

from those levels recorded for pupae. Maximum activity of adult esterase, recorded within 48 hours, declined rapidly after 72 hours. This decline was attributed to the (1) reduction in number, and (2) diminished activity of the 4 leading carboxylesterase isozymes. Conversely, cholinesterase, which had contributed insignificantly to the total activity in pupae rose sharply to account for 8% within 6 hours of emergence and continued to register high activity over 14 days of ageing.

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A hypothesis for the distribution of holarctic groups of fungus gnats (Diptera: Mycetophilidae). R. J. Gagné, Systematic Entomology Lab, FR, SEA, USDA, Washington, DC 20560

Recent revisions of Mycetophilidae show patterns of holarctic distribution that are repeated many times. These flies are evidently very ancient in that many holarctic genera are represented on the southern continents by vicariant genera. In the holarctic region, most genera, subgenera, and species groups have one or more species that occur in both Europe and North America, one or more that are strictly nearctic, and one or more strictly palearctic. Although most species that occur in North America are widespread from coast to coast, some occur only in the Great Plains eastward, others only in the Rocky Mountains westward. Many of the eastern nearctic species occur in Europe, but none of the exclusively western species do. These patterns are not explained by dispersal via Beringia or by separation due to Pleistocene glaciation. The most likely hypothesis for this particular distribution must take into account the early Eocene land connection between eastern North America and Europe. Species presently ranging throughout the holarctic region are probably virtually unchanged since before the breakup of Laurasia and those species limited to Europe and eastern North America unchanged since the early Eocene when those 2 areas were one continent separated from western North America and Asia by seas. Species restricted to eastern North America resulted some time after the breakup of Euramerica in the middle Eocene. This supposes a very ancient age for extant species of fungus gnats, but that conclusion is supported by the fossil record.

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Temporal patterns of parasitization of face fly (Diptera: Muscidae) by *Thelazia* sp. (Bosc) (Nematoda: Spirurata) on three dairy farms in Western Massachusetts. C. J. Geden and J. G. Stoffolano, Jr., Univ. Massachusetts, Amherst, MA 01003

Two species of nematode bovine eyeworms of the genus *Thelazia*, *T. gulosa* and *T. skrjabini* have been recovered from the eyes of slaughtered