

The tomato red spider mite, *Tetranychus evansi* Baker & Pritchard, is an important exotic pest in small-scale production of tomatoes and other solanaceous plants in Africa. The mite most probably originated from Southern America. Pesticide use by small-scale farmers to control the pest is frequently ineffective, yet no natural enemies are known to be associated with the pest in Africa and no commercial varieties resistant to the pest exist. In order to identify the potential natural enemies in the area of origin for classical biological control in Africa, priority areas for the search of natural enemies were identified in Southern America using Desktop-GARP software based on fundamental ecological niche. It was determined that priority areas include areas in Argentina, Bolivia, Brazil, Paraguay and Uruguay, as well as some restricted areas in other South American countries. Surveys were carried out for a taxonomic inventory of predators associated with solanaceous plants in the priority areas which were identified in southeastern and northeastern Brazil. A total of 56,445 mites and insects were found in 330 samples collected from 20 different species of solanaceous plants. *T. evansi* was found only in three samples, on *Solanum americanum* Mill. and *Lycopersicon esculentum* Mill., two solanaceous species on which phytoseiid mites were rarely found. A total of 5,023 specimens of predatory mites (at least 44 species) and 494 specimens of acarophagous insects (at least three species) were recorded. However, none of the predatory mites were found in association with *T. evansi*. Among the insects, although not the most abundant, *Stethorus tridens* Gordon seemed to be more promising since it was found associated with *T. evansi* in all samples in which the latter was found. During population dynamic studies, *T. evansi* was found in higher numbers on *S. americanum* than on tomato and *S. tridens* was highly associated with the pest. However, the predator was not able to check the pest population. A fungal epizootic caused by *Neozygites - floridana* Weiser & Muma drastically reduced the *T. evansi* population but only for two to three months in the rainy season. Five of the most frequently collected predatory mite species were studied in the laboratory but all did not feed on *T. evansi*. Laboratory studies revealed that *S. tridens* is a voracious predator of *T. evansi* and reproduced well on it. The predator consumed an average of  $184.1 \pm 18.02$  *T. evansi* nymphs during its development. The daily consumption was  $41.3 \pm 0.80$  and  $67.8 \pm 1.69$  for adult male and female, respectively. *Stethorus tridens* successfully developed to adulthood from 20 to 30°C but failed to develop at 15 and 35°C, with a lower thermal threshold for development from egg to adult of 9.2°C. The oviposition rate was  $4.0 \pm 0.16$  eggs/female/day with a mean longevity of the female of  $71.58 \pm 6.19$  days and an intrinsic rate of natural increase ( $r_m$ ) of 0.104 female/female/day at 27°C. Studies of the potential worldwide distribution of *T. evansi* showed that the pest poses a serious threat on a worldwide scale as it could become established in extensive areas in all continents.