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PSYCHE.

THE CORN DELPHACID, DELPHAX MAIDIS.

BY WILLIAM HARRIS ASHMEAD, JACKSONVILLE, FLA.

As is well known, the rapid changes taking place in the environments of a new country, under the influence of settlement and modern civilization, by the destruction of the forests and the cultivation of the soil, induce corresponding changes in the natural environment of insect life.

The natural food plants of hosts of insects are destroyed, and these are compelled, by the changed conditions, to seek among the plants brought by civilization such food as will sustain existence and perpetuate their species. Under these civilizing transformations, therefore, new insect pests are continually being brought to notice, appearing on some well known crop previously entirely exempt from their attacks, do great injury, cause the planter anxiety, attract the attention of the entomologist, and require skill and prompt measures for their destruction and the saving of a crop.

A new insect pest has lately appeared on corn in Florida, to which I have given the above name, that peculiarly illustrates this point.

It belongs to the family *fulgoridae*, subfamily *delphacinae*, in the order hem-

iptera, or suctorial bugs, and is apparently unknown to science, although found in great numbers on growing corn in my garden, and on coarse grass elsewhere. Up to the present time, no species in this family, at least to my knowledge, has as yet been described or reported as living on or injuring this cereal in either the United States or Canada.

Many years ago, however, Prof. Westwood, in the annals and magazine of natural history, v. 6. p. 413, published in London, England, in 1841, illustrated and described a species, very closely related to and resembling it somewhat, as seriously destructive to sugar cane in the West Indies; so that, after all, it is not so astonishing that a species in this family should now be found in the United States on so closely allied a food plant.

The "Corn Delphacid" was detected early in July, 1888, my attention being first called to it by the number of ants, *Cremastogaster lineolaris* Say, which were swarming on the leaves and crawling up and down the stalk. Ants never congregate in numbers without cause; and, an examination as to their superabundance at this time soon revealed itself in the discovery of this new corn

pest; for, as is the case when attracted to the aphides, occurring on other plants, they had gone there for the purpose of lapping up the saccharine substance, which, from the punctures of these pests, was exuding in considerable quantity, as a sweet viscid fluid, frequently covering most of the upper surface of the blades, and particularly in notches formed at the basis of the leaf-stalks, where the larvae and maturing insects were found to be fond of congregating.

INJURIES AND LIFE HISTORY.

The injurious affect, of this insect, on growing corn is readily apparent: the depletion of its juices and the saccharine substance on which the young and old feed, so necessary to growth and the maturing of the crop, occurs from the punctures of their beaks, whereby it is stunted in growth and the ears never fully mature; moreover, it is still further injured, scarred and disfigured by the ovipositor or egg-borer of the female, which is used as a saw or borer, to cut into the cellular tissue of the blade or stalk, where she deposits her eggs.

The little cicatrices or scars, thus made, and the depletion of the juices of the plant from the punctures of their beaks, give to it a diseased, sickly appearance, that, in connection with the swarming ants and flies, cannot fail to attract attention.

No delphacid, that I am aware of, has ever been thoroughly worked up in all its stages, and the egg and newly hatched young have never been described or figured; and, as these are

peculiarly characteristic and probably of biologic importance, it is particularly gratifying to me, to have been so situated to work up the life history of the present species, and, to be able to present illustrations of their many remarkable peculiarities.

Finding the species so plentiful on corn and grass in my own garden, for some weeks, it was possible to make visits daily, and thus, the opportunity and satisfaction in working up and studying the insect in all its stages—to a naturalist, the greatest of pleasures—was afforded me.

The egg, (fig. a), about 1 mm. in length, is of a greatly elongated shape, narrowed into a more or less distinct neck at base, and of a translucent white color, except a yellow yelk-like spot near the base, shown in the figure as a black dot.

The female makes an incision, with the ovipositor, under the epidermis of a leaf or in the stalk, into the cellular tissue, of a sufficient size to contain two eggs together, as is shown in the figure. After oviposition, the orifice is cemented with a greyish or white glutinous substance that appears externally, on the surface of the leaf or stalk, only as a cicatrice.

The eggs are laid in regular rows, a slight distance apart, and invariably two are found together, never more or less. Hundreds were examined but I always found two together, as illustrated.

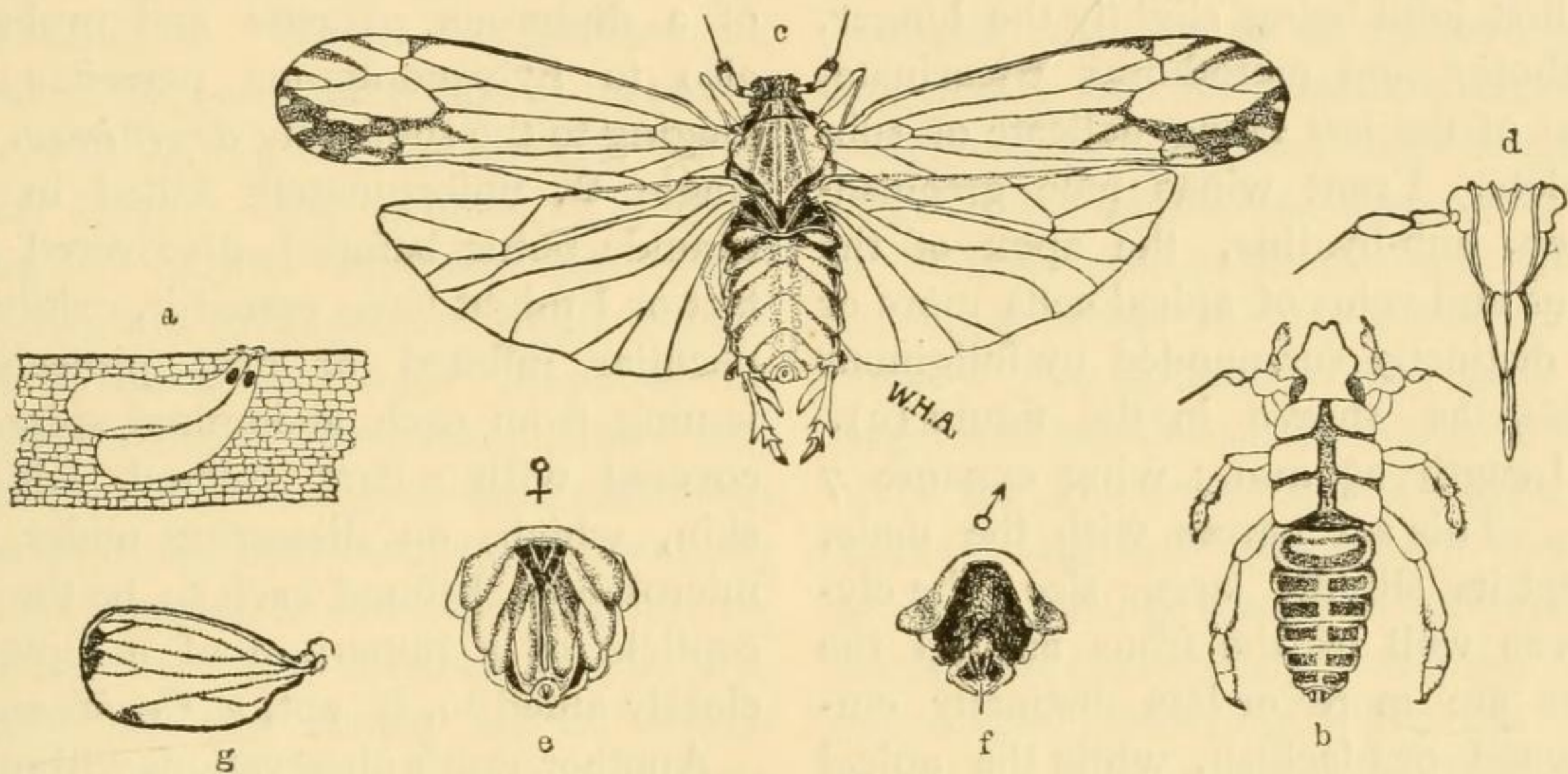
The egg hatches in from a week to ten days, and a succession of broods

appear all during the last of July, August and September, the young and old, in various stages of growth, appearing together. Whether the broods appear later than September I cannot at present tell, as my observations on the species were abruptly terminated by the yellow-fever epidemic.

The newly hatched larva is shown in figure *b*. It is of a pale greenish white color and less than 2 mm. in length, and

insect assuming more and more the appearance of the imago; the cephalic prolongation disappears with the third molt, when the frontal carinae are more or less distinctly visible, as well as the three carinae on the thorax, and distinct wing pads appear.

There are two distinct forms of imagos—a perfect winged and a brachypterous form—which are briefly described below, being, it is believed, together



in some of its characters quite dissimilar to the adult: The head has a remarkable cephalic prolongation, shaped as in the figure; the thorax exhibits dorsally six quadrilateral plates; the abdomen is composed of 7 segments, the basal one being the longest; the middle and anterior tarsi are only 1-jointed, while the posterior tarsi are 2-jointed, the posterior tibiae being without the large movable spur, so characteristic of the adult.

From this stage to the adult there are five distinct molts, after each molt the

with the figure, sufficient to distinguish the species.

Delphax maidis n. sp.

♂ Length 2 mm.; wing expanse $6\frac{3}{5}$ mm. Pale greenish-yellow, in death pale brownish yellow; apex of 1st and the apical half of 2nd antennal joints, lower part of frons, spots on pleurae, most of the abdomen, except the 1st ventral segment and the lateral edges of the dorsal segments, smoky black.

Legs pale, the femora more or less embrowned; apex of posterior tibiae with

several black tipped spines and a large movable spur; tarsi 3-jointed, the basal joint longer than the other two together, all with black tipped spines or teeth at apex; the anterior and middle tarsi shorter, the terminal joint the longest, longer than the first two together. Face with three keels, the middle one forked on the frons above; clypeus also tricarinated, the middle carina delicate; beak, apparently, but two-jointed, reaching far beyond the middle coxae, the first joint being slightly the longer. Prothorax and mesothorax tricarinate, those of the last being delicate or sub-obsolete. Front wings pale greenish-brown, sub-hyaline, the apex of the clavus and veins of apical cells more or less distinctly surrounded by fuliginous clouds, as shown in the figure (c).

♀. Length $2\frac{3}{5}$ mm.; wing expanse 7 mm. This sex agrees with the male, except its slightly larger size, the clypeus as well as the frons and all the coxae are more or less distinctly embrowned or blackish, while the apical edges of the abdominal segments, as well as the lateral edges and a broad dorsal stripe, are yellow.

The ventral apical aspect of the two sexes is shown in figures *e* and *f*; the

head and antennae in figure *d*.

The brachypterous form measures 3 mm. in length, the abdomen being much broader and more depressed than in the fully winged form.

The aborted wings, shown in figure *g*, are less than 3 mm. in length, with a spot at apex of clavus and two on the apical margin, the venation as in the drawing.

PARASITES.

The species is subject to the attacks of a dipterous parasite and probably also to hymenopterous parasites belonging to the subfamily *dryininae*. A single ♀, unfortunately killed in the cyanide bottle before I discovered the fact or I might have reared it, exhibited peculiar inflated or oval projections issuing from each abdominal spiracle, covered with a dark colored, felt-like skin, which, on dissecting under the microscope, I found each to be the receptacle of a puparium of a dipteran closely allied to, if not, a *Cecidomyia*.

Another year's observations will probably enable me to rear this parasite and settle definitely to what family it belongs and it is only mentioned at this time as an interesting fact in its life history well worthy of record.