

Parasitic Plants—The Farmer's Microscopic Foes.

(Continued from August issue.)
POWDERY MILDEW OF THE GRAPE.

Uncinula spiralis.

This fungus affecting the grape has some characters not unlike those referred to in the plum knot. It attacks the foliage, the young shoots and also the young berries and seems to flourish in a dry atmosphere, and hence differs much in this respect from the downy mildew of the grape, referred to in a previous article. It appears in June and grows on the outside of the portion of the plant on which it is found and does not penetrate the tissues as other fungi which we have considered. However, it sends down into the surface cells root-like structures (*haustoria*) which nourish it at the expense of the plant upon which it grows. The parts affected present dull, grayish white patches which are never bright as in "downy mildew." Sometimes these appear as blotches of white-wash. At first on the ends of innumerable thread-like structures spores (*conidia*) are borne, these dropping off and finding suitable conditions, become the centres of further development.

When the vegetative part of the fungus (*mycelium*) has fully developed, receptacles (*perithecia*) are formed, and in these flask-like bodies (*asci*) form containing *ascospores*, which serve to carry the trouble into another season. They usually form about September or October. So here we have summer spores (*conidiospores*) and winter spores (*ascospores*), the former for rapid growth of the fungus, the latter for the perpetuation of it from year to year.

REMEDIES—1. Dry sulphur applied two or three times, once when the shoots begin to appear, again when in blossom, and shortly before the grapes begin to turn. Apply in warm and bright weather after the dew is off.

2. Boil three pounds each of flours of sulphur and lime in six gallons of water until reduced to two gallons. When settled pour off the clear liquid. One pint of this in 12 gallons of water gives good results when sprayed upon affected parts.

This destructive fungus is also closely related to the preceding. It usually appears first upon the young leaves, presenting a cobweb appearance. It soon becomes white and powdery from the development of spores (*conidia*).

Soon after this thin patches form on the berries and later on they become covered with brown patches of the growing fungus. When the white and powdery appearance is present spores are being produced as seen represented in fig. 1, which may be termed the summer spores (*conidia*). These spores as they form fall from the tips of the threads which are present at this stage of the fungus. They germinate quickly when they reach a moist place, soon produce new horizontal threads from which arise vertical branches with their spores as seen in fig. 1.

Later on, sometimes in June, the winter spores (*ascospores*) are produced. During this stage receptacles (*perithecia*) are formed of a chestnut color; the older portions of mildew lose their whitish appearance and become of a dirty brown color.

In these receptacles only one *ascus* is developed, but in this eight spores are formed. The appearance of a receptacle, or *perithecium* and the *ascus* it contains, is seen in fig. 2.

There is a third form of spore produced sometimes. These are born in pear-shape bodies (*pycnidia*) and may be found along with the young *perithecia*. See fig. 3.

It seems that our climate is favorable for mildew, especially upon the foreign varieties, but as the trouble is confined to the surface it can be readily reached by fungicides.

It is evident that the best time to apply a remedy is while the spores are least protected;

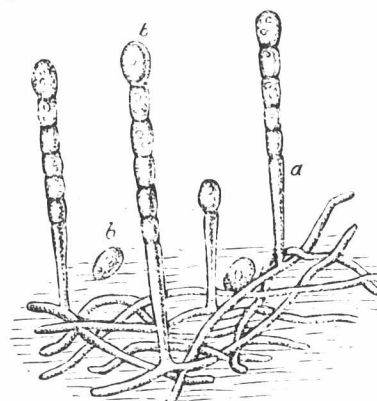


FIG. 1.

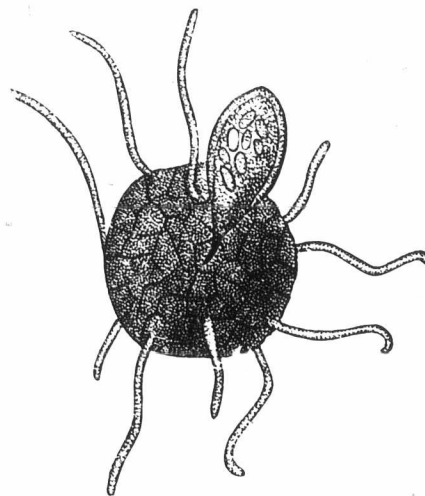


FIG. 2.
POWDERY MILDEW OF GOOSEBERRY.
Sphaerotheca mors-suae.

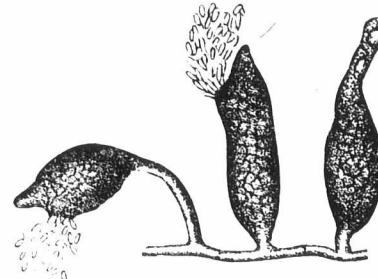


FIG. 3.

the conidial spores, just before they begin to ripen, and for the *ascospores*, before they are surrounded by a thickened wall. A good time, generally speaking, is while the mildew is beginning to establish itself upon the host.

REMEDIES—1. Sulphur thrown upon the bushes as soon as the first leaves are fully formed; repeat the process every ten days during the most rapid growth of the canes, that is till the early development of the fruit.

2. Remedy 2 of the powdery mildew of grapes.

3. Some have obtained good results from using fresh-mown hay, soaked in brine 12 hours, as a mulch, covering the entire surface of the soil about the plant. Watering the plants with strong soap-suds has a good effect. As long as you can keep plants growing vigorously there is but little danger from mildew.

4. Spray at intervals during the season with potassium sulphide, $\frac{1}{2}$ oz. to gallon water.

Tree-Planting and Tree-Growing at the Agricultural College.

BY JAMES MILLS, AGRICULTURAL COLLEGE, GUELPH.

Thinking that a few lines on our experience in the planting and growing of trees might be of interest to your readers I beg to submit the following notes:—

BLACK WALNUTS.

In 1881 we planted with black walnuts, from 12 to 15 inches high, a piece of clay loam, a little less than half an acre, on the side of a slope exposed to the west and north-west winds. The plants were obtained from seed which we had sown two years before and were set out with a view to form a clump of valuable shade trees. They were set in rows six feet apart and the same distance from one another in the rows. The soil between the rows has been ploughed lightly once a year and cultivated twice, with a little hoeing, to kill weeds and keep the ground open.

Regarding this plantation I beg now to report that the trees have all grown well without damage from frost or any other cause. At the present time they look quite healthy and are likely to do well in future, notwithstanding the severity of our Guelph climate. I have just measured a number of them and find that in nine years they have attained a growth of from 12 to 20 feet high, being $3\frac{1}{2}$ to 5 inches in diameter near the root, and $2\frac{1}{2}$ to $3\frac{1}{2}$ inches in diameter four feet above the ground. About half of them are of the larger size.

I may add that in the cultivation of the walnut and other trees we have proved beyond doubt that, when the soil around trees is kept clean and loose by stirring occasionally in dry weather, the trees grow much more rapidly than when the ground about them becomes hard or grass is allowed to grow about them.

EUROPEAN LARCH.

In the same year, 1881, we planted also another plot of ground, about a quarter of an acre, with European Larch, of the same size as the walnuts, namely, 12 to 15 inches high. We raised the plants from seed and set them in rows five feet apart and the same distance from one another in the rows. Our object was twofold: (1) To conceal a gravel pit from view, and (2) to test the European Larch in this locality and climate.

For the first five years after planting the ground was cultivated more or less with the plough, sculler and hoe. Since that time the space has been completely occupied, so that we have not had room for either ploughing or hoeing among the trees.

At the present time this plantation presents a beautiful appearance, not only concealing the unsightly gravel pit as we desired, but adding an element of beauty and interest to the landscape. The trees are from 12 to 24 feet high; growing nicely, and looking very thrifty. They vary in diameter from 3 to $5\frac{1}{2}$ inches near the root, and from $2\frac{1}{2}$ to $4\frac{1}{2}$ inches five feet above the ground.

For the information of those who are not familiar with the European Larch I may say that it is of the same genus as the Canadian tamarack, which is known as the American Larch (*Larix Americana*). The European Larch resembles the tamarack, but is a different species and is much more valuable. The timber is difficult to split, is very durable, and in value is equal to Douglas Pine.