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INHIBITION OF RUSTS OF IRIS AND WHEAT BY TWO PHYTOPATHOGENIC PSEUDOMONADS

Pseudomonas marginata (McCulloch) Stapp has been reported to initiate infection on iris leaves through rust pustules[1]. As the rust pustules were acting as principal avenues for the entry of the bacterium in host leaves, it was considered intresting to krow the influence of the association on the rust fungus [*Puccinia iridis* (DC) Wallr.]. Germination tests were, therefore, conducted with uredospores collected from apparently normal and bacteria infested rust pustules. A remarkable reduction of germination of uredospores was detected in the latter case. A similar phenomenon was also observed to occur when non-contaminated uredospores of iris rust were allowed to germinats in a drop of aqueous suspension of 48 hr old culture of *P. marginata*. It was, thus, indicated that the contamination of rust uredospores with *P. marginatae* inhibited the germination of iris rust uredospores, in nature.

To confirm the inhibition of germination by *P. marginata*, uredospores of rusts of iris and wheat, (*P. graminis* f. sp. *tritici* and *P. recondita*) were kept for termination on glass slides in drops of bacterial suspension in a dilution series. The test in drops of water and an aqueous suspension of *P. sesami* served as checks. Inhibition of germiration occurred with *P. marginata* only. In the drops with higher bacterial concentrations, the inhibition was complete whereas in the cases of lower concentrations, the uredospores did germinate but the growth of germ-tubes was remarkably retarded. For further microscopic examination, the drops on slides were air dried and stained with crystal violet bacteria staining solution. In drops with *P. marginata*, a congregation of bacterial cells was observed on the surface of uredospores and germ tubes. Heavy congregation of bacterial cells seemed to effect a total inhibition of uredospore germination. In the cases where germination of spores had occurred, the bacterial cells collected in large numbers around the tips of germ tubes resulting either in a growth retarding effect on germ-tubes or bursting of their tips. In the case of *P. sesami*, congregation of bacterial cells occurred in the vicinity of tips of germ-tubes but without any obvious influence on these structures.

The inoculation of healthy leaves of iris and wheat with *P. marginata* contaminated uredospores of respective rusts, failed to produce any rust infection. A normal rust infection, however, developed on the host leaves inoculated with *P. sesami* contaminated rust uredospores. It was further observed that when a dilution series of *P. marginata* was employed to contaminate the rust uredospores, the development of rust infection on both the hosts showed a negative correlation with the concentration of bacterial cells in the dilutions. *P. marginata* was, thus, observed to inhibit the iris and wheat rusts identically.

With a view to detecting the rust-inhibiting phenomenon with other bacterial phytopathogens, germination tests were carried out with uredospores of stem rust of wheat in drops of aqueous bacterial suspension of 8 cultures of *Pseudomonas*, 6 cultures of *Xanthomonas* and one culture each of *Agrobacterium tumefaciens* and *Erwinia carotovora*. Germination of uredospores in aqueous suspensions of *Eschrichia coli* and *P. marginata*, and water alone served as checks. The culture of *P. cichorii* (Swingle) Stapp. inciting a zonate spot on cabbage, was identified to act as strong inhibitor of germination of uredospores of stem rust of wheat.

The present investigation records *P. marginata* and *P. cichorii* as antagonistic to rusts of iris and wheat. Adequate information is needed on the mechanism of inhibition and the scope of utilizing these organisms for the control of plant rusts.

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