

Tomato, *Lycopersicon esculentum* Mill. (Solanaceae) is one of the most important vegetables grown in Eastern and South Africa for local consumption and income generation by small scale farmers. Yet, yields of the crop are far below the potentials due to many factors including damage caused by red spider mites. This is aggravated by unsustainable control strategies relying solely on highly toxic pesticides with long term harvest intervals and subsequent contamination of human and the environment. Sustainable and environmentally friendly integrated production and pest management approaches are therefore urgently required. This study aimed at providing basic information on the bioecology and the population dynamics of red spider mite, *Tetranychus evansi* Pritchard and Baker and the two spotted red Spider mite, *Tetranychus urticae* Koch appeared to form the acarine complex in field tomatoes in Kenya.

In laboratory life table studies, *T. evansi*, the most damaging red spider mite on tomatoes showed a high potential of increase at 30°C with a short overall developmental time from egg-to-adult of 8.82±0.21 days, a more female biased sex ratio of 1.75 female per male despite a low hatchability of the eggs. None of the female deutonymphs emerged at 100°C and a significantly slower overall developmental time from egg-to-adult of 55.13±2.83 days at 15°C (p<0.05) was recorded. The lower thermal developmental threshold for *T. evansi* was 12°C.

The spatio-temporal and within plant distribution patterns of the two spotted red spider mite, *T. urticae* revealed the lower tomato canopy layer as the preferred zone for these spider mites. Furthermore, *T. urticae* was a very aggregative species. The preliminary sampling plan derived from this aggregative distribution patterns showed that a precision of 0.25 (a ratio of mean to standard error) was reasonable and still adequate for the density estimate of *T. urticae* adults in field tomatoes.

The study carried out on the effect of the predators on *T. evansi*, showed that five species of predators were associated with *T. evansi*, and included; *Phytoseiulus persimilis* Athias -Henriot (A cari: Phytoseiidae), *Pronematus spp.* (A cari: Tydeidae), *Oligota spp.* (Coleoptera: Staphylinidae) and *Stethorus spp.* (Coleoptera: Coccinellidae) However, these predators did not seem to have any impact on the population of *T. evansi*.

An intensive regression analysis and a graphical description carried out between the *T. urticae* rate of increase, the plant quality, the predators and the weather data from three tomato growing seasons revealed that, the plant quality was positively associated with the rate of increase, while rainfall and temperature relative humidity interaction showed a negative relationship with the rate of increase. Further more, the stepwise regression between the rate of increase, the plant quality, the predators and the weather data showed that 40% of the variation in red spider mite numbers over the three growing seasons was explained by the biotic factors and weather condition. The population dynamics was a function of the initial level of infestation and the rate of increase