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E. fetida as Indicator of Neonicotinoides' Presence in soil Ecosystem

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Abstract—*Neonicotinoides disrupt neural transmission in central nervous system by targeting the nicotinic acetylcholine receptors on post synaptic membrane; which ultimately lead to paralysis or death of an organism. As these pesticides are broad spectrum and have increased utility, they are under scrutiny for their impact on non- target organisms. Various laboratory and field studies have claimed increase in adsorption with increased soil moisture and organic content. In earthworms, neonicotinoidal exposure adversely affects worms' growth, reproduction, avoidance, burrowing, feeding and survivability. Being epigeic, E. fetida is more likely to be exposed to higher concentrations of such agrochemicals. Various other biomarkers such as levels of antioxidant enzymes and genotoxicity have also been studies which proved the presence of DNA damage in the presence of higher levels of neonicotinoides. Dose dependent significant increase in avoidance and DNA damage was observed in earthworms. While significant reduction in feeding, burrowing, abundance and growth were observed in worms exposed to neonicotinoides as compared to control in dose dependent manner. Abundance of earthworms in most soil ecosystem and its sensitivity to pesticidial contamination makes it an appropriate model to eco-toxicological assessments. The altered parameters may act as biomarkers for the presence of pesticides and can be utilized as an early warning for taking steps towards environmental sustainability.*

Keywords*: survivability, Neonicotinoides, Eisenia fetida.*

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