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## Similarities in Evasive Behavior of Wolf Spiders (Araneae: Lycosidae), American Toads (Anura: Bufonidae) and Ground Beetles (Coleoptera: Carabidae)

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**SIMILARITIES IN EVASIVE BEHAVIOR OF WOLF SPIDERS  
(ARANEAE: LYCOSIDAE), AMERICAN TOADS (ANURA:  
BUFONIDAE) AND GROUND BEETLES  
(COLEOPTERA: CARABIDAE)**

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While collecting newly metamorphosed American toads, *Bufo americanus* Holbrook, we have observed that they exhibited evasive behavior similar to that of adults of the wolf spiders, *Pardosa saxatilis* (Hentz), *Pirata insularis* Emerton, *Pirata arenicola* Emerton, *Pirata piratica* (Oliver), and adults of the ground beetle, *Elaphrus ruscarius* Say. When pursued or disturbed, the spiders, beetles and toads ran across the ground rapidly for short distances (ca. 1-50 cm). They then stopped abruptly and remained motionless. If they were further pursued, this escape sequence was repeated in the same or another direction. Toads and spiders occasionally moved to shallow water to avoid capture. Spiders ran across the water surface whereas the toads swam partially submerged. We observed this resemblance in evasive behavior on numerous occasions at ponds on the south edge of Carbondale, Illinois (spiders and toads), 1 km west of Grinnell, Iowa (spiders and toads), and 1.5 km west of Bloomington, Illinois (spiders, toads and beetles). (Specimens were collected for identification from the latter site.)

The spiders, beetles and young toads are generally of similar sizes (Table 1), and all are cryptically colored (grays, browns, blacks) matching the drab mud substrate. *E. ruscarius* also has spots on its elytra that resemble the dorsal warts of *B. americanus*. Similarity in locomotion, size and coloration is so well developed that we have often pursued animals that were originally thought to be toads only to discover that they were either spiders or beetles.

The spiders, toads and beetles were found on mud banks around the ponds in early summer. These areas usually had little or no vegetation and were thus presumably areas of considerable exposure to predation. The erratic movements and cryptic coloration of the spiders, beetles and toads would probably be quite adaptive for avoiding predation in this environment. We have often encountered large mixed groups of spiders, beetles and toads where all individuals were simultaneously exhibiting escape behavior. This would seem to be particularly effective in confusing a potential predator.

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Table 1. Body lengths of preserved adult wolf spiders, adult ground beetles and newly metamorphosed American toads collected around ponds near Bloomington, Ill.

Species	Number of Specimens	Body Length (mm)	
		$\bar{X}$	Range
LYCOSIDAE*			
<i>Pardosa saxatilis</i>	20	5.52	4.5 - 7.1
<i>Pirata arenicola</i>	10	5.27	4.5 - 6.1
<i>Pirata insularis</i>	2	5.63	4.9 - 6.4
<i>Pirata piratica</i>	14	5.56	4.6 - 6.8
CARABIDAE			
<i>Elaphrus ruscarius</i>	4	7.29	6.8 - 7.6
BUFONIDAE			
<i>Bufo americanus</i>	38	8.19	7.4 - 9.5

\*Wolf spiders appear somewhat larger than the measurements given because of their extended legs.