



## Comparative sensitivity of earthworms in avoidance tests

• Shreetama Bandyopadhyaya • Priyanka Kumari • Kirti Chandra  
• Sumeet Ranjan and Shahla Yasmin

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Corresponding Author : Shahla Yasmin

**Abstract :** We investigated the effects of two different pesticides (Profenofos 50% and Thiophanate Methyl 70%) on the avoidance behavior of *Eisenia fetida*, *Eudrilus eugeniae* and *Pheretima posthuma* under laboratory conditions. The tests were performed according to ISO guidelines 17512. The results indicated that the ecologically relevant and naturally occurring species *Pheretima posthuma* was most sensitive followed by *Eudrilus eugeniae*, while *Eisenia fetida* was the least sensitive. It is suggested that avoidance tests could be used as an initial screening tool for risk assessment of pesticides.

**Key Words :** Earthworms; Fungicide; Insecticide; Risk assessment; Natural soil; toxicity

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### Shreetama Bandyopadhyaya

B.Sc. III year, Zoology (Hons.),  
Session : 2011-2014, Patna Women's College,  
Patna University, Patna, Bihar, India

### Priyanka Kumari

B.Sc. III year, Zoology (Hons.),  
Session : 2011-2014, Patna Women's College,  
Patna University, Patna, Bihar, India

### Kirti Chandra

B.Sc. III year, Zoology (Hons.),  
Session : 2011-2014, Patna Women's College,  
Patna University, Patna, Bihar, India

### Sumeet Ranjan

Research Scholar, Dept. of Zoology  
Patna Women's College,  
Patna University, Patna, Bihar, India

### Shahla Yasmin

Head, Dept. of Zoology, Patna Women's College,  
Bailey Road, Patna-800 001, Bihar, India  
E-mail : shahla\_apex@yahoo.co.in

### Introduction :

A greater proportion (>80%) of biomass of terrestrial invertebrates is represented by earthworms which play an important role in structuring of soil, soil fertility and soil permeability. In agricultural areas worldwide, there is an increasing concern about soil contamination due to the widespread use of insecticides (Zhou et al 2006; Reinecke and Reinecke 2007; De Silva and Van Gestel 2009; De Silva et al 2010; Garcia et al 2011; Santos et al 2011). The potential risk of chemicals for the habitat function of soils is often investigated applying acute (OECD 1984; ISO 1993) and reproduction tests (ISO 1998; OECD 2004) using earthworms as representatives of the soil biocenosis. Constraints such as the inability to assess population effects with acute toxicity tests and also the long duration and the labor intensive nature of the reproduction test called for rapid assessment methods with shorter duration but high sensitivity and ecological relevance.

Behaviour therefore is suggested as a sensitive and relevant alternative endpoint for toxicity tests with the soil organisms, like earthworms (Hund-Rinke and Wiechering 2001; Heupel 2002; Natal Da Luz et al 2004; Schaefer