endospore, and for

this reason, they can survive easily under extremely bad conditions where most antagonistic bacteria and fungi die. On the other hand, the preparations of these bacteria can be made easily. The antagonism of a **Bacillus** sp., which was isolated from soil, was investigated against some plant pathogens, and some antagonistic fungi, considering these advantages of the bacterium. In paired cultures on potato dextrose agar, the bacterium was very highly antagonistic against **C.m.** pv. **michiganense** (the width of inhibition zone 18.6 mm), but moderately against the other plant pathogenic bacteria (the widths of inh. zones 6.0-9.3 mm). It inhibited the **Verticillium dahliae, Cladosporium fulvum** and **Rhizoctonia** sp. strongly. But **Botrytis cinerea, Alternaria alternata, A. solani, Sclerotinia sclerotiorum, Fusarium oxysporum** f.sp. **lycopersici, Phytophthora capsici, Macrophomina phaseoli,** and the antagonistic fungi **Thichoderma** spp. and **Myrothecium verrucaria** were less inhibited by the bacterium (the widths of inh. zones 11.0-16.0 mm). It was thought that this **Bacillus** sp. isolate is promising for the forthcoming biocontrol studies.

Antagonistic Effects of Phyllosphere Micoflora of Lemon Trees on **Phoma tracheiphila** in vitro

A. ERKILIÇ (7) A. ÇINAR (7)

Antagonistic effects on **Phoma tracheiphila** of saprophytic fungi which were isolated from the phyllosphere of lemon trees were studied in dual culture, antibiotic production in liquid culture, and volatile and non-volatile antibiotic productions, in vitro. In dual culture **Aspergillus versicolar, A. niger, A. candidus, Epicoccum nigrum** and **Penicillium** sp. were effective by producing inhibition zones. In addition, the culture filtrate of **A. sclerotiorum** reduced the mycelial growth ot the pathogen by 83.7 %. Volatile and nonvolatile antibiotics of **Trichoderma viride** reduced the mycelicial growth of **P. tracheiphila** by 41.0 and 57.5 %. Results indicated that some microorganisms present in lemon phyllosphere could be used for the control of Mal Secco disease.

Effects of some Saprophytic Microorganisms in Phyllosphere of Lemon Trees on Disease Induce of **Phoma tracheiphila in** Controlled Conditions

A. ÇINAR (7), A. ERKILIÇ (7)

Some fungi which were isolated from the phylosphere of lemon trees, showing antagonism against **Phoma tracheiphila** in vitro were studied under controlled conditions to determine their effect on infec-

tion rate and severity of Mal Secco disease. When **Aspergillus sclerotiorum** and **Aureobasidium** sp. applied to leaves of lemon seedlings two days before the **P. tracheiphila** inoculations, infection rate of the twigs was reduced by 55.6 and 66. 7 %, and disease severity by 50.0 and 64.3 %, respectively. When antagonists were applied with pathogen or after the inoculation of the pathogen no succes was obtained. Results indicated that some fungi present on lemon phyllosphere may be used integrated disease management programs of Mal Secco.

Disease Incidence and Distribution of Gummosis Caused by **Phytophthora citrophthora** (Sm. and Sm.) Leonian on Lemon Trees and its Control by Antagonistic **Trichoderma**

Y. DEDE (7) M. BİÇİCİ (7)

The possibilities to use some antagonistic **Trichoderma** species against gummosis disease caused by **Phytophthora citrophthora** were studied in the present study. Also, it was aimed to determine the disease incidence and distribution of the agent in the soils in lemon orchards at the Çukurova University campus area. It was seen that the pathogen had suppressed by **Trichoderma** species on dual culture studies. Moreover, it was determined that the extending of gummosis symptoms were be able to reduced on trees which were inoculated with **Trichoderma** species after three weeks the pathogen inoculation in spring and autumn periods. The disease was found as highest on Kütdiken variety and to be at least on nucellar mixed variety in the disease survey studies, **Phytophthora** sp. was isolated with leaf baiting technique on leaf discs to be 85 % for Kütdiken lemon plots and 32 % for nuceller mixed plots.

Detecting of Possibility to Obtain of Sour Orange Lines to be Resistant to Root Rot Disease by Using to Tissue Culture Techniques

C. CAN (7) K. KOÇ (7) A. ÇINAR (7)

In this study some tissue culture techniques were used to obtain tolerant or resistant sour orange, **Citrus aurantium** L., lines to gummosis disease, **Phytophthora citrophthora** Smith and Smith Leonian. For this purposes culture filtrates were used to induce somaclonal

variation and regeneration of stem explants through somatic embryogenesis. The optimum hormon combination was 4.0 GA+2.0 BAP mg/1 for induce somatic embryogenesis of stem explants. Cultures in this hormonal combination gave the best results when they kept in complete darkness for 2-3 weeks then placed under light. Young and small shoots were rooted best when they were placed in MS medium containing 1.0 and 2.0 mg/l NAA+IBA hormone concentrations, and kept under light for one month. In studies conducted to induce somaclonal variation by using culture filtrate of **P. citrophthora** the rate of somatic embryogenesis started to decrease after % 50 concentration of culture filtrates. Results obtained in vitro were supported with the results obtained in bioexperiments.

Untersuchungen Uber die Rolle der Phytoalexine bei der Resistanz von Weinrebe gegenüber **Phomopsis viticola**

E. ONOĞUR (9) E. KAÇAR (41) N. ÇETİNKAYA (9)

Die Schwarzfleckenkrankheit der Weinrebe ist eine der gefaehrlichen Krankheiten in der West-Türkei. Über den Resistenzmechanismus der Rebe gegenüber **Phomopsis viticola** ist fast nichts bekannt. Aufgrund der Befunde, dass die Phytoalexine Resveratrol und Viniferin bei der Resistanz gegenüber **Plasmopara viticola** und **Botrytis cinerea** eine Rolle spielen könnten. wurde untersucht, ob dies auch für **P. viticola** gilt. Hierfür wurden zunaechst Reaktionen der 26 Rebsorten gegenüber dem Erreger ermittelt und sie wurden demnach als resistent bzw. anfaellig eingestuft. Bei den ausgewaehlten Sorten wurden der Gehalt an Gesamtphenolen bestimmt und Resveratrol-Synthese und Symptomentwicklung in den inokulierten bzw. mit UV-Licht (254 nm) behandelten Blaettern verfolgt. Der Gehalt an Gesamtphenolen war kein Kriterium für Resistenz. Auch die blaue Fluoreszenz (Resveratrol und Viniferin) war bei allen Sorten mit unterschiedlicher Anfaelligkeit waehrend der Besiedlung des Blattgewebes zu beobachten. Die Sorten unterschieden sich darin, dass der Erreger sich bei den anfaelligeren schneller verbreitete. Die Behandlung von resistenteren Blaettern mit UV-Licht zur Induktion von Phytoalexine vor der Inokulation veranlasste jedoch unerwartet, dass Gewebe im Bereich der auskeimenden Sporen mit Bildung von Fluoreszenz nicht reagieren konnte und schneller besiedelt wurde. Dies wurde als Indiz genommen, dass diese Stoffe bei der Symptomentwicklung eine gewisse Rolle übernehmen könnten.

Das Fungitoxische Potential der Aetherischen Ile von **Bifora radians** Bieb.

O. YEĞEN (1)

Im Rahmen dieser Arbeit wurde das fungitoxische Potential der aetherischen Öle von **Bifora radians** Bieb. untersucht, das sich als Unkraut in den letzten Jahren im Getreideanbaugebiet von Mittelanatolien sehr schnell verbreitete. Beim Mycelwachstumstest von **Fusarium culmorum** im wasser-Agarmedium liegen der Bereich der LD_{50}-Wert der aus 2,25 g vom frischen **B. radians** gewonnenen aetherisschen Öle in 100 ml Agarmedium. Das Mycelwachstum von **F. culmorum** war bei der aetherischen Öldaempfe von **B. radians** signifikant vermindert. Bei der Dünnschichtchromatographie wurden die Platten mit Kieselgel G (Schichtdicke : 300 µm) beschichtet und 30 min. lang bei 110°C aktiviert. Danach wurden die aetherischen Öle von **B. radians** punktförmig (5 µl) aufgetragen. Zum Entwickeln wurde das Sandwichkammersystem verwendet. Dabei wurde die Laufstrecke von 100 mm benutzt und das Fliessmittel war Benzol. Nach dem Entwickeln liess man das Fliessmittel von der Schicht abdampfen und danach wurden die Mycel-und Konidiensuspentionen von **Dreschlera sorokiniana, Botrytis** sp. und **Fusarium culmorum** in 2 % igen Glucoselösung auf die Schicht gesprüht. Nach 4 taegige Bebrühtung bei 25°C im Dunkeln waren die Flecken sichtbar, auf denen kein Pilzwachstum festgestellt wurde. Dabei wurden die Fleckenflaeche und ihre hRf-Werte Restgestellt. Zum Schluss zeigten diese Versuchsergebnisse, dass die aetherischen Öle von **B. Radians** ein relativ hoches fungitoxisches Potential besitzen.

Fungitoxic Effect of **Bifora radians** Bieb. against Cereal Root Rot Agent **Fusarium culmorum** (W.G. Smith) Sacc. in Soil

A. GÜRCAN (3) B. TAŞTAN (22)

Fungitoxic effect of **Bifora radians** Bieb., a recently populated weed, against cereal root rot agent, **Fusarium culmorum** (W.G. Smith) Sacc. in soil was investigated. **Bifora radians** plants were harvested at flowering stage and chopped in pieces of 1.5-2.0 cm. and 5, 10, 20 and 40 g plant material were mixed with 1 kg sterilized soil. Glass pipes of 2x3 cm. were closed with jelatinous paper in one end and 2 % water agar was poured in pipes. Following the fungus inoculation the upper ends were also closed and the pipes placed in the soil. Mycelial development of the fungus on agar was measured on the third day. As a result, mycelial development of the fungus was found to be significantly slower than control. Inhibitory effect continued in varying

degrees for three months. The highest inhibition was observed one month after the plant corporation. and the inhibition rates were 47.6, 40.4, 38.6 and 34.2 % for 40, 20, 10 and 5 g plant material, respectively. Only in the experiment with 5 g plant material, mycelial development reached to the control level in third month, in other characters, mycelial development was found to be always less than the control.

Effects of Soil Solarization on Disease Incidence and Viability of Sclerotia Produced by **Sclerotinia sclerotiorum** (Lib) de Bary

A. AKSAY (7) Ö. ÇINAR (7) M. BİÇİCİ (7)

To eliminate soil-borne pathogens recently, soil pasteurization by solar energy is applied in warmer countries having summer days with high temperatures. It has been studied some activities which took place with applying solarization in this study. Sclerotia lost their viability by 90-100 percent in 0-30 cm soil depths after solarization for 6-8 weeks and were colonized highly by other microorganisms. This showed that temperatures resulted from the solarization increased the microbial activity in soil. It was, therefore, understood that solarization of **Sclerotinia solerotiorum.** Laboratory tests also showed that mycelia of **S. sclerotiorum** were killed between 30 minutes to 6 days perind, and sclerotia were killed between 5 hours to 29 days period at 37-50°C. Disease incidence was statistically reduced on cucumbers (**Cucumis sativus L.**) grown on infected soils treated by solarization compared to untreated control plots ($p=0.05$).

Studies on the Effects of Soil Solarization on Primary Agent of Strawberry Root Rot Caused by **Rhizoctonia solani** Kühn and Disease Incidence

M. BİÇİCİ (7) H. PALA (7) Ö. ÇINAR (7)

The research was conducted to determine the effects of soil solarization on strawberry root rot pathogen which causes yield reduction in the Eastern part of Meditterrenean Region and the disease incidence. The pathogen population was reduced at the rate of 100 and 92.5 % in the 10 and 20 cm of the soil depths, respectively, by the application of soil-solarization. It was determined that fungi were more effected by solarization when it was compared with bacteria. On the contrary, actinomycetes population was increased by this application. The rate of weed incidence and the dead of plants was lowest from the fumigation treatment, the highest yield was obtained with the soil solarization.

Possibilities of Usink Smoke Tablets against Gray Mold (**Botrytis cinerea** Pers.) in Greenhouses

O. YALÇIN (24) F. EVCİL(24) S. ÖZ (24)

Through this study, smoke tablets effectiveness was searched against gray mold (**Botrytis cinerea** Pers.) causing serious damage on tomato plants in greenhouses. The results on average with Tecto (thiabendazole) were 86.1 % and 91.92 %, respectively, in 1986 and 1987, wind Ronilan-smoke generator (vinclozolin) 91.05 % 93.54 respectively, in 1987 and 1988. These results were satisfactory. On the other hand, in terms of application such tablets give great facility in treathing the plants when they are of 5-6 or more bunches.

Investigations on Effectiveness of some Fungicides to the Agent of Bacterial Speck of Tomato (**Pseudomonas syringae** pv. **tomato)**

H. ÖZAKTAN (9) N. DELEN (9)

The disease of bacterial speck has been sometimes caused to losses on the tomatoes both growing on the fields and in the greenhouses. Chemicals containing cupper have been proposed in order to prevent the disease. But, the phytotoxic effect of copper to the tomato plant may cause the growers to suffer damage under some conditions. For the purpose, fact that the causal agent may be prevented as more without problems, **in-vitro** tests which was carried out with different chemicals, was determined that maneb and mancozeb were very effective to the pathogen, besides chemicals containing cupper. Furthermore, it was found that iprodion in our study was successfulyy inhibited the growth of certain isolates whereas it was less effective in the inhibition of the growth of other isolates.

Studies on the Chemical Control of some Pathogens Problem on the Greenhouse Tomatoes

N. DELEN (9) M. YILDIZ (9) B. YILDIRIM (39)
H. KARAYİĞİT(39)

Early tomato growing in the greenhouses have a great economical importance in Turkey. According to statistics in 1985, tomato production were done 60 % of 9.137 ha covered space in the country. **Alternaria** spp., **Pseudomonas syringae** pv. **tomato** and **Botrytis cinerea** are

the important pathogens of these areas. For control these important disease agents different fungicide programs were tested. At the result of the trials, copper oxychloride + zineb (3 times), iprodion + mancozeb (3 times), copper oxychloride + zineb (1 time), dichlofluanid + maneb (3 times) were found as the most effective and the economic program. According to the laboratory tests, there was not obtained any less sensitive isolates of **Alternaria** spp. and **B. cinerea** to dicarboximides in the greenhouses where the studies were done.

Studies on the Determination of the Effects of the some Chemicals to Sunflower Downy Mildew (**Plasmopara helianthi** Novot.) and of the Resistance to Metalaxyl

E. ONAN (24) A. KARCILIOĞLU (24)

Downy mildew (**Plasmopara helianthi** Novot.) which is soilborne and can also be carried by seed is a major problem of sunflower. If the pathogen attacks the plants at a period between seed germination and emergence, it can result in 100 percent of yield losses mostly. So, chemical treatment should be applied for its control. In the study, the effects of Previcur N, Seresan P and Aprin 35 SD are determined on downy mildew of sunflower as seed treatment. Besides, to find whether **P. helianthi** acquire the resistance to metalaxyl, or not it is carried out the small plot and the laboratory experiments under the controlled conditions. It is seen that Aprin 35 SD is effective to downy mildew but Previcur N and Ceresan P are not. It is determined that the sensitive of **P. helianthi** is on the decrease to low doses of Aprin 35 SD but is not above 200 g of dose when zoosporangium suspension is trained for increasing doses of chemical (100, 200, 300, 400, 500 and 600 g/100 kg seed).

Recherches Sur Les Produits de Traitement des Semences et la Methode de Traitement Convenable Contre la Maladie de la Brunissure du Rız (**Pyricularia oryzae** Bri. et Cav.) Dans la Region Mediterranee de la Turquie

A. ATAÇ (21)

La maladie de la brunissure a de grande importance parmi les maladies fongiques du riz. Cette maladie ci-dessus, existe dans notre pays aussi bien que dans tous le monde. On sait que le champignon de la brunissure hiverne sur le chaume du riz et sur les semences infectées dans les regions subtropicaux. Dans notre pays, il n'ya pas

de produits chimiques et d'une methode détérminées sur le traitement des semences contre l'agent pathogène de la maladie de la brunissure du riz. Cette récherche a été conduite pour resoudre de problème du traitement des semences, en 1985-1987. Cette recherche a été basée complétement sur la désinféction des semences du riz enfectées par **P. oryzae.** Au cours destravaux, on a été employé 7 systemiques et 9 non-systemiques fongicides et on a été constatée que les efficacitées des fongicides de Benlate (Benomyl, 50 % PM), de Bavistin (Carbendazim, 50 % PM) et d'Enovit Süper (Thiophanate methyl, 70 % PM) sont suffisantes pour l'éradication de **P. oryzae,** aux doses de 200 grammes pour 100 litres d'eaux avec la methode de trempage pendant 30 heures avant de germination des semences.

Recherche de Méthode Convenable de Lutte Contre l'Oidium (**Uncinula necator** (Schwein.) Burr.) de la Vigne

K. TURAN (21)

Les résultats des essais de traitement de différents Instituts de Recherche de Lutte Agricole montrent que la durée entre les deux premiers traitement varie de 13 à 41 jours. En partant de la différence de végétation du cépage, de la durée entre les deux premiers traitements et du développment de la maladie, nous avons cherche le moyen de dimunier le nombre de troitements. Ansi avons nous réalisé des essais de troutements dans 4 endroits diffferens. La première essou est basée sur la methode officielle de lutte agricole (A). Deuxièmment nous avons pris en consideration la periode de dimension des grains duraisin (B), le premier temps où le symptome de la maladie a été observe (C) et le temps de floraison (D), les trors premiers carurteres ont été utilises dans des traitement effectiés à Arpaçsakarlar, à Akdam et à Sarıçukur. Mais le temps de floraison a été tenu comple aux essois faites a Fındıklı en plus des 3 premiers caractéres. Ona pulvérisé super solor 73 (Soufre 73) et Bayleton 5 WP (Triadimefon 5) à Arpaçsakarlar, à Akdam et à Sarıçukur, et Topas 100 EC. (Pencanozole 10) a Fındıklı. Les taux d'efficacité de traitements Sont de : 99.19 % à Arpaçsakarlar (5 pulveérisations), de 93.11 % à Akdam (4 pulvérisations) et de 92.94 % à Sarıçukur (4 pulvérisations) selon la méthode A, d e87.26 % à Arpaçsakarlar, de 83.15 % à Akdam et de 96.54 % à Sarıçukur avec 3 pulverisation selon le caractére B, de 81.16 % à Arpaçsakarlar (2 pulvérisations), de 75.23 % à Akdam (2 pulvérisations) et de 91.22 % à Sarıçukur (3 pulvérisations) selon le caractire C. Les résultats des essois de troitements à Fındıklı sont selon les caractères A, B, C et D, de 98.17 % (4 pulvérisations), de 99.28 % (3 pulvérisations), de 100.00 % (5 pulvérisations) et de 99.94 % (4 pulverisations) respectivement.

The Importance of Yield Analysis for the Application of Fungicides Used against Grape Powdery Mildew (**Uncinula necator** «Schw.» Burr.)

M. COPÇU (51)

In the vineyards growers have used intensified fungicides during April-June growing periods as mainly systemics. Recently the kinds of these fungicides have increased, but almost all of them are triazoles. In 1986 one of the most important mildewcides Topas 100 EC (penconazole 10 %) was registered against grape powdery mildew (**Uncinula necator** «Schw.» Burr.) as the highest effectiveness. On the other hand, the differences of the yield values (quantity, size and colours of berries etc.) between treated with Topas 100 EC and the other systemic (fenarimol) were determined. Although there was not any considerable variations on the effectiveness of the fungicides, it was obtained very important yield differences between their values. At the end of the crop maturity, yield values presented as table grape of the treated with Topas 100 EC and the other were 23.82 t/ha respectively. As it can be seen there was very important increasing on production of table grapes treated with Topas 100 EC. Then, grapes dried and raisan quantity was determined and also quality (as size, colour, etc.) and unit price was experted. In treated grapes with the other fungicide the raisan amount and scale and unit price were 4.77 t/ha, no. 9 and 638 TL/kg respectively. These values were 5.95 t/ha, no. 11 and also 772 TL/kg for Topas 100 EC treated rasians. As a result of these studies not only effectiveness of the pesticides but also their effects on the crop yields are very important specifications and it should be determined or at least observed.

Inhibition of **Botrytis cinerea** Pers. Which Causes a lot of Loss in Müşküle Grape During Storage with Irradiation+Refrigeration Combined Treatment

O. TİRYAKİ (34)

In our country the most important stored grape variety is Müşküle. The major problem of this grape is gray mould disease which is caused by **B. cinerea.** A lot of researchers have demonstrated that ,using gamma rays, storage time of grape (which means to delay **B. cinerea** infection) has been extented. Also, these research findings showed that irradiation was more advantageous than chemicals and irradiation+refrigeration treatment was more hopeful. A joint expert com-

mittee on the wholesomeness of irradiated foods (JECFI) convened by the WHO, FAO and IAEA concluded in 1980 that foods irradiated with a dose of up to 10 kGy are wholesome for human consumption. Parallel to these findings, for determination of the optimum dose which inhibits infection, Müşküle grapes were inoculated with **B. cinerea** suspension, artifically ($1.87x10^6$ spor/ml) and were irradiated with doses of 0, 1, 2, 3, 4, 5 kGy ^{60}Co. The experimental design was randomised plot design with three replication and the two treatment applications were done at 17 and 34 day after harvest. Infection rates are observed at 3-4°C temperature and 90-95 % relative humidity. As a results of this research it was concluded that, generally, the effect of irradiation decreased with increase of time after irradiation. Infection rate increased especially in later period at higher doses. After 17 day harvesting treatment infection has been delayed 17 day with 4 kGy but is has been delayed only 3 day with 5 kGy after 34 day harvesting treatment. It was seen that it is possible to obtain more hopeful results with decreasing the time between irradiation and harvest.

Investigations on Developing and Application of the Systems for Forecasting in Controlling Apple Scab Disease (**Venturia inaequalis** (Cke.) Wint.)

H.A. YÜRÜT (22) H. COŞKUN (22) K. BENLİOĞLU (22) M. GÜRER (22)

In this investigation, the classical apple-scab control method was compared with forecasting control method during the years 1982-1985. Plant phenology, temperature and leaf-wetness periods were based on the forecasting treatments. The trials were carried out on Amasya apple variety in the Institute orchard in 1982-1983. Thermohygrograph equipment was used in this experiment. Whereas, leaf wetness recorder (Dewitt) was used in the experiments which were set out in Çubuk and Atatürk Forest Farm on starking variety in 1984-1985. Data of leaf-wetness period and temperature were recorded by leaf-wetness recorder. These data were appraised according to a previous scale and the infection periods were determined. Then, at the end of determined periods, systemic and semi-systemic fungicides were applied. The affirmative results were obtained from these applications. In the classical method, the chemicals were applied four times against to apple-scab in 1984-1985 whereas in the forecasting method, the chemicals were applied twice in the same years. The effects in 1984 were averaged 82.79 % for the classic method and averaged 86.06 % for forecasting method. Also, the effects in 1985 were respectively averaged 89.42 % and 96.15 %.

Application of the Forecasting and Warning System in the Control of Apple Scab (**Venturia inaequalis** (Cke.) Wint)

S.T. DEMİR (24) B. HEPDURGUN (38)

Apple Scab diseases can not be controlled in some regions and years although it was applied even 7-8 chemical treatments. Because there are a close relation between the epidemic of the disease and climatic conditions. Moreover it is difficult to follow this relation. In the forecasting and warning system; the biology of fungus, phenology of the trees and climatic factors are considered and critical infection periods are determined. So, effective treatments can be done. In 1987 the studies of the forecasting and warning system were carried out at two observation orchards in Uşak (Sivaslı and Banaz). Matured perithecia were found on 14.1.1987 at Sivaslı and on 19.1.1987 at Banaz. Ascospores were observed until 22.6.1987. Length of leaf surface wetness period and average temperatures were valued according to Mills table. And so, it was determined that there were 5 infection periods at Sivaslı and 7 infection periods at Banaz. According to these infection periods, it was done three chemical treatments to control apple scab both at Sivaslı and Banaz, and good results were obtained. The effectiveness of the system was 94.09 to 99.87 % at different four orchards at Sivaslı and 81.06 to 96.36 % at various six orchards at Banaz. The effect was lower at Banaz. In our opinion, this could be due to delaying the second treatments.

Uber die Möglichkeit Zur Anwendung von Netzschwefel bei der Bekaempfung von Schwarzfleckunkranheit an Weinrebe

Z. AYVAZ (37) E. ONOĞUR (9)

Es ist in der Literatur bekannt, dass **Phomopsis viticola** in Cirrhi seiner Pyknidien elementeres Schwefel akkumulieren und dadurch die Keimung von Sporen regulieren kann. Beruhend auf dieser Tatsache wurden Untersuchungen vorgenommen, deren Ergebnisse wie folgt zusammenzufassen sind: Dienten die Triebstückchen als Naehrmedium zur Inokulumgewinnung, so sank der Keimprozentsatz mit der erhöhten Inokulumdichte zwar ab, aber ein kritischer Punkt, wo die Auskeimung nicht mehr stattfand, war nicht zu verzeichnen. Auch bei erhöhten Mengen an $MgSO_4 . 5H_2O$ in PDA als Naehrboden war kein kritischer Punkt für Auskeimung und Keimschlauchbildung zu beobachten. Elementeres Schwefel und Netzschwefel schalteten die Sporunkeimung und Keimschlauchbildung bei 30 ppm völlig ab, wobei

die Schwefelverbindungen wie Na_2SO_3 keine Wirkung aufwiesen. Der **Phomopsis**-Befall an den Topfpflanzen wurde durch vor der Inokulation erfolgte Netzschwefelbehandlung vermindert. So betrug die Wirksamkeit des Mittels (600 g/100 1) 71 % bei der Jugendphase und 82 % bei der Spaetphase der Triebe. Auch die Symptomentwicklung an den behandelten Internodien war langsamer. Echter Mehltau an Weinrebe wird in der Ege-Region hauptsaechlich durch kombinierte Anwendung von Netzschwefel und systemischen Fungiziden bekaempft. Hierzu wurde diskutiert, ob eine früh erfolgte (Stadium E) Netzschwefelanwendung bei der Bekaempfung dieser Krankheiten vom Nutzen sein könnte.

Investigation of the Carbendazim, Thiobendazole and Benomyl Residues in Lemons

A. GÜVENER (33) C. KARACA (33)

Lemon production is one million ton per year in Turkey. These have to be protected against **Penicillium digitatum** Sacc. disease in warehouses. Therefore, lemons were treated by dipping them carbendazim, thicbendazole and benomyl solution and residue am amounts of these chemicals were determined by using some methods. Proper residue analysis were detected by the recovery study. After that, treated lemon samples were prepared and analysed. First group lemons were dipped in the carbendazim solution of 25 gr a.i/100 lt water, second group lemons were dipped in the benomyl solution of 25 gr a.i/100 lt water, 50 gr a.i/100 lt water, third group lemons were dipped in the thiobendazole solution of 30 gr a.i/100 lt water, 60 gr a.i/100 lt water for one minute. The treated lemon samples were analysed after 24 hours without peeled and found average of 1.1 ppm, 1.7 ppm for carbendazim; 4.18 ppm, 6.19 ppm for benomyl and 5.04 ppm, 7.36 ppm for thiobendazole in the whole fruit, respectively. After 21 days, lemon samples had 0.958 ppm carbendazim, after 10 days 1.98 ppm, 2.76 ppm benomyl and 2.65, 3.16 ppm thiobendazole residues in the whole fruit. In the peeled samples were detected 0.07 ppm carbendazim, 0.15 ppm benomyl and 0.09 ppm, 0.24 ppm thiobendazole residues after storing 10 days. Maximum residue limits of these chemicals were 10 ppm and detected residue amounts were below their limits. According to these results we can say that it will not be any hazard to the human health and any commercial risk in the market by these treatments. We found that the higher dosage of benomyl (75 gr a.i/100 lt and Carbendazim (90 gr a.i/100 lt) leaved residues higher than limits after 24 hours of the treatments as 13.6 ppm, 13.17 ppm, respectively.

Chemical Control Possibilities of Damping-off Disease of Pine Seedlings

N. VURAL (9) N. DELEN (9)

Damping-off disease caused the important damages on the pine seedlings. In the first step of the study which were made for protecting the seedlings from this disease, isolations were done from the diseased plants and from the seeds. In these isolations, from the diseased plants **Fusarium** spp. (mostly **F. oxysporum**), **Cylindrocarpon** sp., **Rhizoctonia** sp., **Alternaria** spp., **Pythium** spp., **Phytophthora** spp. and **Macrophomina** sp. and from the seeds **Fusarium** spp. (mostly **F. oxysporum**), **Pythium** spp., **Alternaria** spp. and **Pullularia** sp. were obtained. According to these findings different fungicide programs were tested. Application of metalaxyl + mancozeb to seed bed during the sowing time and thiram + benomyl application after the emergence of the seedlings were found as the most effective program. On the other hand, it was observed that to sow the seeds into the clean soil increased the effectiveness of the programs.

Studies on Chemical and Physical Properties of Flotation Residue, Refined Residue, Sulphur Concentrate and Rich Ore Obtained at Sulphur Enterprises for Possible Uses in Plant Protection

A. SAV (22) G. ERDİLLER (3)

In this study, we investigated flotation and refined residues, sulphur concentrate and rich ore obtained from Keçiborlu Sulphur Enterprise to use in plant protection. Chemical analyses were, with first priority, conducted in the materials which we handled. Then, they were brought to a degree not to leave residue from a sieve of 44 μ. As third step, physical analyses were carried out on the ground materials. Chemical analyses showed that the amount of free sulphur for flotation residue, refined residue, sulphur concentrate and rich ore were 12.5 %, 60.2 %, 81.34 % and 79.91 %, respectively. At the begining,, flotation residue considered as subject of our study was later discarded because of very low amount of free sulphur containing in chemical analyses. Physical analyses of the tested materials showed that the weights per liter, bulk densities, flovabilities, humidities, higroscopicities, pH and sticking capabilities were 580-710, 23-26 %,

7-10, 1.35-1.40 %, 7.4-15.3 %, 3.25-4.1 and 11.8-44.3, respectively. Depending on the results we can say that sulphur concentrate and rich ore suitable materials as sulphureous dust pesticide. Refined residue has generally suitable physical properties, but its chemical property is not good because of its lack of free sulphur.

Effects of Some Fungicides against Important Antagonistic Fungi

N. ZIRHLI (35) S. MADEN (3)

Antagonistic fungi and plant pathogenie fungi that they effected were found out by literature review and effects of 9 commercially important fungicides on 13 antagonistic fungi, namely **Alternaria alternata, Aspergillus flavus, A. niger, Cladosporium cladosporioides, Fusarium moniliforme, F. solani, Gliocladium roseum, Mucor hiemalis** f.sp. **hiemalis, Myrothecium verrucaria, Penicillium expansum, P. patulum, Trichoderma harzianum, T. viride** were investigated. From the applied fungicides; benomyl affected all the fungi except **A. alternata** and **M. hiemalis** f.sp. **hiemalis**, while captan affected most of all except **A. alternata, G. roseum** and **M. verrucaria** and carboxin all but **G. roseum** and **T. harzianum**. Imazalil was tried on three fungi and affected all of them, that were **A. alternata, A. niger, T. viride**. Metalaxyl did not affect any of the antagonists. From the other three fungicides; mancozeb was effective against all the fungi except **F. solani**; and quintozene all the fungi except **F. solani** and **M. verrucaria**; Thiram all fungi except **A. niger** and triadimefon the 10 fungi except **A. flavus, G. roseum** and **M. verrucaria**. In the text, LSD_{50} and LSD_{95} values of the fungicides on the above mentioned fungi were also given.

Screening of some Plants Growing in Turkey for their Antifungal Activity

B. ŞENER (12) F. BİNGÖL (12) U. ABBASOĞLU (12)

In the present study 100 plants collected from different localities in Turkey were investigated in the aspect of their antifungal activity. The results obtained indicated that the antifungal activity in the plants under test was related to the phenolic substances in the plants.

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