

is known in the order Perisporiaceæ, we may confidently assume that they result, later in the season, from the union of the contents of two cells, or hyphæ, *i. e.*, they are of sexual origin.

We thus have, as in the *Uncinula*, both summer and winter spores. The summer spores develop outside the leaf, and germinate rapidly as soon as moistened by rain or dew. Consequently, during a wet summer, the spread of the fungus is extraordinarily rapid, so that within a few days a large vineyard becomes infested. The winter spores are found in the interior of the dry leaves, and hibernate within those on the ground. In summer they again get on to the young leaves by the agency of animals, wind, and rain.

Sulphur, as a means of checking or remedying this particular mildew, has proved a failure, and, indeed, no satisfactory remedy has, until recently, been found, though prophylactic means, such as those recommended by Mr. Wm. Saunders, namely, the sheltering of the vines by a board covering over the trellis, have been more or less successful.

The fact that no satisfactory remedy existed until lately, was well illustrated by the discussion which followed the reading of a paper by Mr. F. S. Earle, at the meeting of the American Horticultural Society, at New Orleans, last February, on "Fungoid Diseases of the Strawberry." * The consensus of opinion was that we have no remedy for most of the fungus diseases of plants. That this was, unfortunately, a true state of the case, practical cultivators will admit; for though intelligent treatment will check the growth of the black knot, and the proper use of lime and sulphur will check *Erysiphe* and *Uncinula*, these are about the only fungus diseases which we can control with satisfaction and certainty. Prof. G. C. Caldwell is reported to have stated about a year ago, at a meeting of the New York Horticultural Society, that mildew could be prevented by soaking the stakes in the vineyard in a solution of blue vitrol; but as that report does not specify which mildew was intended, I know not how authoritative it is.

During my visit to South France, in the summer of 1884, I was struck with the prevalence of this Downy Mildew in most of the vineyards, and the French grape growers around Montpellier felt far more anxiety as to the consequence of this *Peronospora* than they did as to the work of the Grape-vine *Phylloxera*. They feel now, that with the aid of our American stocks, they can control and defy this underground pest; but the *Peronospora*, which was a few years ago unknown to them, but which has been introduced with the American vines, has so far entirely baffled them, as, I believe, it has baffled our own grape growers.

In an address which I had the honor to deliver before the Central Society of Agriculture of the Department of Hérault, in June, 1884, and which treated principally of insecticides and insecticide appliances, I took occasion, in view of the interest then felt in this mildew, to recommend the use of the following as a promising fungicide: The ordinary milk-kerosene emulsion, prepared after the formula given in my late official reports as United States Entomologist, with from two to five per cent. of carbolic acid, and the same percentage of glycerine, and then diluted in 20 to 50 parts of water to one of the emulsion, and sprayed on to the under surface of the leaves by means of a cyclone nozzle of small aperture, so as to render the spray as fine as possible. The suggestion of the carbolic acid was due to the results obtained by Prof. Gustav Foëx, Director of the Ecole Nationale d'Agriculture, at that place.

It was very gratifying to find this recommendation at once acted upon, and up to the time when I left Montpellier, with satisfactory results. Reports of further trials showed also, that this mixture so sprayed at once arrests the spread of the mildew. I was well aware of the difficulty of dealing satisfactorily with a fungus which may, in a single night, without any warning, manifest itself all over a vineyard; but it is a great point gained to know how to check it, even if the knowledge may at times be of little practical avail in large vineyards. But much good, nevertheless, resulted, and "*Le Procédé Riley*" was much written about in *La Vigne Américaine*, and other viticultural journals a year ago. However, the experience of the past year in France has furnished a remedy which, from all accounts, is in every way satisfactory, because it not only destroys direct, but acts as a prophylactic.

* Many writers on mycological subjects misuse this term "fungoid" (which means something not a fungus, but fungus-like), in speaking of true fungi or of a fungus disease.