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Article

Age and size at maturity in *Tyrophagus curvipenis* (Acari: Acaridae) when fed on three different diets

SHI-SEN YE[1,2] & ZHI-QIANG ZHANG* [3,4]

[1] *School of Forestry, Fujian Agriculture and Forestry University, Fuzhou, Fujian, China*
[2] *Fujian Forestry Vocational Technical College, Nanping, Fujian, China. E-mail:aasen@163.com*
[3] *Landcare Research, 231 Morrin Road, Auckland, New Zealand. E-mail: zhangz@landcareresearch.co.nz*
[4] *Centre for Biodiversity & Biosecurity, School of Biological Sciences, University of Auckland, Auckland, New Zealand*
**Corresponding author*

Abstract

Tyrophagus curvipenis Fain & Fauvel, 1993 (Acari: Acaridae) has been reported from a very broad range of plant and animal hosts in various habitats in Australia, France, Portugal and New Zealand. However, except host/habitat records, there have been no reports of its life history and other aspects of biology. In this laboratory study conducted at 25°C, *T. curvipenis* were kept individually and fed three different diets. The time from egg to adult mite was recorded and size of resulting adult mites was measured. *T. curvipenis* completed development on dry yeast in 10 days, about half of time needed when fed rolled oats and 42% of time needed when fed wheat flour. The length and width of the prodorsal shield was used to determine adult size. Adult females fed yeast were 18% larger than those fed on oats and 25% larger than those fed on wheat flour. Adult males were 14% larger on yeast than on oats, and 27% larger on yeast than on wheat flour. Faster development and larger size at maturity on yeast are correlated with the higher protein content of yeast compared to that in oats and wheat. Males were smaller and developed faster than females on all three diets.

Key words: Food, development, size, *Tyrophagus curvipenis*

Introduction

Animals that live in heterogeneous environments often display plastic phenotypes such as age and size at maturity (Pigliucci 2001). These developmental traits are highly variable and can affect overall species fitness and survival (Stearns 1992, Nylin & Gotthard 1998). Many life history traits are correlated; therefore, studying developmental traits, although taking much less time than constructing full life tables, may provide useful insights into the fitness consequences of these life history traits (Walzer & Schausberge 2011). Age and size at maturity are strongly affected by food limitation (Mikolajewski *et al*. 2005), and they may also be sex-specific. There is a paucity of studies on mites of this aspect of developmental plasticity (Walzer & Schausberger 2011). In this study, we examine the age and size at maturity of *Tyrophagus curvipenis* Fain & Fauvel, 1993 (Acari: Sarcoptiformes: Acaridae) when fed three different diets.

Species of *Tyrophagus* have a wide food range and habitats, and include some of the most economically important mites inhabiting stored food and other stored products (Hughes 1976, Fan & Zhang 2007). Several species of *Tyrophagus* are also known to cause damage to economic plants such as ornamental flowers and vegetables in greenhouses (Zhang 2003; Kasuga & Honda 2006). Studies of the life history and biology of this genus are numerous, but concern mainly a few common species. For example, *Tyrophagus putrescentiae*, a cosmopolitan species, is known to feed and reproduce on such food as fungi, pollen, garlic, seeds, cheese and various stored products, as well as

