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The rust fungus of *Puccinia Xanthii* f. sp. *Ambrosiae-trifidae* being a good biocontrol agent of giant ragweed

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Ambrosia trifida Linn., the giant ragweed, is a serious alien invasive grass in Northeastern China, especially in Liaoning province. The grass is nortious for its casuing pollinosis in summer and significantly decreasing biodiversity in the established communities. Although various means, like laborious unrooting and herbicide spraying, have been taken to control the weed, its robust extending trend was not be effectively prohibited. In 2002 summer, the authors occasionaly discoveried the rust fungus of *Puccinia xanthii* f. sp. *ambrosiae-trifidae* on giant ragweed plants in Shenyang rural area, it showed serious infection, even lethal to plants. Its host range test was conducted by a combination of in vitro leaf inoculation of 13 composite plants in laboratory and artificial plant inoculation of 29 species of 24 genera belonging to 10 families of relavent plants in greenhouse. In combination with field investigation, the rust fungus is found to be an obligate parasite of giant ragweed without infecting any crops and even the genetically close common ragweed, Amrosia artemissifolia. The detailed research of the rust disease cycle showed that the condition of higher humidity and temperature (>25°C) in summer strongly contributed to the epidemic of the rust disease. The freezing treatment of the teliospores of the rust fungus could break up their dormance and promoted the teliospore's germination rate, which evidently triggered the host tissue infection. During growing season the rust teliospores germinated to produce basidiospores or subbasidiospores, they then germinated and infected the host tissue like leaves, stems and spikes. Under favorable conditons the rust disease might complete a disease cycle within one week. Both the breakdown of the plant tissue organelles like mitochondria and chloroblasts, and physiological interference of the host tissue contributed to the disease process and even host plant death. The vast field release of the freezing treated teliospores in late humid spring produced good control effect during 2009-2012. The rust disease has widely spreaded in all giant ragweed growing areas in Northeastern China, and it has imposed a sustainable control of giant ragweed in China.

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