Combining Ethephon and SL Analogs for Suicidal Germination of Striga hermonthica

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The parasitic plant, Striga hermonthica, threatens food security in Africa and affects the income of smallholder farmers, with impacts between $7-10 billion USD annually. A newly emerging strategy to combat this parasite is suicidal germination. Striga seeds rely on strigolactones (SLs), released by host crop roots, as germination stimulants. Ethephon, an ethylene precursor, can also be used as a germination stimulant and can be combined with SL analogs to increase germination rates, leading to more efficient suicidal germination. In this study, the efficiency of ethephon alone and in combination with two SL analogs, MP3 and Nijmegen-1, was evaluated under laboratory and greenhouse conditions to assess their potential in enhancing Striga seed germination and controlling Striga emergence. Germination bioassays (n=5/treatment) were conducted using unconditioned Striga seeds and varying concentrations of ethephon (0.2–400 µM) and SL analogs. Concentration-dependent effects were observed, with a notable increase in germination activity when combining 400 µM ethephon with 1.0 µM of MP3, resulting in germination above 75%, while the SL analogs alone showed limited efficiency (<45%). In the greenhouse trials (n=6/treatment), MP3 alone reduced Striga emergence by 67%, while its combination with ethephon further reduced emergence to 85%. Ethephon alone resulted in only a 37% emergence reduction, highlighting its role as a germination activity enhancer when combined with SL analogs. These findings suggest that ethephon can enhance the suicidal germination activity of SL analogs, offering a potential solution to reduce the Striga problem in African countries.

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