

EFFECT OF SPRAYING BORDEAUX MIXTURE ON FOLIAGE.

somewhat unsatisfactory; yet there is sufficient data to indicate a gain from spraying and an additional increase of thickness where an excess of lime was used.

These experiments conducted in the greenhouses, where most of the conditions were under control, give perhaps more valuable results than if they had been carried on in the open air, as rain and other atmospheric disturbances which would affect the plants, were entirely avoided. A steady temperature, a regular supply of water, without washing the leaves an even spraying of the leaves with an atomizer, all went to secure uniformity of surrounding influences. On the other hand, the dews, which are deposited on outdoor plants, might have the effect of bringing into solution some of the compounds of the dried residue of the mixture adhering to the leaves.

The results, on the whole, confirm Lodemann's statements, that the increased thickness of the leaf resulted from spraying with Bordeaux mixture, and that the thickness was probably due to an increase in the length of the palisade cells.

Lodemann's measurements, however, are manifestly wrong, as the plum leaves examined by him are stated to be "from 10.4 to 12.9 micromillimetres in width," or about the same width as length of a good-sized microbe. Leaves would be very flimsy structures if this were the case.

With regard to the increased greenness of the foliage, it is well-known that calcium is especially abundant in the leaves of green plants, and it is probable that some of the calcium of the lime in the Bordeaux mixture is absorbed by

the leaves. Boussingault found that if calcium sulphate be placed on the leaves of a plant it will disappear in a few hours, and sooner on the lower than on the upper surface. Further, the effect of depriving plants of calcium as an ingredient of their food supply is well shown in the text books on Physiological Botany. Hence it is not improbable that the increased greenness in the leaves sprayed with an excess of lime, is caused by the leaves absorbing an excess of calcium.

CONCLUSIONS.

Bordeaux mixture has an invigorating effect on leaves, as evidenced by the increased thickness and the marked development of the chlorophyll granules in the cells. This increased vigor is of much importance, as a strong healthy plant is always in a much better condition to withstand the attacks of fungus diseases than a weakly one.

Instances of losses from improperly made Bordeaux mixture indicate that a lack of sufficient lime may result in injury. Crumpling of the leaf resulted in Nos. two and four from lack of sufficient lime.

An excess of lime gave better results than smaller amounts. The leaves seem able to take up some of the lime; and additional lime give the foliage increased vigor. Hence, it might be advisable to use larger amounts of lime than are generally used in the mixture. The increased thickness of the leaf is probably due to the increased development of the palisade layers of cells.

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