

Project Title : Biological Control of *Rhizoctonia Solani* and Its Entegration With Chemical Control in Potato Growing

Start /End Date : 2006-2008

Supporting Body : GDAR

Leader : Hadi AYDIN

Co-researchers : -

Summary : *R. solani* Kühn is an important fungal pathogen that causes both stem canker and black scurf of potato (*Solanum tuberosum* L.), which leads to tuber yield reductions and losses in tuber quality. Stem canker consists of stem lesions that can reduce tuber yield by reducing the transport of nutrients throughout the plant. Black scurf is the formation of sclerotia, the long-term survival structure of the fungus, on newly formed tubers.

The objectives of this study were to determine the *in vitro* and *in vivo* efficacy of antagonists that are originated from soils collected from different parts of Turkey against *R. solani*. The sensitivity of those which had been found to be effective was tested against some fungicides which already used against *R. solani*. The control possibilities of the combination of low doses of fungicides and antagonists were also investigated with this study.

In order to achieve the objectives mentioned above, 320 candidate antagonists were isolated in this study and 82.5% of them were determined to be belonging to 14 *Trichoderma* spp. Among these, *T. asperellum*, *T. atroviride*, *T. crassum*, *T. croceum*, *T. gamsii*, *T. inhamatum*, *T. neokoningii*, *T. spirale*, *T. strigosum*, *T. tomentosum* were isolated for the first time in Turkey. Furthermore, there seems to be no information so far, about the antagonistic activity of *T. crassum*, *T. croceum*, *T. gamsii*, *T. inhamatum*, *T. neokoningii*, *T. strigosum* and *T. tomentosum* against *Rhizoctonia* at all.

Results clearly proved that some isolates of *Trichoderma* were found to be very effective against *R. solani*. They also showed the variation in sensitivity against fungicides *in vitro*. Two greenhouse trials in pot conditions were carried out in two consecutive seasons. In both trials, two different experiments were performed in artificially infested soil with healthy tubers and in uninfested soil with naturally infested tubers. At the first season, antagonistic isolates were tested individually. The most promising ones among the antagonists, when applied alone, were *Trichoderma asperellum*TZ20, *T. harzianum*LO52, *T. harzianum*TZ14 and *T. hamatum*ÖT16. At the second season, antagonists and ¼ dose of registered seed fungicides [Rizolex-T (Tolclofos methyl+Thiram), Celest-max (Fludioxonil)] were applied in combination to detect compatible fungicide/antagonist combinations for integrated disease control. Results showed that the combinations did not increase the efficacy against stem canker with respect to the individual treatments, however, black scurf was more effectively controlled with fungicide/antagonist combinations.