

larger and less branched. This may perhaps be due to more favorable conditions for growth. Again, where the disease was taken from an affected tomato and planted in a healthy fruit, the decay was more rapid than when inoculated from leaves. These observations throw some doubt upon the identity of the leaf fungus as that causing the rot in the fruit.

From a previously limited study of the group of fungi to which the *Cladosporium* belongs, I must admit that the conclusions arrived at by the experiments run contrary to my expectations. Further study needs to be given to this subject before remedies may be announced with certainty. If it is established that the rot first appears upon the foliage, some fungicide may be applied to the leaves with the desired results. It would certainly do no harm to use flowers of sulphur in much the same manner that it is applied to grape-vines, roses, etc., as an effective remedy for the mildew.

THE VITALITY OF SEEDS.

BY W. J. BEAL.

IN the fall of 1879, five years ago, I began some experiments, hoping to add something to the information which we now possess on this subject. I selected fifty seeds of each of twenty-three different kinds of seeds of common plants. I prepared twenty lots of these seeds all alike. Each lot, or "set" of seeds, was well mixed in moderately moist sand, just as it was taken, from three feet below the surface, where the land had never been plowed. The seeds of each set were well mixed with the sand and placed in a pint bottle, the bottle being completely filled and left uncorked and placed with the mouth slanting downward. The bottles were buried about twenty inches deep below the surface of the ground on a sandy knoll. The acorns were not placed in the bottles, but were left near them.

About the 25th of July, this year, I took up one of these bottles and began testing the seeds. I might say here, that two years ago I dug down to the acorns and found them all decayed. The other seeds at that time were not disturbed. I placed the sand in some shallow porous saucers, which were set in a very little water near the south window of our botanical laboratory. I regret to say, that after trying them a little over a month, to August 27th, there were still seeds just starting to grow; so my report is not complete.

During a considerable part of August the weather was unusually cool, and most likely more of the seeds would have started had the weather been warmer, or had artificial heat been applied. I now give the names of each species, opposite which are the number which germinated, and some comments.

- Amaranthus retroflexus*, L. Pig-weed. 19 germinated.
- Ambrosia artemisiæfolia*, L. Rag-weed. 0, certainly. Several empty rotten cases or shells were seen.
- Brassica nigra*, Koch. Black Mustard. 0.
- Bromus secalinus*, L. Chess, Cheat. 0, certainly. Several old kernels, with paleæ adherent, were found, but all were decayed and empty. In at least three cases one or more dead slender roots were found, showing that they had sprouted and died while below ground.
- Capsella Bursa-pastoris*, Moench. Shepherd's Purse. 43 germinated. Some taken out the day these notes were written up.
- Erechthites hieracifolia*, Rof. Fire-weed. 0, certainly.
- Euphorbia maculata*, L. Spotted spurge. 0, certainly. Quite a number of seeds were found, and they seemed plump and sound, but none sprouted.
- Lepidium Virginicum*, L. Wild Peppergrass. 25 germinated. One taken out the day of writing this.
- Lychnis Githago*, Lam. Common Cockle. 0, germinated certainly. Many old coverings were seen, but all were empty.
- Maruta Cotula*, D. C. May-weed. 13 germinated certainly. Several empty coverings were found. Two taken out the day of writing this note.
- Malva rotundifolia*. Common mallow. 1 (?) germinated. Many empty seed-coats were seen.
- Oenothera biennis*, L. Evening Primrose. 38 germinated. Several taken out the day this was written.
- Plantago major*, L. Common Plantain. 0, certainly. Some empty seed-coats seen.
- Polygonum Hydropiper*, L. Smart-weed. 3, certainly. Many empty seed-coats were seen.
- Portulaca oleracea*, L. Purslane. 19 germinated, when the weather was hottest.
- Quercus rubra*, L. Red Oak. 0, certainly. All dead after two years.
- Rumex Crispus*, L. Narrow or Curled Dock. 44 germinated. Some taken the day of this writing.
- Setaria glaura*, Beauv. Fox-tail, Pigeon grass. 3 certainly, and others seen apparently sound. This grass needs much heat.

Stellaria media, Smith. Chick-weed. 34, certainly.

Thuja occidentalis, L. Arbor Vitæ. 0, certainly. Some empty seed-coats seen.

Trifolium repens, L. White Clover. 0, certainly. This is quite surprising. [Since reading this paper 5 seeds germinated.]

Verbascum Thapsus, L. Common Mulleins. 17 germinated. Some taken out the day of this writing. Twelve seeds germinated, about which there was some uncertainty.

A word to those who contemplate any similar experiment. Do not mix seeds together, especially when they are small and resemble each other somewhat closely. If placed in bottles, take pains to press or pack the soil in quite firmly. Test similar seeds at time of starting experiment, to know about vitality of those tested.