

Evaluation of resistance of upland rice varieties to *Striga hermonthica* through laboratory, pot and field experiments

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Abstract: *Striga hermonthica*, a root parasitic weed, is a potential biotic constraint to upland rice production in Sub-Saharan Africa. Resistance of upland rice varieties to *Striga* was evaluated in laboratory and pot experiments. Among 50 varieties evaluated in the laboratory, SATREPS1, NERICA5 and NERICA13 exhibited high resistance to *Striga* and only less than 3% of the inoculated *Striga* seedlings were sustained 3 weeks after inoculation. In contrast, more than 63% of *Striga* seedlings survived on the most susceptible variety, NERICA18. The three resistant varieties allowed 67-77% of *Striga* seedlings to penetrate into the roots, while several of the susceptible varieties allowed only 30%. Thus it would appear that the resistant varieties have inhibitory mechanisms that abort *Striga* parasitism subsequent to root penetration. Two thirds of *Striga* which developed shoots on SATREPS1 died thus suggesting that SATREPS1 has additional mechanism(s) that inhibit *Striga* growth after establishment of parasitism. The resistance of SATREPS1 was confirmed in a pot experiment in comparison with three high-yielding varieties in Sudan. Further evaluation of resistance of SATREPS1, NERICA5 and NERICA13 under field conditions is in progress at SUST, in comparison with NERICA4 and NERICA18 as susceptible varieties and Nipponbare as a reported resistant variety. In an observation made 44 days after rice sowing, the number of emergent *Striga* plants per 10 rice hills was 1.8, 0.3, 3.0, 11.0, 6.5 and 4.0, respectively. Percent infested hills were 7.5, 2.5, 22.5, 45.0, 32.5 and 27.5, respectively. These results demonstrate higher resistance of STAREPS1, NERICA5 and NERICA13 to *Striga* than Nipponbare, at least at the early vegetative growth stages under field conditions. It is noteworthy that germination inducing activity of root exudates of the three resistant varieties to *Striga* seeds was not lower than those of the other varieties. Therefore, involvement of stimulant production in their resistance is ruled out and planting these varieties in *Striga* infested soils may enhance depletion of the parasite seeds reserves.

Keywords: root parasitic weeds, root exudates, germination, STAREPS1, NERICA5, NERICA13