

ENTOMOLOGY

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Abstracts

Organic Insect "Control" in Indiana Vegetables. ALAN C. YORK, Entomology Hall, Purdue University, West Lafayette, Indiana 47907.——Cucumber, snap beans, eggplant, and cabbage were interplanted between previously transplanted rows of seven companionate plant treatments: dwarf marigold, nasturtium, peppermint, thyme, sage, and dill. Companionate crops were transplanted on 30 in centers and vegetables seeded between these rows approximately 2 weeks later. Each treatment consisted of 5 rows of a companionate plant and one row each of the 4 vegetables. The control (untreated) was created by seeding 3 rows of each of the vegetables and spraying at 10-day intervals with carbaryl 80S, 5 tsp per gallon of water per 500 sq ft. Three replicates were utilized of each treatment. Insect numbers, crop damage, and yield were evaluated. Only yields differed significantly one from another. Snap bean yields were highest in the dwarf marigold treatment, followed by nasturtium, dill, peppermint, and insecticide. Cucumber yields were highest in dill, followed by dwarf marigold, insecticide, sage, and nasturtium. Eggplant yields were highest in the insecticide treatment, followed by dill, thyme and dwarf marigold. Cabbage seedlings in each treatment except the insecticide were destroyed when about 3 in tall by flea beetles.

"Studies on the Predation of Mosquito Larvae, by Pleid Bugs." RANDALL T. BAUM and JAMES D. HADDOCK, Department of Biology, Purdue University, Fort Wayne, Indiana 46805.——In an attempt to assess the predation efficiency of pleid bugs (Hemiptera: Pleidae) on mosquito larvae experiments using prey-predator ratios of 20:2, 20:5 and 20:10 were set up in white laboratory porcelain pans. A 20:2 ratio resulted in the highest efficiency of predation: 1.13 larvae/predator/day. This is presumably due to a lessening of competition between the predators. Experiments designed to explore a relationship between predation efficiency and % light transmittance ranges (18-23%, 60-78% and 95-100%) showed no significant differences between high and low values. Occasionally, more than one pleid bug was observed feeding on a mosquito larva. No cannibalism was observed during the course of the experiments. There was a trend toward greater predation efficiency if the prey were less than 5mm in length. Pleids will sometimes be found attacking mosquito pupae which are somewhat larger but less active.

Parasites Reared from Black Cutworm Larvae (*Argrotis ipsilon* Hufnagel) (Lepidoptera: Noctuidae) Collected in Indiana Corn Fields from 1947 to 1977. RICHARD B. SCHOENBOLM and F. T. TURPIN, Entomology Department, Purdue

University, West Lafayette, Indiana 47907.——Black cutworm larvae found infesting Indiana corn fields were collected in the springs of 1974, 1975, 1976, and 1977. Larval stages collected ranged from third instar to sixth instar. Collected larvae were reared in the laboratory and emergent parasites were identified. The following parasite species were obtained: *Meteorus leviventris* (Wesmael) (Hymenoptera: Braconidae), *Microplitis kewlevi* Muesebeck (Hymenoptera: Braconidae), *Campoletis argentifrons* (Cresson) (Hymenoptera: Ichneumonidae), *Archytas apicifer* (Walker) (Diptera: Tachinidae), and *Bonnetia comta* (Fallen) (Diptera: Tachinidae). Rates of parasitism were 10.4, 67.7, 23.8, and 12.2 percent in 1974, 1975, 1976, and 1977, respectively. In all four years, *M. leviventris* was the most abundant, and *B. comta* was the next most abundant parasite. The black cutworm was a new host record for *A. apicifer*.

Hemocytes of the Fifth Instar European Corn Borer, *Ostrinia nubilalis*. HUBNER SPENCER E. REAMES and HAROLD L. ZIMMACK, Biology Department, Ball State University.——Hemocytes of the fifth instar European corn borer, *Ostrinia nubilalis* Hubner (Lepidoptera: Pyralidae) were examined in stained and unstained preparations. Prohemocytes, plasmatocytes, granular hemocytes, oenocytoids, and spherule cells were found in this stage. The prohemocytes are characterized by a scant intensely basophilic cytoplasm. The highly pleomorphic plasmatocytes are characterized by a punctate nucleus, and production of cytoplasmic extensions *in vitro*. Granular hemocytes are characterized by a small eccentric to central nucleus, accumulation of lipid droplets, and the production of extremely fine cytoplasmic extensions in living preparations. The oenocytoid is characterized by a small eccentric nucleus in a large expanse of homogenous basophilic cytoplasm. The spherule cell is characterized by a number of large spherules within the cytoplasm which may mask the nucleus.

Some Techniques for Collecting, Preserving and the Slidemounting of Arthropods. R. F. WILKEY, Arthropod Slidemounts, 118 West Cherry Street (P.O. Box 185), Bluffton, Indiana 46714.——One of the most important steps in making satisfactory slidemounts is the "quick heat fixing" of the tissue. This is done by collecting the specimens in 75% alcohol and heating this solution, just to a light boil. Allow to cool, pour off the heating alcohol and replace with fresh. This heating needs to be done as soon as possible—at least within 48 hours. This procedure applies to large specimens to be stored in alcohol as well as material to be slidemounted. There are two basic "types" of mounting media; temporary and permanent. Of the temporary type, the most common are HOYER'S and POLYVINYL ALCOHOL. Specimens may be mounted directly into these media from life or alcohol and with heating, may become clear enough for observation. I consider these temporary because they are somewhat unpredictable and may break down in several ways. The most common permanent type media are; BALSUM, EUPARAL and PICCOLYTE. Material to be mounted using these media are cleared in a 10% KOH solution (up to 3-4 days), cold, rinsed in a weak alcohol solution (10%) and transferred to a special lactophenol solution with a special staining formula added. This is heated for 1-2 hours and specimens then rinsed in a 75% alcohol mixture and mounted directly

in EUPARAL or transferred to Cellosolve or Xylene and then into BALSAM or PICCOLYTE. The transferral and manipulation of the specimens is made easier by the use of microtools such as cutters, spatulas and probes. Most of the chemicals, detailed techniques, tools and other supplies are available from the above company.

Considerations of Variability and Taxonomic Methodology in the Systematics of the Orthocladiinae (Diptera: Chironomidae). RONALD A. HELLENTHAL, Biology Department, University of Notre Dame, EDWIN F. COOK, Department of Entomology, Fisheries & Wildlife, University of Minnesota, St. Paul, Minnesota 55108, and THEODORE J. CROVELLO, Biology Department, University of Notre Dame, Notre Dame, Indiana 46556.——Specimen samples of adults of taxa within the Orthocladiinae were evaluated for character variability and distribution characteristics and for the importance and effects of observer errors and specimen preparation procedures. Slide-mounts of dissected specimens were found to be indispensable for taxonomic study of adult Chironomidae. Slide-mounting methods omitting maceration or utilizing phenol were unacceptable for many Orthocladiinae due to insufficient clearing or distortion of characters. Character measurements made by different persons showed significant differences. For most characters these ranged from 1% to 3% of character means, but for measurements of antenna flagellomeres they exceeded 6% of the mean and accounted for over 75% of the total variation. Pooled conspecific character samples from different localities or dates generally showed greater variability and more frequent departures from normality than single samples. Pooling increased sample variability by as much as 250%. The quality of ratio characters was evaluated by comparing the relative variability with that expected for the ratio assuming a random association between the numerator and denominator component variables. The antenna ratio and ratios of palp segment lengths frequently offered no significant advantage over their component variables.

The Effect of a Pathogen, *Nosema necatrix* on the European Corn Borer, *Ostrinia nubilalis* Hubner. JOHN L. MANUSZAK and DR. HAROLD L. ZIMMACK, Ball State University.——European corn borer egg masses in the blackhead stage of development were topically infected with spore suspensions of *Nosema necatrix*, a known pathogen of the armyworm, *Pseudaletia unipuncta*. A comparative study of laboratory and field corn borers was conducted to determine if *N. necatrix* could be used as an effective microbial control agent against the European corn borer. Laboratory corn borers reared on artificial medium and field recovered borers were sacrificed exposing the malpighian tubules and fat bodies. Slides were stained with Zeihl's Carbol Fuchsin and examined for the presence of *N. necatrix*. The observed per cent of infection and per cent of mortality was recorded for laboratory and field borers.