

## Article

## A comparison between *Amblyseius (Typhlodromips) swirskii* and *Amblyseius eharai* with *Panonychus citri* (Acari: Tetranychidae) as prey: developmental duration, life table and predation

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### Abstract

In this study, the developmental duration and life table of *Amblyseius (Typhlodromips) swirskii* and *Amblyseius eharai* with the prey *Panonychus citri* were studied at 25±1°C. The results showed that the developmental duration of the larval stage and a whole generation of *A. swirskii* were significantly shorter than those of *A. eharai*, but no significant differences in developmental duration were observed in other stages. In addition, the larva of *A. swirskii* could develop into a protonymph without any prey, but prey was necessary for larval development of *A. eharai*. The fecundity of the adult female of *A. eharai* was significantly higher than that of *A. swirskii*. The net reproductive rate ( $R_0$ ), intrinsic rate of increase ( $r_m$ ) and the finite rate of increase ( $\lambda$ ) of *A. eharai* were higher than those of *A. swirskii*. The results indicated that *A. eharai* might be a better competitor compared with *A. swirskii* according to the parameters of life table.

**Key words:** Invasion risk, *Amblyseius (Typhlodromips) swirskii*, *Amblyseius eharai*, *Panonychus citri*

### Introduction

*Panonychus citri* (McGregor) and *Phyllocoptruta oleivora* (Ashmead) are dominant pest mites in citrus orchards in China. The continued use of acaricides had resulted in widespread resistance (Hu *et al.* 2010). Some phytoseiid mites were reported to be efficient natural enemies of *P. citri*, such as *Amblyseius sojaensis* Ehara, *Neoseiulus californicus* (McGregor), *Euseius scutalis* (Athias-Henriot), and *Amblyseius newsami* Evans (Masahiro *et al.* 1987; Kasap & Erdal 2004; Kong *et al.* 2005; Xiao & Henry 2010). However, these predatory mites were difficult to rear on a large scale.

In previous studies, some indigenous dominant predatory mites had been discovered in citrus orchards in China, such as *Amblyseius eharai* Amitai *et Swirski*, *Amblyseius imbricatus* Corpuz *et Rimando*, *Euseius ovalis* (Evans) and *Agistemus exsertus* Gonzalez-Rodriguez (Jiang *et al.* 1988; Zhang & Luo 1990; Ji *et al.* 2006, 2012). But they could not control the population of *P. citri* in citrus orchards (Ji *et al.* 2012), presumably because of the low densities of these predators in these orchards early in the season. One approach to overcome this problem is to use augmentative releases of these predators. But they are relatively difficult to produce on a large scale too.

*Neoseiulus cucumeris* Oudemans, a commercialized predatory mite, had been introduced and widely used to control citrus pest mites in citrus orchards in China since 1997 (Zhang *et al.* 2003). However, some unsatisfactory phenomena had been observed: *N. cucumeris* could not colonize the citrus orchard (Ji *et al.* 2012). So another predator, with stronger ability to adapt to citrus ecosystem, would be a preferable alternative.