

NEOTYPHODIUM ENDOPHYTES FOR CROP IMPROVEMENT

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Abstract

Neotyphodium endophytes from *Ascomycetes* have wide distribution among cool season grass species. The fungus lives in plant intercellular spaces of aerial parts and cannot disassociate from host tissues. It transfers vertically and through maternal host making gene escape of no concern. In the grass family Poaceae, fungal endophytes have been found in Poaeae tribe in the genera *Festuca*, *Lolium*, and *Poa*, Bromaeae tribe in the genus *Bromus*, Stipeae tribe in the genus *stipa*, Meliceae tribe, Aveneae tribe and Triticeae tribe. In Triticeae, the fungal endophytes have been found in *Elymus*, *Hordeum* and wild species of *Triticum*. The most widely known and demonstrated endophytes from genus *Neotyphodium* are *N. coenophialum*, *N. lolii* and *N. uncinatum* that infect tall fescue (*Festuca arundinacea* Schreb.) perennial ryegrass (*Lolium perenne* L.) and meadow fescue (*F. pratensis* Huds.), respectively. The symbiotic fungi enhance plant characters including performance, insect and mammalian deterrence, nematode resistance and tolerance to drought, salt and other biotic and abiotic stresses. Interaction between *Neotyphodium* endophytes and cool-season grasses culminates a defensive mutualism in which endophytes produce a range of alkaloids or stimulate the host grass to synthesize alkaloids and other secondary metabolites that protect macrosymbiont (host) from mammalian, insect, and nematode herbivores. *Neotyphodium endophytes* have been found in some Iranian grass species including *Bromus tomentellus* *Melica persica*, *Festuca arundinacea*, *F. pratensis* and *Lolium perenne*. This has opened new doors for improving new grass varieties using *Neotyphodium*-grass association.