

SUGAR BEET STAND REDUCTION FROM TERBUFOS INSECTICIDE AND CYCLOATE HERBICIDE

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Introduction

Sugar beet planting has evolved towards greater reliance on "planting to stand" and less reliance of planting excess seed followed by mechanical or hand thinning. Factors that can cause unwanted stand reductions need to be carefully controlled. Many factors can reduce plant stand including poor quality seed, improper planting rate or depth, lack of soil moisture, soluble salts, disease, insects, heavy soil crust, or agricultural chemical injury. Sugar beets are an important crop to Malheur County, Oregon and southern Idaho. In the spring of 1990 and 1991 sugar beet growers in eastern Oregon and southern Idaho experienced reduced crop stands as a result of suspected pesticide, chemical fertilizer, and salt injury. Pesticide injury to stand was thought to have occurred from the use of terbufos insecticide marketed as Counter 15G and cycloate herbicide marketed as Ro-Neet as well as other causes. Growers and sugar beet industry fieldmen requested information to describe how terbufos rate and placement could affect crop stand and whether terbufos interacted with cycloate to aggravate plant stand loss.

Summary

Studies were conducted to 1) describe phytotoxic damage of terbufos (Counter 15G) on sugar beet (*Beta vulgaris* L) variety HM-PM9 seedlings, 2) quantify the loss of stand with increasing terbufos dosage, and 3) examine the effects of terbufos placement, formulation and interactions with cycloate (Ro-Neet) herbicide and irrigation on sugar beet stand. In replicated greenhouse and a subsequent replicated field test on Owyhee silt loam, symptoms of terbufos damage were first apparent on cotyledons which failed to broaden, lengthen and become as prostrate as cotyledons on untreated plants. Cotyledons and the first true leaves had tip burn symptoms. In the field, seedling stand decreased progressively with terbufos rate, but terbufos placement did not affect sugar beet stand. A slow release terbufos formulation (Counter 20CR) at 2.0 kg ai/ac resulted in only 2.6 percent stand loss 20 days after planting compared with 6.8 percent stand loss with the common formulation (Counter 15G). Cycloate herbicide banded preplant at 1.5 kg ai/ac was associated with a 10.3 percent stand reduction. Terbufos at twice the labeled rate resulted in 29.6 and 13.6 percent stand loss with and without cycloate herbicide. Sprinkler irrigation further reduced stands. Adherence to terbufos labels with careful application calibration is essential to minimize stand loss.

Terbufos and cycloate remain important chemicals for sugar beet production. If sugar beets are not grown with insecticide, they are damaged by the sugar beet root maggot (*Temaops myopaeformis*), wire worm (*Limonius* spp), cut worm (*Peridroma saucia*, *Euxoa* sp), and crown borer (*Hulstia undulatea*).