Combining tomato seed treatment to control seedborne diseases with examination of the seeds for the presence of phytopathogenic bacteria, may prevent distribution of pathogens in the seedling industry and epidemics within the production area.

STUDIES OF THE SEEDBORNE PHASE OF *ALTERNARIA* SP. IN PERSIAN BUTTERCUP AND ITS CONTROL

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An *Alternaria* species was isolated at very high levels from many seed lots of Persian buttercup *(Ranunculus asiaticus)* grown in the northern Negev. In recent years the farmers in this area complained about poor stands in the field plots, but the cause of this problem was not known.

The fungus was isolated from seedlings, mature plants and tubers collected in infected commercial plots. The isolated *Alternaria* sp. is morphologically different from the *Alternaria* spp. previously identified in Israel. According to the CMI (Kew, England), it is taxonomically close to *A. multirostrata* Simmons and Jackson. The pathogenicity of the fungus isolated from seeds was proved under controlled conditions and the seedborne nature of the fungus was studied in laboratory and greenhouse experiments. The fungus was detected on the seed surface and in the seed tissue. Hyphae grew inter- and intracellularly in all the layers of the pericarp and seed coat, including the vascular system. The cuticle of the endosperm separated the diseased portion from the noninfected embryo. The seedborne fungus affects the germinability of seeds and the emergence of seedlings, attacks the low part of the hypocotyl, and causes seedling blight.

Six fungicides were tested for the control of the seedborne fungus. The best results were obtained with Rovral (iprodione), although in seed samples with a high rate of infection, the control was not complete. The treated seeds significantly improved the stand in greenhouse conditions.

To the best of our knowledge, this is the first report of a pathogenic seedborne *Alternaria* in buttercup plants and seeds. Our findings showed that the fungus carried by seeds could cause poor stand and be a source of the spread of the fungus in the buttercup plots.

IMPROVING THE EMERGENCE OF WEAKENED WHEAT SEEDS BY SEED-PROTECTANT FUNGICIDES

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Poor stands in wheat fields in Israel are probably caused by a complex interaction of environmental conditions and the presence of saprophytic seed- and/or soil-borne fungi. Wheat is sown when the first rain falls and seeds in the wet soil may start to germinate. However, if germination is followed closely by a dry period, imbibed seeds may remain at this stage for a long period or even dry back without emerging. Under these stress conditions saprophytic fungi may well become pathogenic to the weakened seeds. The present work was performed to study the effect on seedling emergence of treating weakened seeds with fungicides.

Six wheat cultivars, *viz.*, Bet HaShita, Bet Lechem, Dariel, Deganit, Lakhish and Shafir, were artificially weakened by pretreating the seeds with hot water (45°C for 4–7 h). These pretreatments decreased the number of emerging seedlings by more than 50%. Pretreated seeds received the following fungicide treatments (per kg of seeds): 0.54 g thiram, 2.0 g oxine-copper (Quinolate 15 Plus), 2.0 g prochloraz manganese + carbendazim (CQ 864), 2.0 g prochloraz manganese chloride (CQ 1054), 0.3 ml Busan (TCMTB; [2-(thiocyanomethylthio) benzothiazole], 0.08 g diniconazole (Marit) + 0.09 ml imazalil, 1.5 g Raxil (Folicur; BAYHWG 1608), alpha-[2,(4-chlorophenyl)ethyl]-alpha-(1,1-dimethylethyl)-1H-1,2,4-triazole-1-ethanol, 2.5 ml guazatine and 2.5 ml panoctine super 301000. They were then sown in a Bet Dagan heavy soil or in soils brought from Shuval, Nir Oz and Bet Hagedi. Thiram, quinolate and panoctine and, in a few cases, also guazatine and Busan, increased the total number of emerging seedlings. When seeds were sown in sterile sandy soil, seedling emergence in the untreated controls was high (about 80%) and no differences were observed between treatments. These results indicate that in non-sterile soils, saprophytic fungi attack the weakened seeds and reduce seedling emergence, and that fungicides can effectively protect such seeds against these weak pathogens.

SEED-PROTECTANT FUNGICIDES TO DECREASE THE INCIDENCE OF DAMPING-OFF CAUSED BY *RHIZOCTONIA SOLANI* IN COTTON SEEDLINGS

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With the cancelling of registration of the mercuric fungicides as seed protectants in Israel, a program has been initiated to seek alternative fungicides for seed treatments. Preliminary results in Israel indicated that soils in which cotton was grown were naturally infested with virulent isolates of *Rhizoctonia solani*. In addition, the fungus was frequently isolated from hypocotyl lesions in seedlings of either Acala SJ-2 or Pima S-5 cotton cultivars.

Under laboratory conditions (LD 8:16, 30°/20°C) the following fungicides were tested (per kg of seeds): 7.0 ml PCNB + etridiazole (Terracoat L-205), 6.0 g tolclofos-methyl + thiram (Rizolex-T), 5.0 g carboxin + thiram (Vitavax 200), 5.0 g carboxin + captan (Vitavax 300), 3.0 g pencycuron (Monceren) and 3.0 g captan (Marpan) + PCNB. They effected an increase in seedling emergence as well as a decrease in the degree of disease as compared with Caspan (ethoxymercuric chloride, a mercuric fungicide in use until last year) or untreated seeds. Oxine-copper (Quinolate 15 Plus) (4.0 g/kg seeds) and thiabendazole + 8-hydroxyquinoline (TOG) (3.0 ml/kg seeds) also decreased the disease index but were inferior to the above mentioned fungicides. These results were obtained with seeds planted in either naturally infested or artificially inoculated (0.1 g fungal propagules f. wt/kg soil) soils. These fungicides were also effective in inhibiting the development of seedborne *Rhizopus* spp., supposed to play an important role in decreasing seedling stands under adverse conditions.