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Contrasting growth traits and insect interactions of two tamarix species and a hybrid (tamaricaceae) used for mine rehabilitation in South Africa

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2012-01-31
http://hdl.handle.net/10539/11202

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ABSTRACT

Both indigenous "*Tamarix usneoides*" and alien *T. ramosissima* co-occur in South Africa. *Tamarix usneoides* is potentially a metal and salt phytoremediation species. However, hybridisation is occurring between the two species and hybrids growth characteristics are deemed to be invasive. This study was undertaken at two sites on one Highveld gold mine, characterised by different soil types, where plant growth, reproductive potential and insect abundance and diversity were measured. This aims to establish the growth of *T. usneoides* in two site-species trials, and to identify differences between *Tamarix* taxa that are consistent across different environmental conditions and can be used for identification. This study also set out to establish if higher reproductive effort and enemy release are promoting the invasiveness of *T. ramosissima*. Trees in one site (a water logged, clayey "Glenrosa" soil) displayed significantly greater percentage survival, growth and reproductive effort than trees in the other site (a well drained, sandy "Hutton" soil). Extensive hybridisation between *T. usneoides* and *T. ramosissima* was observed with two hybrid states, morphologically similar to each parent species. The reproductive effort is consistently greater in *T. ramosissima* and *T. ramosissima* hybrid than *T. usneoides* and *T. usneoides* hybrid. After sampling 217 trees in this study, the three characteristics of (1) insertion of filaments into the nectar disc, (2) petal shape and (3) presence of salt glands on leaves most accurately distinguished between *T. usneoides* and *T. ramosissima* taxa. Three insect species have been identified from this study as potentially damaging agents on *Tamarix* spp. Insects can discern between the *Tamarix* tree taxa and *T. ramosissima* is being released from insect herbivore pressure, as very few insects and a lower diversity were recorded on *T. ramosissima* and its hybrids (*T. ramosissima* hybrids > *T. ramosissima*). To achieve phytoremediation objectives, careful tree identification and selection of genetically pure individuals for cloning is recommended. Additionally the removal of existing alien and hybrid plants, and further research to find a suitable host specific insect biological agent to control alien *Tamarix* is necessary.