FIELD EVALUATION OF GreenMatch EX: A NEW BROAD SPECTRUM ORGANIC HERBICIDE


ABSTRACT

GreenMatch EX is a new contact, non-selective, broad spectrum, foliar herbicide. It is exempt from EPA registration and is approved for use in organic farming. This biological product controls both annual and perennial broadleaf and grassy weeds. GreenMatch EX has been tested in California against a variety of broadleaf and grassy weed species to obtain efficacy and weed spectrum data. Studies with three dilution rates (7.5%, 10%, and 15%) and three spraying volumes (35, 60, and 100 gallons per acre) showed a significant correlation between concentration/water volume and percent weed control. The best efficacy was achieved at 10 to 15% dilution rate (v/v) employing 100 gallons of water per acre, which indicates that complete tissue coverage is required to achieve full efficacy. GreenMatch EX performance was dependent upon the age of the weeds, and the best weed control was obtained when plants were young and actively growing. GreenMatch EX at 15% was more effective than GreenMatch (d-limonene) and Matran EC (clove leaf oil) at the recommended commercial application rates of 18% and 5%, respectively.

INTRODUCTION

Interest in incorporating natural-based pesticides in “green” integrated pest management programs has increased dramatically during the past few years. Currently, biopesticides represent 2.4% of the global pesticide market, and is projected to increase to 4.2% by 2010. Weeds constitute the main problem in agricultural systems by reducing crop yields up to 12%, and various kinds of herbicides are employed worldwide to control weed pests. During 2005, the estimated global pesticide market was $33.6 billion dollars with herbicides accounting for 45.8% of this market. At present, the number of biological herbicides with potential to control weeds is limited. Cera plant oil, a by-product in the manufacture of cornstarch, is available as Bioweed™ and has efficacy as a pre-emergence herbicide. Other commercially available post-emergence herbicides include fatty acid (pelargonic acid) sold under the trade name Stryx™, essential oil (clove) sold as Matran™, and monoterpene (d-limonene) from citrus oil sold as Nature’s Avenger™ and GreenMatch™ O. The present study discusses the effectiveness of GreenMatch EX as a new non-selective herbicide with potential to control a broad spectrum of grassy and broadleaf weeds.

MATERIALS AND METHODS

Efficacy of GreenMatch EX was evaluated in three locations in California. The first trial was established in two location in Davis, CA: inside a peach orchard and in an open field. The second trial was located in Wasco, CA inside an almond orchard. A third trial was performed in Fresno, CA in a golf course. The treatments in all field experiments were arranged under a randomized complete block experimental design with 3 x 4 replications. In the trials performed in Wasco and Fresno, Matran EC and GreenMatch were used as the commercial controls at the rates specified in the label. Treatments in the Wasco and Fresno trials were applied using a hand-held CO2 sprayer, while all treatments in Davis were applied with a hand-held sprayer. Water was used as a carrier during the treatment application. When indicated, Na Film P at 0.05% was used as a surfactant.

RESULTS

GreenMatch EX showed non-selectivity in controlling weeds. Both broadleaf and grassy weeds were burned in the presence of herbicide. In the trial performed inside the peach orchard in Davis, eight weed species were commonly found during the evaluation. Excellent control was observed against spurge and thistle; good control against bindweed, clover, and crabgrass; and satisfactory control against Bermuda grass. Poor efficacy was detected in controlling horsetail and dandelion. Table 1 shows the overall control estimated during this trial. Herbicidal effect was increased in the presence of surfactant. Control was greater than 80% at 10% dilution of GreenMatch EX at 100 gps in the presence of 0.05% Na Film P. Redstem filaree, little mallow, shepherd’s purse, bermudagrass, and annual bluegrass were the most common weeds found in the almond orchard in Wasco (Table 2). Data in table 2 shows that weed control depended upon GreenMatch EX concentration and volume of water employed (Figs 1, 2). All six weeds were controlled at the 15% concentration at 100 gps. It was interesting to note that efficacy on shepherd’s purse, bermudagrass, and hairy fleabane was higher than 90% at 14% concentration in 70 gps. At those concentrations, GreenMatch EX performance was better than Matran EC applied at the recommended label rate.

Seven weed species were selected for the trial performed in the golf course in Fresno (Table 3). Smooth crabgrass was highly sensitive to GreenMatch EX followed by prickly lettuce and greater ragweed. Lower efficacy was detected against annual sowthistle, horse weed and flix flox. Interestingly, purple sandweed was not affected by GreenMatch EX, GreenMatch, and Matran EC.

CONCLUSIONS

GreenMatch EX shows good control of a wide variety of broadleaf and grassy weed.

For best efficacy, GreenMatch EX should be used at 10-15% dilution and 100 gps.

Good coverage (high gps) is important for best performance.

Surfactant improves efficacy at high application volumes.

Excellent control can be obtained for the following weed species: spurge, sowthistle, shepherd’s purse, clover, mustard, bermudagrass, hairy fleabane, annual bluegrass, smooth crabgrass.