

DO INSECT DEATH ASSEMBLAGES REFLECT THE LIVING INSECT COMMUNITY? TAPHONOMY OF INSECTS IN A RECENT EPHEMERAL LAKE IN SOUTHEASTERN ARIZONA

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Fossil insects are proving to be valuable sources of information on ancient environments, climates, and species interactions. But, do insect death assemblages accurately reflect the composition and relative abundance of the insect life assemblage? Have fossil insects been transported, selectively preserved, or time-averaged? Despite the diversity and abundance of insects in Tertiary lake deposits (Green River (Eocene) with approximately 220 species; Florissant Fossil Beds (Oligocene) with approximately 1030 species), very little is known about the taphonomy of insects in lacustrine environments.

Willcox Playa, an ephemeral lake in southeastern Arizona, is an ideal setting for examining the taphonomic processes that affect the preservation of insect assemblages in the fossil record. The living fauna is abundant and diverse (2,500 species in 17 orders), insect remains accumulate along the lake's shoreline, and the environmental setting may be comparable to many ancient lake deposits.

Willcox Playa lies at an elevation of 1,300 meters in the Basin and Range Province. The ancient lake bed covers an area of approximately 130 km² and the present lake is confined to 300 m² in the playa's northeast corner. Sediments are derived from the surrounding mountains and consist of fine sands, silts and clays and a surficial crust of evaporite minerals. Lake levels fluctuate in response to Winter (Dec. - Feb.) and Summer (July - Sept.) rains. The lake level is highest following the summer rains.

I compared the living insect fauna with the accumulating dead remains. Insect diversity and abundance in both the live and dead faunas are greatest in the summer and decline in the winter months. Dead insects accumulate in strand line deposits along the northeastern (downwind) shore. Among the dead remains are insects that are found living in the lake, along the shores of the lake, and in the shrubby regions surrounding the lake. Except for the aquatic insects, the relative abundance of the live fauna is reflected in the dead accumulations. Aquatic insects are underrepresented in both abundance and diversity in the accumulating dead remains.

The large number of dead insects found accumulated during the summer are not found on the surface during the winter. It is likely that many of these specimens are buried. How long does it take the dead insect accumulations to become buried? Does one layer of remains represent a single seasons' accumulation? Detailed studies of the living and dead beetle (Coleoptera) faunas will document seasonal changes in relative abundance and diversity.