

## Weed Control in Cole Crops and Onion (*Allium cepa*) Using Ammonium Nitrate<sup>1</sup>

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**Abstract.** Weed control in cole crops and onion by postemergence spraying with liquid ammonium nitrate was studied to determine its feasibility under Fraser Valley, British Columbia conditions. Ammonium nitrate solutions (7.5, 10, 15 and 20% N) were applied at 800 L ha<sup>-1</sup> on warm, sunny days. Shepherd's-purse, low cudweed, redroot pigweed and ladythumb were susceptible to this treatment; common lambsquarters, common purslane and annual bluegrass were tolerant. In order to determine the effect of weed density on weed control, several shepherd's-purse densities were established in broccoli and sprayed with ammonium nitrate solution (20% N; 800 L ha<sup>-1</sup>). Two days after treatment, weed control was 87.2% for an initial density of 500 shepherd's-purse plants m<sup>-2</sup> (1987) and 76.1% for an initial density of 988 plants m<sup>-2</sup> (1988). The seedlings that survived the treatment were sufficiently set back that they did not cause any adverse effect on crop yield. In a separate study, cabbage and onion were found to be tolerant to the ammonium nitrate treatment. Initially, cauliflower, broccoli and Brussels sprouts growth was slightly inhibited by the ammonium nitrate treatment but the plants recovered and crop yield was not affected. Nomenclature: Annual bluegrass, *Poa annua* L. #<sup>3</sup> POAAN; common chickweed, *Stellaria media* (L.) Vill. # STEME; low cudweed, *Gnaphalium uliginosum* L. # GNAUL; shepherd's-purse, *Capsella bursa-pastoris* (L.) Medik. # CAPBA; common lambsquarters, *Chenopodium album* L. # CHEAL; common groundsel, *Senecio vulgaris* L. # SENVU; common purslane, *Portulaca oleracea* L. # POROL; redroot pigweed, *Amaranthus retroflexus* L. # AMARE; ladythumb, *Polygonum persicaria* L. # POLPE; broccoli, *Brassica oleracea* L. var. *italica*; Brussels sprouts, *B. oleracea* var. *gemmifera*; cabbage, *B. oleracea* var. *capitata*; cauliflower, *B. oleracea* var. *botrytis*; onion, *Allium cepa*.

because they give poor weed control in soils with high organic matter and at low soil temperatures (2). In addition, they control groundsel, smartweeds (e.g., ladythumb and the mustard family (e.g., shepherd's-purse) (2).

Epicuticular wax on leaves of cole crops and onion is not easily foliar applied solutions. Upright orientation of leaves further contributes to their low solution retention. Stripping of epicuticular wax from cabbage leaves using the stripping method (4, 14) has been shown to increase the effectiveness of spray solutions by leaves (8). The hydrophobic nature of cole crop and onion leaves provides opportunities for the control of weeds that lack leaf epicuticular wax (8). An ammonium nitrate (20% N) spray was found to control certain weeds effectively in cole crops (3, 7). Since leaf epicuticular wax deposition is influenced by environmental conditions (3, 5, 6, 10, 11, 13, 15), the effectiveness of this control option is expected to vary with climatic conditions.

The objectives of this study were to investigate (1) the effect of ammonium nitrate on weed control in cole crops (Brussels sprouts, broccoli and cauliflower) and onion by ammonium nitrate spray, (2) the effect of shepherd's-purse density on its control by ammonium nitrate spray, and (3) the effect of ammonium nitrate on weed control in cole crops and onion growth and yield.

### MATERIALS AND METHODS

Field experiments were conducted at the University of British Columbia Plant Science Field Laboratory. Unless otherwise noted, natural weed populations were controlled by preplant treatment using the soil fumigant dazomet (1,3,5-dimethyl-2H-1,3,5-thiadiazine-2-thione) at 1.5 kg a.i. ha<sup>-1</sup>. The fumigant was incorporated by rototilling and the surface was sealed using a packer. After 7 to 3