

First Reports of Tobacco Witch Weed (*Striga gesnerioides*) Parasitizing *Dalbergia melanoxylon* and *Richardia scabra* in Zimbabwe

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Abstract

Striga infestation presents a major constraint to crop production in agricultural systems. The tobacco witch weed, *Striga gesnerioides* occurs widely in Africa and other parts of the world where it is known to parasitize mainly cowpea (*Vigna unguiculata*) and other dicotyledonous plants. In Zimbabwe, the parasitic weed was first confirmed in the Nyikavanhu area of Mvuma in the year 2007 and research was initiated to study this parasitic weed and recommend control strategies. A few more reports have been received of the parasitic weed infesting tobacco in other growing regions. However, despite having been reported widely on cowpea in other countries, *S. gesnerioides* has not been documented on this and related crops in Zimbabwe. Interestingly, in previous research conducted in Zimbabwe, it was established that cowpea induces suicidal germination of *S. gesnerioides* seeds but resulting in no further developmental stages such as haustorial attachment. This led to the conclusion that the species strain reported elsewhere on cowpea could be a different biotype from the one currently parasitizing tobacco in Zimbabwe. Thus it was felt that cowpea could then be used in tobacco crop rotations as a trap crop by inducing suicidal germination of parasite's seed. This current work reports the occurrence of *S. gesnerioides* on other plants in addition to tobacco.

New Alternative Hosts

Dalbergia melanoxylon (African blackwood)

The African blackwood, *Dalbergia melanoxylon* was found (27 January 2017) parasitized for the first time by *S. gesnerioides* (Figures 1 and 2) in Mvuma (S18°58.4', E030°37.9'), Zimbabwe. The host plant was observed in the black clay soils in non-cultivated lands but closer to the tobacco fields. This had not been previously recorded. *Dalbergia* is a large genus of small to medium sized trees, shrubs and lianas in the pea family, *Fabaceae* [1]. The genus has a wide distribution and is native to the dry regions of Africa from Senegal to Eritrea and to the North-Eastern parts of South Africa. The discovery of new host plant in the same agro systems with tobacco could elucidate the possibility of *D. melanoxylon* as an alternative host of *S. gesnerioides*.

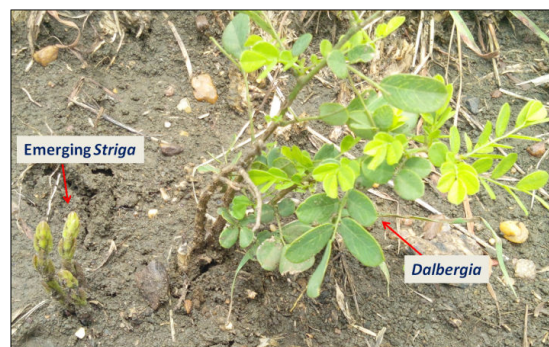


Figure 2: Association of *S. gesnerioides* and *D. melanoxylon*.

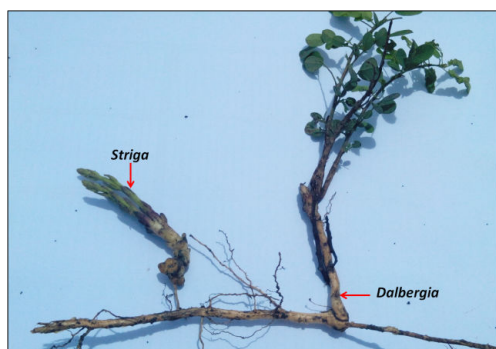


Figure 1: Uprooted parasitized *Dalbergia* spp.

Richardia scabra (Mexican clover)

In addition to *Dalbergia melanoxylon*, *S. gesnerioides* was also found (21 February 2017) parasitizing the weed Mexican clover, *Richardia scabra* (Figure 3) in sandy loamy soils of Dotito (S16°34.0', E031°34.6'). *Richardia scabra* is a weed of economic importance in the tobacco agro systems in Zimbabwe. It is a herbaceous flowering plant in the coffee family and normally grows in sandy soils [2]. In Dotito, the Mexican clover weeds were being parasitized by *S. gesnerioides* in maize, sorghum and groundnut plots; while in tobacco fields, both tobacco and the Mexican clover were parasitized. The occurrence of *S. gesnerioides* on *R. scabra* presents a wild host species which would potentially act as refugia or alternate host during the tobacco offseason period and result in serious infestation on tobacco during the season.

Richardia scabra is also a problem weed in plots where Katambora grass (*Chloris gayana*) is grown. Tobacco fields are normally rotated with Katambora grass to control the plant parasitic nematodes, *Meloidogyne javanica* [3], thus if *R. scabra* is not effectively controlled, this may favour the perpetuation of *S. gesnerioides*, resulting in serious parasitism on the tobacco after the Katambora rotation. Were it not for the parasitic association of *S. gesnerioides* with tobacco, the witch weed would have been an ideal candidate for the biological control of *R. scabra* in tobacco lands [4]. On a different note, soil reclamation of *Striga*-infested soils using *R. scabra* as a catch crop followed by ploughing down the *R. scabra* infested weeds, could be a possible alternative since the weed is less difficult to control compared to the *S. gesnerioides*. This would be beneficial only if done prior to flowering and production of seed by the *Striga* [5].

Conclusion

This report of *S. gesnerioides* parasitizing *Dalbergia melanoxylon* and *Richardia scabra* provides possible alternative hosts of the tobacco witchweed in Zimbabwe. The information is vital in managing *S. gesnerioides* in tobacco lands and other cropping systems. Care must be taken to reduce human, animal and farm implements aided seed dispersal and awareness campaigns should be conducted in the growing regions to educate the farmers on the control measures. Possible control measures should include uprooting of the flowering parasitic plants whenever possible to avoid further seed production as the seeds can remain dormant in the soil for years.

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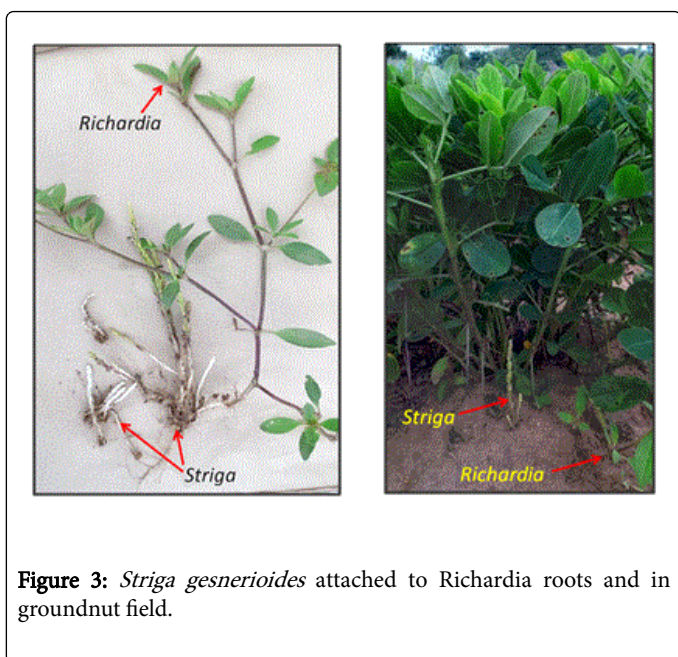


Figure 3: *Striga gesnerioides* attached to *Richardia* roots and in groundnut field.