

soil. No very effective control measures are known. In Hawaii, this insect has been bred from beets and young cucumber seedlings.

268. *Anthomyia bisetosa* Thoms.

Family ANTHOMYIIDAE

Plate X, Figure 28

This is another fairly recent immigrant to our shores, the first specimens having been captured in Honolulu by P. H. Timberlake in the early part of 1919. It was observed on Hawaii in 1927 and Kauai in 1928. It is also known in Japan and probably other regions in the Orient. The color pattern of the adults is an attractive one of light gray with a black band across the thorax and other black markings on the abdomen.

269. *Fannia pusio* (Wied.)

Family ANTHOMYIIDAE

Plate X, Figure 29

Apparently a native of the new world, this anthomyiid fly is known from South America, the West Indies, southern United States, Samoa and Hawaii. Breeding occurs in spoiled meat, dead animals, dead insects, such as cockroaches and beetles, decaying plant material, soured bread and chicken manure. The larvae have been observed swarming in large numbers in the last mentioned material. The white, beautifully sculptured eggs are laid in great numbers on the surface of the food, according to the observations of J. F. Illingworth. Brown, spiny larvae hatch from these and develop on the food material. Pupation usually occurs outside the food, the larvae crawling out to search for a moderately dry place. Adults are sometimes to be seen on algaroba or kiawe (*Prosopis chilensis*) flowers.

270. *Brachydeutera hebes* Cress.

Family EPHYDRIDAE

Plate X, Figure 16

This ephydrid fly is well distributed in the islands and is sometimes very abundant resting or running about on the surface of puddles, stagnant pools, rain barrels, etc., from the seashore to well up into the mountains. The adults are a little smaller than houseflies and silvery-brown in color.

Dr. F. X. Williams has recently made a thorough study of the life-history and habits of this species. He discovered the mottled brownish eggs on dead, partly submerged kukui leaves in pools near Honolulu. The eggs hatch a day or two after being laid. Full-grown larvae are about 10 mm. long, sparsely clothed with dark hairs, and provided with breathing tubes at the rear end. They apparently feed on plant and animal matter in the water. The buoyant, wrinkled, furry puparia are usually formed at the edges of the pond or water container.

Pupae of a related species found in enormous numbers in the western United States were formerly used as food by the Indians.

271. *Pipunculus jvator* Perk.

Family PIPUNCULIDAE

Plate X, Figure 25

An internal parasite of native leafhoppers, this small, big-eyed fly turned its attention to the sugar-cane leafhopper when that insect arrived in Hawaii. The flies may be seen hovering over cane plants searching for their prey. When a suitable young leafhopper is discovered, a fly snatches it up and lays an egg in its body. The larvae feed in the body of the host until its death, and then emerge to transform into stout, dark-brown puparia. Several related species, also natives of these islands, have similar habits.

272. *Scenopinus niger* Macq.

Family SCENOPINIDAE

Plate X, Figure 26

This is an introduced fly, established on Oahu since about 1900, and frequently to be found on windows. The adults are black, with flattened abdomen and dusky wings, and are about 4 mm. long. The larvae are elongate and cylindrical, with about 20 segments. It is believed that they feed on the larvae of clothes moths, fleas and similar insects, and thus are to be considered beneficial.

273. *Aphiochaeta scalaris* Loew

Family PHORIDAE

Plate X, Figure 27

An American insect, this fly is now generally distributed in the lowlands of the main Hawaiian Islands, and is also known from Lisiansky Island and Pearl and Hermes Reef in the chain of islets to the northwest of Kauai. It has been observed breeding in decaying pineapples, dead land-shells, dead rats, etc. Recently an infestation was discovered in some moldy hams being stored in a Honolulu warehouse.

274. *Milichiella lacteipennis* (Loew)

Family MILICHIIDAE

Plate X, Figure 30

First observed here about 1901, this very abundant little fly is also known from the West Indies, southern United States, Fiji, Canton Island, and the islands of Midway and Pearl and Hermes Reef in the Leeward Hawaiian chain. The adults are about two mm. long, with a metallic black thorax, dull black abdomen, and milky white wings. They are often seen in swarms about chicken manure and decaying plant material, resting on vegetation or attracted to flowers of plants such as *Nothopanax*

Fullaway & Krauss, 1945.

*cochleatum*. Breeding occurs in chicken manure and probably in other similar material. The carnivorous anthomyiid fly *Lispa metatarsalis* has been observed preying on adults of this species.

275. *Lynobia maura* Big.

Family HIPPOBOSCIDAE

Plate X, Figure 18

A pest of pigeons in Europe, Africa and Asia, this fly was first discovered in Honolulu in October 1911, by O. H. Swezey. It has since been observed in great abundance on several occasions. Pigeon malaria, caused by the protozoan *Haemoproteus columbae*, is transmitted by this insect.

## Chapter IX

## The Bees, Wasps and Ants

276. *Apis mellifica* Linn.

Family APIDAE

Plate XI, Figure 12

This highly social insect lives in large colonies of from 20,000 to 50,000 individuals, and has been somewhat domesticated. Wild swarms occur, however, and persist for long periods in good locations.

A community will consist of queen, drones, workers and brood or larval bees. The queens are elongated, 15-20 mms., drones robust 15-17 mms., workers 11-15 mms. Color varies from brown to black; the head, antennae, legs and portions of the abdomen dark; body clothed with dense, short, buff or pale pile, which is thickest on the thorax and thinnest on the dorsum of the abdomen. There are many races, the four most important being Italians, Caucasians, Carnolians and German.

The different castes are further distinguished as follows:

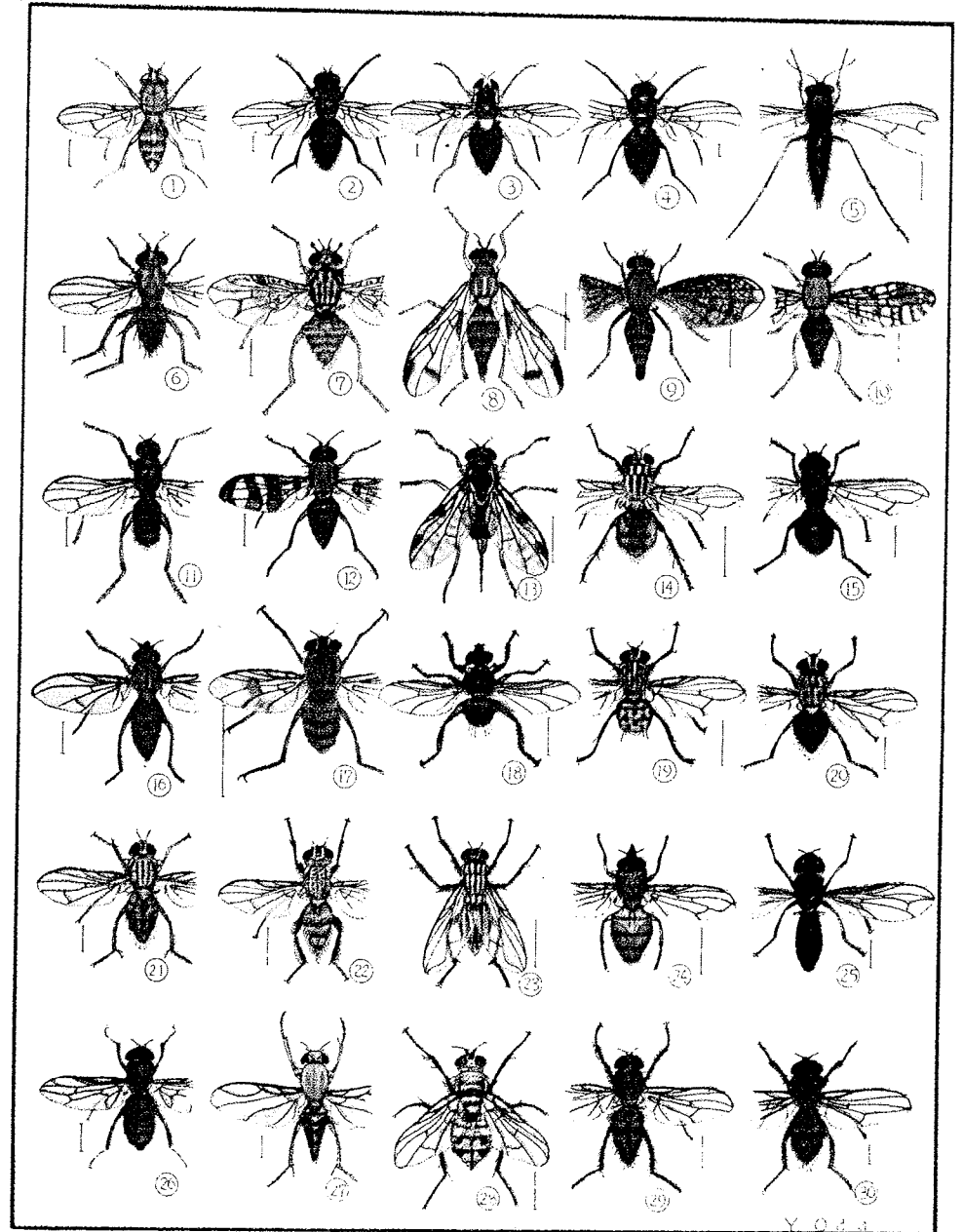
Queen—fertile female, mother of colony, arises from fertile eggs and larvae furnished with special food known as royal jelly; has sting which is only used to kill rival queens.

Workers—abortive or neuter females arise from fertile eggs; home-makers of the colony; sting used in self-defense or in defense of the colony.

Drones—sexual males, arising from unfertilized eggs; mate with queens; have no sting.

The comb consists of two layers of six-sided cells constructed of wax, back to back, and slightly slanting toward the middle partition. The wax is obtained from special glands on the under sides of the abdomen and is masticated and mixed with cephalic gland fluids. It is necessary for the workers to consume 20 pounds of honey to produce a pound of wax. Propolis is a brownish resinous cement collected most abundantly in late summer and fall from buds and trees and used on rough surfaces, small cracks in the hive, and on portions of the comb. Honey comb is the cells which are used for the storage of honey; these are usually around the top and sides of the comb. They are capped with wax. Brood comb is the cells which occupy the lower and central portions and consist of the following kinds: Worker cells similar in size to those used for the storage of honey, containing various stages from the fertilized egg to emerging adult. The mature larvae spin a thin parchment-like cocoon within the cells, where pupation takes place. Queen cells, very large

Plate X



1. *Gitona perspicax*
2. *Agromyza virens*
3. *Liriomyza pusilla*
4. *Ophiomyia lantanae*
5. *Chrysosoma fraternum*
6. *Drosophila spinifemora*
7. *Ceratitis capitata*

11. *Piophilha casei*
12. *Euxesta quadrivittata*
13. *Scholastes bimaculatus*
14. *Synthesiomyia nudiseta*
15. *Chrysomya aenea*
16. *Brachydeutera hebes*
17. *Ceratopoda*

21. *Atherigona excisa trilineata*
22. *Hylemyia ciliocirra*
23. *Musca domestica*
24. *Stomoxys pleuralis*
25. *Pipunculus juvator*
26. *Scenopinus niger*
27. *...*

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# COMMON INSECTS OF HAWAII

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