SYSTEMIC INSECTICIDE INJURY ON POTATO FOLIAGE[1]

Wm. G. Hoyman[2]

During each of the past 5 years, 10 per cent granular disulfoton (Di-syston) (O, O-diethyl S-2-(ethylthio)ethyl phosphorodithioate) has been banded at planting on many thousand potato seedlings, selections and varieties at the rate of 3 pounds active ingredient per acre. The banding was done by mounting 2 applicators on the planter and inserting the 2 delivery tubes from each applicator into 2 outlets used for banding fertilizer to each row in bands 6.5 inches apart and 2 inches below the whole tubers or cut seed. The same rate of active ingredient was side-dressed on Russet Burbank when the plants were approximately 10 inches tall. Side-dressing was done by attaching each of 4 delivery tubes behind an applicator shovel and the 2 shovels per row spaced the granules or liquids in bands 14 inches apart and 3 inches below the seed level. Either banding at planting or side-dressing has caused various phytotoxic effects on plants.

Disulfoton injury has been observed on seedlings each year as they emerged. Progenies in families showed slight to severe injury and the magnitude of injury varied among families - indicating that genotype was a factor affecting susceptibility. Slight symptoms consisted of necrosis confined to the margins of lower leaves. Where injury was more severe, marginal necrosis was accompanied by necrotic spots on leaves. The appearance and distribution of necrotic areas was somewhat similar to early-blight lesions caused by Alternaria solani (Ell. & C. Martin) Sor. Where necrotic areas were numerous and coalesced, the leaves withered and hung from partially green or brown stems. Severely affected plants died or remained stunted.

The 1968 variety trial included 25 selections and the varieties Russet Burbank, Kennebec, Superior, Norgold Russet, Lenape and Norchip. Banding 3 pounds per acre active ingredient at planting caused severe symptoms on selections B5412-10 and J271, but no symptoms were observed on the varieties.

---

[1]Cooperative investigation of Crops Research Division, Agricultural Research Service, U. S. Department of Agriculture and the Washington State University College of Agriculture. Scientific Paper No. 3212, Pullman.

[2]Research Plant Pathologist, Crops Research Division, Agricultural Research Service, U. S. Department of Agriculture, Irrigated Agriculture Research and Extension Center, Prosser, Washington 99350.

Slight injury occurred on Russet Burbank 14 days after 3 pounds per acre active ingredient were side-dressed and furrow irrigation applied the same or the following day. Slight injury also appeared on this variety 14 days after a liquid formulation of the sulfoxide (O, O-diethyl S-ethyl-2-sulfinylethyl phosphorodithioate) of disulfoton was side-dressed at the rate of 3 pounds per acre active ingredient. Soil type was Warden fine sandy loam. Research (1) has shown that insecticidal absorption was more rapid and greater from sandy soil than from silt or clay loam, or peat.

Temik (2-methyl-2-(methylthio) propionaldehyde O-(methylcarbamoyl) oxime) has been banded and side-dressed on Russet Burbank the past 4 years. No injury occurred when 3 pounds per acre active ingredient were banded at planting, but this systemic insecticide was more phytotoxic than disulfoton when an equivalent amount of active ingredient was side-dressed and followed immediately by furrow irrigation. The symptoms were identical to those caused by disulfoton.

Literature Cited

1. Getzin, L. W. and R. K. Chapman. 1959. Effect of soils upon the uptake of systemic insecticides by plants. J. Econ. Entomol. 52:1160-1165.