

This insect is one of the most formidable enemies of the wheat crop, with which the farmers of the United States, and, as it now appears, of Canada also, have to contend. It is a small gnat or midge, which naturalists have placed in the family of gall gnats. (*Cecidomyiade*.) Mr. Harris' *Report on Destructive Insects*, and Herrick's valuable paper, published in *Siliman's American Journal of Science*, vol. 42, furnish the most reliable statements in regard to the character and habits of this insect. So far back as 1797, Dr. Isaac Chapman, of Philadelphia, published a history of its transformations which substantially agree with later observation.

"The head and thorax of this fly are black. The hind-body is tawney, and covered with fine grayish hairs. The wings are blackish, but are in reality tinged with yellow at the base, where also they are very narrow; they are fringed with short hairs, and are rounded at the end. The body measures about one-tenth of an inch in length, and the wings expand one quarter of an inch, or more. Two broods or generations are brought to maturity in the course of a year, and the flies appear in the spring and autumn, but rather earlier in the Southern and Middle States than in New England. The transformations of some in each brood appear to be retarded beyond the usual time, as is found to be the case with many other insects; so that the life of these individuals, from the egg to the winged state, extends to a year or more in length, whereby the continuation of the species in after years is made more sure. It has frequently been asserted that the flies lay their eggs on the grain in the ear; but whether this be true or not, it is certain that they do lay their eggs on the young plants, and long before the grain is ripe; for many persons have witnessed and testified to this fact. In the New England States, winter wheat, as it is called, is usually sown about the 1st of September. Towards the end of this month, and in October, when the grain has sprouted, and begins to show a leaf or two, the flies appear in the fields, and, having paired, begin to lay their eggs, in which business they are occupied for several weeks. The following interesting account of the manner in which this is done, was written by Mr. Edward Tilgham, of Queen Anne county, Maryland, and was published in the eighth volume of the *Cultivator*, in May, 1841. 'By the second week of October, the first sown wheat being well up, and having generally put forth its second and third blades, I resorted to my field in a fine warm forenoon, to endeavour to satisfy myself, by ocular demonstration, whether the fly did deposit the eggs on the blades of the growing plant. Selecting a favourable spot to make my observation, I placed myself in a reclining position in a furrow, and had been on the watch but a minute or two, before I discovered a number of small black flies alighting and sitting on the wheat plants around me, and presently one settled on the ridged surface of a blade of a plant completely within my reach and distinct observation. She immediately began depositing her eggs in the longitudinal cavity between the little ridges of the blade. I could distinctly see the eggs ejected from a kind of tube or sting. After she had deposited eight or ten eggs, I easily caught her upon the blade and wrapped her up in a piece of paper. I then proceeded to take up the plant with as much as I conveniently could of the circumjacent earth, and wrapped it all securely in a piece of paper. After that I

continued my observations on the flies, caught several similarly occupied, and could see the eggs uniformly placed in the longitudinal cavities of the blades of the wheat; their appearance being that of minute reddish specks. My own mind being thus completely and fully satisfied as to the mode in which the egg was deposited, I proceeded directly to my dwelling, and put the plant with the eggs upon it in a large glass tumbler, adding a little water to the earth and secured the vessel by covering it with paper, so that no insect could get access to the interior. The paper was sufficiently perforated with pin holes for the admission of air. The tumbler with its contents was daily watched by myself to discover the hatching of the eggs. About the middle of the fifteenth day from the deposit of the eggs, I was so fortunate as to discover a very small maggot or worm, of a reddish cast, making its way with considerable activity down the blade, and saw it till it disappeared between the blade and stem of the plant. This I have no doubt, was the produce of one of the eggs, and would, I presume, have hatched much sooner, had the plant remained in the field. It was my intention to have carried on the experiment, by endeavouring to hatch out the insect from the flax-seed state into the perfect fly again; but being called from home, the plant was suffered to perish. The fly that I caught on the blade of the wheat, as above stated I enclosed in a letter to Mr. John S. Skinner, the editor of the *American Farmer*, of Baltimore, who pronounced it to be a genuine Hessian fly and identical in appearance with others recently received from Virginia."

"Dr. Chapman agrees with the writer, in saying that the Hessian fly lays her eggs in the small creases of the young leaves of the wheat. 'The number on a single leaf,' says Mr. Herrick, 'is often twenty or thirty, and sometimes much greater. In these cases many of the larvae must perish. The egg is about a fiftieth of an inch in diameter, cylindrical, translucent, and of a pale red colour.' Mr. Tilgham was correct in supposing that the eggs would hatch in less than fifteen days, under favourable circumstances; for, if the weather be warm, they commonly hatch in four days after they are laid. The maggots when they first come out of the shells, are of a pale red colour. Forthwith they crawl down the leaf, and work their way between it and the main stalk, passing downwards till they come to a joint, just above which they remain, a little below the surface of the ground, with the head towards the root of the plant. Having thus fixed themselves upon the stalk, they become stationary, and never move from the place till their transformations are completed. They do not eat the stalk, neither do they penetrate within it, as some persons have supposed, but they lie lengthwise upon its surface, covered by the lower part of the leaves, and are nourished wholly by the sap, which they appear to take by suction. They soon lose their reddish colour, turn pale, and will be found to be clouded with whitish spots; and through their transparent skins a greenish stripe may be seen in the middle of their bodies. As they increase in size, and grow plump and firm, they become imbedded in the side of the stem, by the pressure of their bodies upon the growing plant. One maggot thus placed seldom destroys a plant; but two or three are fixed in this manner around the stem, they weaken and impoverish the plant, and cause it to fall down, or to wither and die. They usually come to their full size in five or six weeks, and then measure about three twentieths of an inch in length. Their skin now gradually hardens, becomes brownish, and soon changes to a bright chestnut colour.