

When on the roots the lice subsists also by suction, and their punctures result in abnormal swellings on the young rootlets, as shown at *a* in figure 16. These eventually decay, and this decay is not confined to the swollen portions, but involves the adjacent tissue, and thus the insects are induced to betake themselves to fresh portions of the living roots, until at last the larger ones become involved, and they too laterally waste away.

In figure 16 we have the root-inhabiting type, *Radicolica*, illustrated; *a*, roots of Clinton vine, showing swellings; *b*, young louse as it appears when hibernating; *c*, *d*, antenna and leg of same; *e*, *f*, *g*, represent the more mature lice. It is also further illustrated in fig. 17, where *a* shows a healthy root, *b* one on which the lice are working, *c* root which is decaying and has been deserted by them; *d d d* indicates how the lice are found on the larger roots. *e*, female pupa seen from above, *f* the same from below; *g*, winged female, dorsal view; *h*, the same, ventral view; *i*, the antenna of the winged insect; *j*, wingless female laying eggs on the roots, while *k* indicates how the punctures of the lice cause the larger roots to rot. Most of these figures are highly magnified; the short lines or dots at the side showing the natural size.

During the first year of the insect's presence the outward manifestations of the disease are very slight, although the fibrous roots may at this time be covered with the little swellings; but if the attack is severe, the second year the leaves assume a sickly yellowish cast, and the usual vigorous yearly growth of cane is much reduced. Eventually the vine usually dies, but before this takes place, the lice having little or no healthy tissue to work on, leave the dying vine and seek for food elsewhere, either wandering underground among the interlacing roots of adjacent vines, or crawling over the surface of the ground in search of more congenial quarters. During the winter many of them remain torpid, and at that season assume a dull brownish color, so like that of the roots to which they are attached, that they are difficult to discover. They have then the appearance shown at *b* in figure 16. With the renewal of growth in the spring, the young lice cast their coats, rapidly increase in size, and appear as shown at *c*, *f*, *g*, in the figure; soon they begin to deposit eggs, these eggs hatch, and the young become also egg-laying mothers like the first, and like them also remain wingless. After several generations of these egg-bearing lice have been produced, a number of individuals about the middle of summer acquire wings. These also are all females, and they issue from the ground, and rising in the air, fly or are carried with the wind to neighboring vineyards, where they deposit eggs on the underside of the leaves among their downy hairs, beneath the loosened bark of the branches and trunk, or in crevices of the ground about the base of the vine. Occasionally individual root lice abandon their underground habits and form galls on the leaves.

The complete life history of this insect is extremely interesting and curious, and those desirous of further information as to the different modifications of form assumed by the insect in the course of its development, will find them given with much minuteness of detail in the 5th, 6th, 7th and 8th Reports on the Insects of Missouri, by C. V. Riley.

Remedies: This is an extremely difficult insect to subdue, and various means for the purpose have been suggested, none of which appear to be entirely satisfactory. Flooding the vineyards where practicable seems to be more successful than any other measure, but the submergence must be total and prolonged to the extent of from twenty-five to thirty days; it should be undertaken in September or October, when it is said that the root lice will be drowned, and the vines come out uninjured.

Bisulphide of carbon is claimed by some to be an efficient remedy: it is introduced into the soil by means of an augur with a hollow shank, into which this liquid is poured; several holes are made about each vine, and two or three ounces of the liquid poured into each hole. Being extremely offensive in odor and very volatile, its vapor permeates the soil in every direction, and is said to kill the lice without injuring the vines. This substance should be handled with caution, as its vapor is very inflammable and explosive. Carbolic acid mixed with water, in the proportion of one part of acid to fifty or one hundred parts of water, has also been used with advantage, poured into two or three holes made around the base of each vine with an iron bar to the depth of a foot or more. Soot is also recommended, to be strewed around the vines.

It is stated that the insect is less injurious to vines grown on sandy soil; also to those grown on lands impregnated with salt.

Since large numbers of these insects, both winged and wingless, are known to crawl over the surface of the ground in August and September, it has been suggested to sprinkle the ground about the vines at this period with quicklime, ashes, sulphur, salt or other substances destructive to insect life. The application of fertilizers rich in potash and ammonia have been found useful, such as ashes mixed with stable manure or sal-ammoniac.

A simple remedy for the gall-inhabiting type is to pluck the leaves as soon as they show signs of the galls, and destroy them.

Several species of predaceous insects prey on this louse. A black species of Thrips with white fringed wings deposits its eggs within the gall, which, when hatched, produce larva of a blood red color, which play sad havoc among the lice. The larva of a Syrphus fly, *Pipiza radicum*, which feeds on the root louse of the apple, see figure, 18, has also been found attacking the Phylloxera. Another useful friend is a small mite, *Tyroglyphus phylloxera*, P. & R., see fig. 19, which attacks and destroys the lice, and associated with this is sometimes found another species, *Hoplophora areolata* Riley, of a very curious form, reminding one of a mussel. The lice are also preyed on by several other species of the lady-bird family, and by the larva of lace-wing flies.

To guard against its introduction into new vineyards, the roots of young vines should be carefully examined before planting, and if knots and lice are found upon them, these latter may be destroyed by immersing the roots in hot soap suds or tobacco water.

Our native American vines are found to withstand the attacks of this insect much better than do those of European origin, hence by grafting the more susceptible varieties on these harder sorts, the ill effects produced by the lice may in some measure be counteracted. The roots recommended to use as stocks are those of Concord, Clinton, Heribmont, Cunningham, Norton's Virginia, Reutz, Cythiana, and Taylor. The Clinton, one of the varieties recommended, is particularly liable to the attacks of the gall-producing type of Phylloxera, but the lice are seldom found to any great extent on its roots, and the vine is so vigorous a grower that a slight attack would not produce any perceptible effects.—*Canadian Entomologist*.

THE HERRING KING.

The attention of scientists has frequently been called to the band fishes (*Tanioides*), more on account of their odd form than for their value as a food fish. Their body is of an extraordinary length, and is flat like a band of ribbon, and is covered throughout with small, beautiful, bright and shining scales. The dorsal fin extends over the entire back, and the ventral fin is missing altogether, or consists of a few long thin or fragile bone spurs, which are in the front part of the body near the pectoral fins.

Among the band fishes the herring king (*Regalecus ganslii*), which is found in the northern seas, always creates more or less of a sensation every time one is caught, and that is seldom and far between. As this fish lives in the greatest depths of the ocean it very rarely occurs that one is washed ashore. It was first discovered on the Norwegian coast in the neighborhood of Bergen, in 1776, and as the herring were passing along the coast at the time, the new fish was named the Herring King. Later this fish was observed on the Scandinavian and Scotch coast, and lately a specimen was caught at Stavanger, and was preserved in an almost perfect condition. The most striking feature is the exceedingly great length, as most of the specimens caught measured from 9 to 18 feet in length. The head is relatively very small, and provided with minute teeth. The bright, silvery, ribbon-shaped body is provided with dark spots and stripes, and the dorsal fin is of a mild pink color. The first spines or ossicles are of an uncommon length, and form a fan-shaped and exceedingly fragile head ornament, which was not found in a perfect condition in any of the specimens.

THE SALTNESS OF THE SEA.

During a recent voyage to Campbell Island, in the South Pacific, M. Bouquet de la Grye, took occasion to make careful observations on the saltiness of the sea. Referring to his paper in the *Annales de Chimie et de Physique*, for details of method, we propose to give here his principal results.

In the Mediterranean, an inclosed sea, with strong evaporation, the saltiness reaches as high as 22 grammes of chloride per litre of water. In the port of Marseilles the water of the