

Ian Henning Stenholt Clausen

Institut for Populationsbiologi, Universitetsparken 15, DK-2100  
København Ø, Denmark

(Present address: Miljøstyrelsen, Bekæmpelsesmiddelkontoret,  
Strandgade 29, DK-1410 København K, Denmark)

A BUDGET FOR CD AND PB IN STEATODA BIPUNCTATA (ARANEAE: THERIDIIDAE)

Spiders occupy a central position in a natural food-chain system, being simultaneously predators and prey to other animals, insects and birds respectively. It is therefore important to study the fate of potentially harmful elements in spiders.

Steatoda bipunctata spiders were fed fruitflies (Drosophila hydei) that were reared on media containing different concentrations of cadmium (Cd) and lead (Pb). The spiders were kept in plastic vials, and at intervals they were moved to clean vials so prey remains could be sampled, and the vials could be washed with nitric acid. By measuring Cd and Pb in spiders, flies, prey remains, and nitric acid a budget could be made for uptake and excretion of the metals in Steatoda.

Preliminary results suggest that Cd and Pb behave distinctly different. Cd is assimilated very efficiently; probably about 100% of the consumed Cd is taken up into the body, whereas the excretion seems to be close to zero. Thus Cd is effectively biomagnified in Steatoda, and the data suggest that Cd in free-living spiders might reach levels toxic to birds that prey on them.

Pb is much less efficiently assimilated, and the relative uptake seems to be dependant on the concentration in Drosophila, so that the biological concentration factor (BCF) is negatively correlated with ppm Pb in Drosophila. Thus, the BCF is above one at Pb-concentrations in the flies below ca. 10 ppm, whereas it drops to well below one with greater Pb-values in the flies.

The lead levels in Steatoda seem to reach a plateau of about 8 ppm at which point no more Pb is accumulated. This value is far below the concentrations found in free-living Steatoda at polluted sites (→ 100 ppm), and it is speculated that a major contribution of Pb to free-living spiders comes via atmospheric particles, except in the cleanest areas.