

Abstract

The fall armyworm (FAW), *Spodoptera frugiperda*, is an invasive pest, causing great damage in Africa, Asia, Near-East and Australia. Experts are calling for integrated pest management to minimize the effect. The parasitoid *Eiphosoma laphygmae* was identified as a potential candidate for classical biocontrol. The thesis overall-objective was to assess whether first observations in rearing and host-range tests of the species justify further investment. For this we compiled existing knowledge on the wasp through a systematic literature review. We conducted non-choice host-range tests with three *Spodoptera* species. We observed rearing efficiency with four different host-ages and two different substrate of exposures. Additionally, we assessed which FAW-instar gets killed by the endoparasitoid. In terms of rearing: Parasitism rates are significantly higher on maize (28.1%) compared to diet as substrate of exposure (10.2%, $p= 0.004$). We observed a tendency that parasitism rates are lower when larvae are four-days old at exposure compared to one- to three-day olds. The parasitoid emerges when the FAW is in its fifth instar. *E. laphygmae* is distributed throughout tropical America, making it a potential candidate for all tropical invaded areas of the FAW. Apparent parasitism of *S. littoralis* and *S. latifascia* were not observed in host-range tests. It developed until the cocoon stage for *S. exigua*. However, apparent parasitism rates were significantly lower (4.9%) when compared to *S. frugiperda* (38.6%, $p>0.001$). Literature records support the high specificity of *E. laphygmae*. *Anticarsia gemmatalis* and *Alabama agrillacea* have also been noted as hosts, however, these are single records. Mean parasitism rates in the field are 4.3% and max. 14.5%. Nevertheless, these numbers are likely underestimates due to the applied sampling techniques and season of data collection. Because of the wide natural range and high specificity, we conclude that research on the species as a potential classical biocontrol agent should continue and focus on host-range tests and improving rearing efficiency.

Keywords: Biological control, *Eiphosoma laphygmae*, *Eiphosoma vitticole*, larval parasitism, *Spodoptera frugiperda*