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Dieback Resistance Potential in Different Varieties of Shisham (*Dalbergia sissoo* Roxb.)

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Abstract

Nine phenotypically different varieties of Shisham (*Dalbergia sissoo* Roxb.) were identified from Punjab University, Quaid-e-Azam Lahore, Pakistan and adjacent areas, on the basis of physical appearance of the plant, branching pattern, pod characters, leaf and leaflet size and shape, branching and leaf density and stem surface characteristics. On the basis of their relative resistance to dieback disease, the different varieties were named as Resistant 1, Susceptible 1-4, Unspecified 1-4. The Resistant 1 variety is characterized with dense, and long branches, which grow outward and downward forming a canopy. Generally plants do not attain much height. Leaves are large up to 16 cm in length, with four or five leaflets per leaf. Leaflets broad, globose or subglobose, young leaflets glaucous, mature leaflets glabrous, leaflet apex apiculate. Pods small, generally one rarely two seeded. Susceptible 1 and Susceptible 2 varieties were found to be highly susceptible to dieback showing 20% or more dieback incidence. These two varieties have been commonly cultivated in Punjab. Susceptible 3 and Susceptible 4 varieties were least susceptible showing dieback incidence not more than 2 %. The unspecified varieties 1 – 4 were named so because they did not show any disease symptoms but number of plants of these varieties was not large enough to decide their resistant potential. Shisham forestation can be revived by planting Resistant 1 and less susceptible varieties viz., Susceptible 3 and Susceptible 4 on suitable, well-drained sandy loam soils.

Key words: *Dalbergia sissoo*, dieback, resistant variety.

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Chemical control of wilt in Shisham (*Dalbergia sissoo* Roxb.)

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Abstract

Fusarium solani (Mart.) Appel & Wr. was isolated from the roots of shisham (*Dalbergia sissoo* Roxb.) plants of 6–30 years age, showing symptoms of wilt disease at different stages. *In vitro* toxicity assays with three fungicides revealed that Benomyl is the most effective in controlling mycelial growth of *F. solani* followed by Ridomil Gold while Aliette had insignificant effect. Field study showed that application of 50 liters of 200 ppm Benomyl can effectively recover 6-8 years old wilting shisham plants.

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Economic evaluation of bakanae disease of rice

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Abstract

Bakanae disease infestation levels of 5, 10, 25, 50, 75 and 100% seedlings were compared with non-infested control in a field trial. According to the results treatments with 5, 10, 25, 50, 75 and 100% infestation had significantly lower paddy yields of 4.15, 3.95, 3.75, 2.97, 2.45 and 1.87 t/ha respectively against 4.45 t/ha paddy yield in the control. Losses of 57.97% were recorded in 100% infested treatment producing 68.40% seedling infection. The study indicated the potential of the disease to cause heavy economic losses.

Key words: *Fusarium moniliforme*, Bakanae disease, incidence: loss ratio.

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Effect of seed-borne fungi on seed quality components of different wheat varieties and their response to fungicide seed treatment

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Abstract

Five different species of seed-borne fungi, i.e., *Alternaria alternata*, *Aspergillus niger*, *Fusarium moniliforme*, *Curvularia lunata* and *Stemphylium* sp. were isolated from infected seeds of twelve wheat varieties. *Alternaria alternata* was isolated as a predominant fungus with highest frequency from Pak-70 followed by Mehran-89. The maximum growth of seedlings was recorded in Anmol and Sarsabz followed by H-68 and minimum from Pak-70, Mehran-89, Soghat and Johar respectively. The germination percentage of all wheat varieties were significantly increased in seeds treated with Baytan, Vitavax, Benlate and Captan as compared to Derosal and Rizolex. Baytan, Vitavax, Benlate, Captan and Dithane M-45 significantly increased the seedling emergence, plant height, number of seeds per spike, 1000-seed weight and grain yield per plot of wheat variety Pak-70. Rizolex had the least effect among the fungicides studied.

Keywords: Wheat, Seed-borne fungi, Fungicides, Seed quality, Plant height, Yield.

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Evaluation of different cereal straw for early and high yielding crop of Oyster mushroom, *Pleurotus florida*

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Abstract

The oyster mushroom, *Pleurotus florida* (Strain PK-401) was cultivated on different cereal straws for early and high yielding crop. The wheat and paddy straw, empty corn cobs and millet heads were used as substrate. The earlier pinhead formation and maturation of fruiting bodies were observed in case of empty corncobs, followed by paddy straw, wheat straw and empty millet heads, respectively. The maximum number of flushes was harvested from wheat and paddy straw followed by empty corncobs and millet heads. The less period between flushes was recorded on wheat and paddy straw followed by empty corncobs and millet heads. The maximum fresh yield on percentage of substrate dry weight basis was obtained from wheat and paddy straw followed by empty corncobs and millet heads.

Keywords: Oyster mushroom, *Pleurotus florida*, cereal straw, growth, yield.

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Screening for *Ascochyta* Blight resistance in Chickpea (*Cicer arietinum* L.)

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Abstract

Ten chickpea lines CM1966/93, CMC77S, CM843/98, CM1223/98, CM1441/98, CM2070/98, CC 104/99, CC106/99, CC107/99, CC124/00 were found highly resistant to *Ascochyta* blight with disease rating of 2 followed by 34 lines that were resistant and 21 lines were tolerant. None was found immune to blight. The highly resistant lines have exhibited higher level of resistance against blight as compared to earlier released varieties (CM72, CM88 and CM2000).

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Effect of bio-pesticides on mycelial growth of *Rhizoctonia solani* and management of black scurf of potato

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Abstract

In vitro evaluation of five different neem based bio-pesticides viz., neem oil, neem leaf difusate, replin, nimakil and nimboli for their efficacy against mycelial growth of *Rhizoctonia solani* AG 3 isolate SL-41 was assessed at 0.5, 1, 1.5 and 2% concentrations of the potato dextrose agar medium. Antifungal activity of bio-pesticides in inhibiting mycelial growth of the fungus differed and depended on bio-pesticides and their concentrations. Replin was found to be the most effective as it caused complete (100%) inhibition in mycelial growth of the fungus at 2% concentration followed by nimboli and nimakil. Neem leaf diffusate was least effective in reducing the mycelial growth of the fungus. Neem oil at 2% concentration was as effective as Nimakil at 1.5% concentration. All the tested bio-pesticides completely inhibited the induction of stem girdling and stem canker symptoms of the disease. Black scurf management by potato tuber treatment with three bio-pesticides, selected on the basis of their antifungal activity against mycelial growth of the isolate SL-41, differed in terms of number of eyes germinated, sprout killed and black scurf incidence & severity. Maximum eye germination was achieved through the application of Replin. Nimakil was the most effective in decreasing black scurf incidence and severity over non-treated inoculated control while nimboli resulted in the least number of sprouts killed but overall manifested the least effectiveness.

Keywords: Potato, black scurf, *Rhizoctonia solani*, bio-pesticides, disease management.

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Physiological studies on *Ascochyta rabiei* (Pass.) Lab.

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Abstract

The effect of culture media, carbon and nitrogen sources, pH levels and temperature were studied on mycelial growth of *Ascochyta rabiei*. Maximum growth of the fungus was found on chickpea extract agar medium. Glucose was found to be the best source of carbon while potassium nitrate and sodium nitrate were better sources of nitrogen. The most suitable pH level for growth of the fungus was 7.0 and 7.5. Growth of *A. rabiei* was maximum at 25^0 C after 15 days of inoculation while it is not significantly different from that of 20^0C after 21 days of inoculation. The growth was reduced drastically below 10^0C and above 30^0C.

Key words: *Ascochyta rabiei*, culture media, pH, carbon, nitrogen, mycelial growth.

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Menace of die-back in shisham plantations of District Jhang

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Abstract

Shisham (*Dalbergia sissoo* Roxb.) die-back on state owned forests and farmlands in district Jhang was studied during 2003. An area of 120 acres of Shorkot plantation, 50 acres of Sajhowl bela , 11 avenue Km of Jhang - Sargodha road side, 18 avenue Km of Rangpur canal side and 16 different land holdings of 4 rural union councils of tehsil Jhang were randomly selected. The results indicated that maximum tree mortality of 34% was observed along roadside followed by 25% on canal side, 23.12% in irrigated plantation and 20 % in Bela (Riverian) forest. The age classes of these forest categories varied from 7-11 (Farmlands), 5-25 (riverian forest), 20-35 (road sides), 30-35(irrigated plantations) and 35-60(canal sides) years. None of these forest categories was water logged and saline except Shorkot plantation. The results of 16 different landholdings encompassing an area of 496 acres with an average of 13 trees per acre varying in age from 3-35 years depicted a significant increase in infection with the age of trees. Although the average infection percentage/ landholding was low (16.16%) but a maximum of 40.0% with a varying number of completely dead trees were recorded.

Key words: Shisham, *Dalbergia sissoo*, die-back, Jhang.

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Performance of Cowpea (*Vigna unguiculata-L.*) genotypes under field conditions

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Abstract

Cowpea varieties IT-97K 1042-8, IT-97k-499-4, IT-95k-1156-3, IT-97K-4979-2, S-A Dandy and Elite were raised at NIAB and ARRI, Faisalabad selected for plant height (46-72cm) days taken to 95 % flowering and for diseases resistance (1-2 rating). Infestation was maximum on IT-97K-461-4, 1068-7, IT-97K 1042-8 and IT-98k-558-1 and were graded as susceptible. Maximum grain yield was recorded in Elite (550 Kg/ha) and lowest grain yield was observed in IT-95K-1156-3 (332.3 Kg/ha). Yield and yield contributing characters of twenty four entries tested revealed that they differ significantly from each other.

Key Words: Cowpea, Yellow mosaic virus, Agronomic characters.

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Resistance of Zn-accumulating plants against the disease caused by *Pythium ultimum* (Trow)

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Abstract

Some species of plant growing on calamine soils hyperaccumulate heavy metals from those soils in their tissues. This study tests the hypothesis that such metal accumulation confers a benefit to the plant by providing defense against fungal pathogens, using the Zn-hyperaccumulator *Thlaspi caerulescens* (J. & C. Presl.) and the pathogen *Pythium ultimum* (Trow).

Infection of plants by *P. ultimum* was assessed by observing symptoms of damping-off in seedlings and by microscopic observation of fungal hyphae and spores in seedling roots. Using *P. ultimum* as a test pathogen, comparison was made between the susceptibility of Zn accumulating seedlings of *T. caerulescens* with those of non-accumulating species of *T. arvense* and between seedlings of *T. caerulescens* grown from three seed collections of different zinc status. The seeds of the Zn-hyperaccumulating species germinated well up to the level of 30μg Zn ml^{-1}. The germination/damping-off rate increases/decreases with the increasing of Zn concentrations in the seeds of Zn-hyperaccumulating plants. Whereas, in non-accumulator the germination rate was decreased with increasing of Zn concentrations and not a single seed was germinated in presence of *P. ultimum*. In the three populations of *T. caerulescens* damping-off was manifested according to the concentration present in the seeds. In all of these experiments infection by *P. ultimum* was greatly reduced in the roots containing high concentration of Zn. The results confirm the hypothesis that heavy metal hyperaccumulation in these plants confers protection against attack by fungal root-pathogens.

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Effects of salts of copper on in vitro growth of some soil fungi

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Abstract

In vitro evaluation of three salts of copper viz. copper sulfate ($CuSO_4$), copper chloride ($CuCl_2$) and copper oxychloride [$CuCl_2.3Cu(OH)_2$] was done to check the effect of these compounds against three soil fungi namely, *Aspergillus oryzae*, *A. niger* and *Drechslera tetramera.* The data recorded at the end of incubation period revealed a remarkable decrease in fresh and dry biomass of these fungi by the action of all salts of copper. *A. oryzae* showed maximum suppression in growth in response to these treatments especially to copper sulfate, while *A. niger* showed the least.

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New ectomycorrhizas from Sakesar Hills

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Abstract

The Sakesar hills fall in Dry subtropical submountaneous forest of salt range. The highest peak of this range is 1, 522m above sea level. Conifers especially *Pinus roxburghii* and *Pinus wallichiana* occupy the upper altitudinal zone of these hills. During the investigation of pines of Sakesar hills for the exploration of diversity of ectomycorrhizas, twenty-two root samples from the rhizosphere of these trees were taken from different sites of PAF Base, Sakesar. This investigation revealed fifteen different kinds of ectomycorrhizas. The isolated mycorrhizas are morphologically and anatomically described and are given tentative binomials considering each mycorrhiza as a distinct entity. These ectomycorrhizas fall in the category of "unidentified" mycorrhizas, as their possible mycobionts are not known.

Key Words: Sakesar hills, ectomycorrhizas, pines, PAF Base, *Pinus roxburghii*, *Pinus wallichiana*, Salt Range.

Mycopath, 2003, 1(2): 171-177

Freshwater hyphomycete spora of the River Ravi

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Abstract

In a study of the river spora of Ravi, Lahore, twenty-nine conidial species mostly belonging to freshwater hyphomycetes were recorded by four techniques from January to June, 1999. These species were recorded by filtration of water, sporulation on submerged plant material and trapping in natural or artificial foam. The natural foam provided the richest data on the river spora. A few species were observed colonizing the submerged plant material. The data obtained by direct filtration and artificial foam trapping was quite similar. *Articulospora proliferata* and *Tetracladium marchalianum* were the only species detected by all the four techniques.

Key Words: Freshwater hyphomycetes, foam spora, the River Ravi.

Mycopath, 2003, 1(2): 179-183

Study of dynamics of phylloplane fungi in relation to *Ascochyta* blight in chickpea

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Abstract

Eight chickpea varieties (3 resistant* and 5 susceptible^{+}) were screened for the abundance and diversity of phylloplane fungi. This study was carried out before and after the foliar spray of the pathogen, *Aschochyta rabiei* on field grown chickpea plants. Samples for study were also collected from the local market in the months of March and April. A total of nine fungal species were encountered in the screening process of six market samples collected at an interval of one week. The number of phylloplane fungi associated with the market samples increased with time. The samples collected in April turned up with maximum diversity of phylloplane fungi. Screening of the experimental plants yielded a total of eight fungal species. Except for two species i.e., *Alternaria alternata* and *Aspergillus niger*, the phylloplane flora of the market samples and the experimental plants was totally different. During the early stages (before the spray) the number of fungi associated with the phylloplane was significantly low as compared to the later stages i.e., after the spray. However, the density of these fungi increased during the later stages in three varieties which were NE 1256*, AUG 970^{+} and ILC 1256^{+}. While for varieties 184 W*, CM 72^{+}, ICC 630^{+} and ILC 2548* the pattern was not very clear. In the case of C 679^{+}, the density increased with an increase in the age of the host plant.

Key words: Phylloplane fungi, *Ascochyta* blight, chickpea.

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Effects of Zn and Ni metals on the growth of different isolates of *Pythium* species isolated from metal-contaminated and non-contaminated soils

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Abstract

Some species of fungi growing on serpentine and calamine soils accumulate heavy metals in their mycelia and show poor growth in non-contaminated soil. This study tests the hypothesis that these fungi growing in heavy metal contaminated soil are tolerant and decrease the pollution from the soil. In present study, *Pythium mamillatum* Meurs and *P. splendens* Braun were isolated from Ni and *Pythium ultimum* Trow from Zn polluted soils whereas only *P. ultimum* was isolated from non metal-contaminated soils. The effect of different concentrations of Zn and Ni on mycelial growth and biomass *P. mamillatum*, *P. splendens* and *P. ultimum* were studied. *P. ultimum* isolated from zinc contaminated soil was more tolerant than species isolated from non-contaminated or nickel-contaminated soil. *P. mamillatum* and *P. splendens* isolated from high nickel soil were more resistant to nickel than *Pythium* species isolated from non-contaminated or Zn-contaminated soil. The production of oospores of *P. mamillatum* was greater in Zn concentrations as compared to the *P. ultimum* isolated from Zn-contaminated soil. However, the comparative study of *P. ultimum* and *P. mamillatum* shows that the production of oospores increases with increasing Zn and Ni concentrations up to a certain level and then decreases.

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In-vitro inter-relationship between plant growth promoting rhizobacteria and root knot nematode (*Meloidogyne incognita*) and their effect on growth parameters of brinjal

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Abstract

The influence of rhizobacteria as the treatment on germination, migration and penetration of *Meloidogyne incognita* in brinjal was evaluated under laboratory conditions. The results obtained were highly significant and revealed that *Pseudomonas fluorescens* promotes germination 87.5% and was effective in reducing root penetration by *Meloidogyne incognita* i.e. 39.3 juviniles. Due to the effect of *P. fluorescens*, the plant height increased by 40.9%, number of leaves was maximum i.e., 50%, number of gall formation was also controlled i.e., 70.3%. It was concluded from the studies that rhizobacterium *Pseudomonas fluorescens* is a potential biocontol agent and it has ability to increase the yield and suppress the attack of plant pathogen.

Keywords: Rhizobacteria, *Pseudomonas fluorescens*, *Meloidogyne incognita*, brinjal or eggplant, root-knot.

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Dot blot hybridization and PCR based detection of begomoviruses from the cotton growing regions of Punjab, Pakistan.

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Abstract

Total DNA extraction was carried out from the five virus infected host plant species namely, *Zinnia elegans, Eclipta prostrata, Solanum nigrum, Capsicum annuum and Ageratum conyzoides* with suspected Geminivirus symptoms. By using universal primers for the DNA A genome of whitefly-transmitted geminiviruses, approximate full length DNA A genome was PCR amplified for four of the viruses Zinnia leaf curl virus (ZiLCV), Solanum yellow leaf curl virus (SYLCV), Pepper leaf curl virus (PeLCV) & Ageratum yellow vein virus-Pakistan (AgYVV-P) except *Eclipta prostrata* yellow vein virus (EPYVV). Nucleic acid hybridization was used to compare homologies with four different probes of the begomoviruses namely african cassava mosaic virus (ACMV), watermelon chlorotic stunt virus (WCSV), cotton leaf curl virus (CLCuV) and SYLCV (DNA A). Relative levels of cross hybridization were analyzed under similar optimized conditions for each test. EPYVV showed least homology with any other Begomovirus from Pakistan, PeLCV found to be more closely related with ACMV and WCSV as compared to the probes from Pakistan viruses ie., SYLCV & CLCuV.

Key words: Dot blot, PCR, Begomoviruses.