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HOST PENETRATION AND INFECTION BY THE ANASTOMOSIS GROUPS OF *Rhizoctonia solani* Kühn ISOLATED FROM POTATOES

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Rhizoctonia solani Kühn (teleomorph **Thanatephorus cucumeris** (Frank) Donk), represented by several anastomosis groups (AGs) with different cultural characteristics and host specifications, is distributed all over the world (Ogoshi, 1987). Penetration of different anastomosis groups and various isolates of **R. solani** by means of infection cushions, lobate appressoria or directly by hyphae were determined by Dodman **et al.** (1968), Ruppel (1973), Marshall and Rush (1980), Armentrout and Downer (1987) on various hosts other than potatoes. Following the penetration of cuticula and cell walls by infection pegs the growth of hyphae into cells and intercellular spaces were also described on the same hosts (Dodman **et al.**, 1968). Therefore, the objective of the study is to observe and to determine the fungal structures aiding penetration to stems and the development in tissues of potato stems by the anastomosis groups of **R. solani** (AG-2 type 1, AG-2 type 2, AG-3, AG-4 and AG-5) isolated from potatoes grown in the Erzurum Region.

In all investigations one isolate from each anastomosis group and two potato cultivars Bintje and Resy were used. In early stages of the penetration process fungal structures and their formation were observed by light microscope on epidermal tissues peeled from the stems of young potato plants inoculated according to Dodman **et al.** (1968) and then stained with 0.1% (w/v) trypan blue dissolved in 50 % (v/v) acetic acid (Armentrout and Downer, 1987). Transverse sections of stems taken from these plants and from potatoes raised in soil infested at seeding with the inoculum prepared as described by Papavizas and Ayers (1965) were stained with safranin and fast green and then examined for the development of isolates within the tissues after penetration.

During the initial phase of penetration all isolates from AG-2 type 1, AG-- type 2, AG-3, AG-4 and AG-5 of **R. solani** produced infection cushions on underground stems of Bintje and Resy potato cultivars. Additionally, isolates of AG-3 and AG-5 achieved penetration by forming lobate appressoria. Direct hyphal penetration, which is seldom detected (Ruppel, 1973), was observed on both cultivars infected by AG-4. As a matter of fact in agreement

with other studies carried on various plants except potatoes (Dodman **et al.**, 1968; Marshall and Rush, 1980; Armentrout and Downer, 1987) penetration with the aid of infection cushion and lobate appressorium was more common. Infection cushions originated from one or more lateral branches of main hypha were tightly compacted and formed sparsely in isolates of AG-2 type 1, AG-2 type 2 and AG-4. However, the infection cushions of AG-3 and AG-5 were loose in structure but produced very close to each other in a manner densely covering the surface of the stem. This type of dense growth showed the high virulence of AG-3 because of the high positive correlation between the density of infection structures and disease severity (Marshall and Rush, 1980). As a matter of fact AG-5 was also reported to be virulent on potatoes (Bandy **et al.**, 1984). Numerous fine infection pegs formed from infection cushions grew between or into epidermal cells following the penetration of cuticula. A similar mode of penetration also occurred through the infection peg produced from a lobate appressorium, except that the infection peg enlarged in subcuticular cavity immediately after passing through the cuticula. Further invasion of tissues beneath the epidermal layer continued inter- and intracellularly and resulted in collapse of tissues and symptoms. On the other hand, monilioid cells were observed in cortical tissues 90 days after inoculation by AG-3 isolate.

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