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The phytobiome of a unique ecological system: parasitic weed and its host plant

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Phelipanche and Orobanche species (broomrapes) are holoparasitic plants that connect to the vascular systems of their hosts, allowing the transfer of various substances including a possible exchange of endophytic bacteria that inhabit the internal tissues of both plants. To shed light on the microbial aspects of the parasitic interaction between Phelipanche aegyptiaca and its host, tomato, we characterized the endophytic composition in both plants before and after attachment using mass sequencing analysis. Endophyte communities of the parasitic weed were significantly different from that of the nonparasitized tomato root but no significant differences were observed between the parasite and its host, parasitized tomato root, suggesting bacterial exchange between these two plants. In addition to molecular analysis, isolation of endophytic bacteria from the parasitic weed- host plant system enabled to examine whether these isolates can affect the dynamics of host – parasite interaction. Endophytic bacteria isolates were examined for their ability to secrete substances that may affect the dynamics of this system, and indeed, a few isolates inhibit the growth of the parasitic weed. The current study focuses on the bacterial aspect of host – parasite interaction and highlights the potential of exploiting alternative environmentally friendly approaches for parasitic weed control.