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become quite specific in reaction; in cases in which they mingle with other groups of their own or with other species, they may learn to respond to the signals of these.

### Further Experiments on Locations of Contact Chemoreceptors in Insects

Hubert and Mable Frings  
assisted by Carl Frings  
Pennsylvania State University

Continuing attempts to locate the contact chemoreceptors involved in feeding reactions of insects, adults of the following species were studied. The loci of the receptors which were found are given with each.

#### TRICHOPTERA (Caddis-flies)

*Polycentropus interruptus* -- all tarsi, palpal tips, haustellum

*Agrypnia vestita* -- same as *P. interruptus*

*Limnephilus ornatus* -- same as *P. interruptus*

#### LEPIDOPTERA

*Cercyonis pegala* (Wood nymph butterfly) -- tarsi of middle and hind legs (fore legs are rudimentary), tip of proboscis, antennal tips.

#### COLEOPTERA

*Brachyrhinus sulcatus* (Strawberry root weevil -- palpal tips, antennal tips.

#### DIPTERA

Tipulidae (Crane flies) of eight species, mainly *Tipula* spp. — tarsi of all legs, palpi, labella.

Of these, the weevil is remarkable in having the receptors on the antennae. Usually mandibulate species lack antennal receptors. This seems to be related to the fact that the mouth-parts are inside the "snout" when the insect is not feeding, thus producing a situation like that of haustellate insects with retractible mouth-parts. The discovery that the butterfly has receptors on the antennae was made only after removal of most of the tarsal receptors, supporting our earlier findings with two species of moths. These findings necessitate a reinvestigation of the situation in all haustellate insects.