

# Control of *Penicillium* decay of garlic

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*All fungicides tested in two years of trials significantly increased garlic stands and yields.*

**C**love rot of garlic, incited by *Penicillium corymbiferum* Westling, is frequently a cause of poor stand establishment in the central coast area, where plant populations have been reduced as much as 50 percent. The disease also is one of the primary causes of decay in stored garlic.

Symptoms in the field include a relatively slow decay of the clove after planting which can result either in the complete loss of the clove or the emergence of weak, yellowed plants which may not survive. The decay can spread into the stem plate of young plants affecting the development of new roots. *P. corymbiferum* frequently sporulates on the surface of decaying cloves producing the typical bluish-green masses of spores. Cloves infected with *Penicillium* are soon invaded by secondary organisms such as bulb mites, nematodes, bacteria, maggots, and fungi, which tend to mask the primary cause of the decay.

The primary source of inoculum is diseased bulbs used for propagation. As these bulbs are cracked to separate the cloves, *Penicillium* spores are spread to healthy cloves. Thus, relatively minor amounts of disease can result in a high percentage of contaminated cloves following cracking.

Other than planting under optimal conditions for rapid emergence, no control recommendations have been developed. There is some indication that the hot water-formaldehyde treatment used for control of stem and bulb nematode will

reduce disease incidence to some extent.

## Trials

Trials were conducted in 1976 and 1977 to test various fungicides for control of *Penicillium* rot. The following method was used:

Shortly after cracking, cloves were soaked in water suspensions of various fungicides for five minutes. The garlic was then drained and dried. One to two days later treated cloves were planted and covered with 1 to 2 inches of soil. Three hundred cloves were planted in each plot and each treatment was replicated four times. Several stand counts were made as plants emerged. At maturity each plot was dug and the bulbs counted and weighed.

Because Trial I was in a field severely infested with white rot fungus (*Sclerotium cepivorum*), which destroyed the field before harvest, only plant counts were available from the trial.

Significant increases in stand and yield were obtained from cloves treated with all of the fungicides used alone or in combination. Greatest increases were obtained when benomyl was used. The addition of either captan or thiram to benomyl did not result in any significant difference.

Benomyl (Benlate), captan (Orthocide), and thiram (Thylate) are not registered for use on garlic. Anilazene (Dyrene), dichloram (Botran) and potassium sorbate are registered for use on garlic, but not for use in the specific manner employed in these tests.

TABLE 1. Stand Counts — Trial I

Treatment	Lb/100 gal H <sub>2</sub> O	Av. # plants emerged
1. benomyl	0.5	285
2. benomyl + captan	0.5 2.0	272
3. benomyl	1.0	286
4. benomyl + captan	1.0 2.0	280
5. benomyl	2.0	295
6. benomyl + captan	2.0 2.0	288
7. captan	2.0	248
8. Check	—	152
	LSD 05	20
	01	27

TABLE 2. Stand Counts and Yields—Trial II

Treatment	Lb/100 gal H <sub>2</sub> O	Av. # plants emerged*	Yield lb/A
1. benomyl	0.5	309	22236
2. benomyl + thiram	0.5 2.6	306	22890
3. benomyl	1.0	329	21582
4. benomyl + thiram	1.0 2.6	311	21582
5. benomyl	2.0	335	22236
6. benomyl + thiram	2.0 2.6	319	22236
7. thiram	2.6	227	18966
8. Check	—	123	12426
	LSD 05	29	1308
	01	40	1962

\*Occasional multiple cloves were planted which produced more than one plant.

TABLE 3. Stand Counts and Yields—Trial III

Treatment	Lb/100 gal H <sub>2</sub> O	Av. # plants emerged	Yield lb/A
1. benomyl	0.5	288	16024
2. benomyl + captan	0.5 2.0	292	15761
3. benomyl	1.0	284	15892
4. benomyl + captan	1.0 2.0	292	15761
5. benomyl	2.0	285	15631
6. benomyl + captan	2.0	290	16023
7. captan	2.0	245	14061
8. Check	—	204	12360
	LSD 05	20	646
	01	27	879

TABLE 4. Stand Counts and Yields—Trial IV

Treatment	Lb/100 gal H <sub>2</sub> O	Av. # plants emerged	Yield lb/A
1. dichloram	2.25	253	14633
2. anilazene	1.0	219	12835
3. potassium sorbate	4	234	13652
4. Check	—	185	11854
	LSD 05	20	1053
	01	28	1513

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