PROTECTING CABBAGE PLANT BEDS FROM MAGGOTS.

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PUBLISHED BY THE STATION.
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In most sections where cabbages have been long and generally raised, the growers have a hard and constant fight against enemies. From seed bed to seed harvest of the second season, each stage of cabbage growth is in danger of ruin from some pest; and many of these pests have proven as hard to conquer as any on the farmer's list of foes. Flea-beetles, maggots, aphids, loopers and worms among the insects, club root, black rot and soft rot among diseases, have all proved serious and perplexing pests.

But if vigorous, healthy plants can be secured and transplanted without check, a great advantage has been gained in the struggle with foes of later stages of growth. Unfortunately, it has been almost impossible, in many sections, to secure such plants from a reasonable amount of seed and on a moderate area of seed bed. Flea-beetles attack the seedlings as soon as they appear above ground and maggot flies lay their eggs immediately thereafter, from which the destructive larvae promptly emerge to attack the plants at the root. Many growers in the cabbage sections of New York have been unable, in consequence of these attacks on the young plants, to raise more than a small fraction of the seedlings they need; and millions of sets have been brought in from Maryland and New Jersey. This importation of plants is both costly and dangerous. It should cost only ten or fifteen cents a thousand to raise the plants, while the imported ones cost from seventy-five cents to a dollar and a quarter a thousand. There is great liability, also, of introducing club root into uninfected fields by using plants from an unknown source.

*This is a brief review of Bulletin No. 301 of this Station, on Screening for Protection of Cabbage Seed-Beds, by W. J. Schoene. Any one interested in the detailed account of the investigations will be furnished, on application, with a copy of the complete bulletin. The names of those who so request will be placed on the mailing list to receive future bulletins of the Station, popular or complete as desired. Bulletins are issued at irregular intervals, as investigations are completed, not monthly.
Early control methods have been made to control the flea-beetles, which are yearly becoming more troublesome; and attempts to drive away the maggot flies or to kill the maggots by the use of kerosene emulsion or carbolic acid applied about the roots of the plants have not been generally effective. Some growers have made effort to control both classes of insects by covering the seed beds; but these attempts have not always been economical or satisfactorily successful. The method appears most promising of any, however, and in a test made by the Station in 1907 its results were highly gratifying. Too much dependence can not be placed upon any test of a single year, and many details need further study; but the results justify growers in making tests on a small scale.

The test above referred to also included a study of the time of planting cabbage seed, with reference to its effect on insect injury. The experiments were made in cooperation with Mr. Levi Page of Seneca Castle, an experienced cabbage grower in one of the leading centers of the industry in the State.

A seed bed on rich, black loam soil was carefully fitted to get rid of weeds and fertilized liberally, just before seeding, with a good, complete chemical fertilizer. Seed was sown at four different dates,—April 29, May 13, May 17 and May 28. This was done to get rid, if possible, of some of the insect trouble by growing plants when broods were not present in force; but little or no benefit was gained in this way.

Cold weather retarded germination of the early sown rows, flea-beetles attacked the plants as soon as they emerged from the ground and maggots completed the destruction begun by the flea-beetles. Only a few dozen plants were secured instead of 70,000 which the seed should have produced. The second seeding was intended to supply plants enough to set forty acres; but only enough escaped injury to set a little over four acres. Flea-beetle injury was decidedly less at this sowing, but general infestation with maggots ruined the bed. Plants from the two later seedings were also so checked by maggots that none of them reached suitable size for setting in time to be of use.

Of the second seeding, made May 13, one plat screened consisted of rows only 6 inches apart instead of a foot apart as on the other places. A group of 21 of these rows, 150 feet long, was covered
with a screen of cheesecloth as soon as the plants began to appear. Foot boards were set on edge about this plat, held in position by stakes and banked with earth wherever hollows or uneven ground was liable to allow insects to enter. A cover of cheesecloth, made by sewing together four yard-wide strips, was attached to these boards. Laths and small nails were used to secure the cloth and it was supported by a wire stretched on top of a row of stakes through the middle of the plat.

The 21 rows were thoroughly protected from insects. Flea-beetle infestation was slight, possibly due in considerable measure to natural decline of the brood at this time. There was no injury from maggots.

The growth of the plants was highly satisfactory, as they did better than uninjured check plants in the open. One month after covering, the protected plants were fully a week ahead of the checks and were good, stocky plants 6 or 7 inches high. (See title page.) The cover was removed at this time and the plants allowed to harden for a week before transplanting. They were then set by machine and made fully as good recovery from the removal as plants grown in the open.

The seed had been sown too thick in the row, so that there were many small plants; but 50,000 good sets, by actual count, were taken from the bed.

Cost. The shape of the bed,—narrow oblong rather than square,—made the expense for the foot boards, which was the largest item, nearly twice as great as necessary; but, notwithstanding this, the total cost for materials was only $20.21, or 40 cents a thousand plants. As the cheesecloth can be used for at least three years and the boards for ten the expenditure would be only about eight cents a thousand plants where cabbage is a regular crop.

On a bed 40 by 45 feet, which gives the same area, this cost would be reduced to five cents a thousand.

Suggestions. The Station would, accordingly, recommend a trial of this method on a small scale. Prepare bed thoroughly to free from weeds, fertilize well, sow seed rather thick, in rows 6 inches apart, bank up boards to keep out insects as completely as possible, and keep cover perfect. Remove screen a week or ten days before transplanting time, in order to harden plants; but begin planting as soon as eggs of maggot flies are noticed on or about the plants.