# OHP: 2020 CA Contingent Label Weed Efficacy Report

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# **Background:**

Fuerte was released in 2019 by OHP. It contains the two active ingredients (% by weight), Flumioxazin (0.125%) and Prodiamine (0.75%) which make it a granlar formaulation primarily for woody nursery and landscape crops. The need for a PPO (Group 14) + root inhibitor (Group 3) herbicide, is a welcome addition to the ornamental market. The first label list 109 weeds sp. that Fuerte controls. The only other ornamental label that exceeds this is Gemini G at 120 weed species. Despite Fuerte's remarkable proof of efficacy demonstrated in its labelling, a trial was devised to demonstrate additional efficacy on some of the worst weeds faced by nursery and landscape managers. Of the species CA was interested in we evalauted Hoary Alyssum (*Berteroa incana*) (Fig. 1); Field Pennycress (*Thlaspi arvense*); Pineappleweed (*Matricaria matricarioides*); Broadleaf Plantain (*Plantago major*); and, Canada Thistle (*Cirsium arvense*).



**Fig. 1.** Hoary Alyssum (*Berteroa incana*) in nursery fields of Northland Farms, West Olive, MI (Photo by: H. Mathers).

# **Objective:**

To evaluate Fuerte (EPA Reg. No. 59807-20) (OHP, Inc., Bluffton, SC) for potential control or suppression of five difficult weed species (listed above). The current label states, "Apply Fuerte at 100 pounds per acre, per application... at approximately a

3-month interval during the growing season... Do not exceed, "200 pounds of Fuerte, per acre, per year." Therefore, efficacy was evaluated at 100, 150 and 200 lb/ac of Fuerte. These three treatments were compared to an industry standard Marengo<sup>®</sup> G (indaziflam) (Bayer Environmental Science, Cary, NC) at 200 lb/ac, and an untreated check (no herbicide).

## Material and Methods:

The experimental design was a randomized complete block design (RCBD) with five replications, per species, per treatment, in Nursery Supply Classic 400 (1-gallon) (7.75" dia.) containers filled with (85% pine bark and 15% Comtil) (Krutz Bros. Central Ohio, LLC, Groveport, OH) and topdressed with one TBSP of Osmocote Plus 15-9-12 (8-9 mo) before seeding. Pots were watered before seeding and after seeding on 07/14/2020. A minimum of 20 seeds were applied according to species to each container. Herbicides were applied on 07/16/20 and watered in with  $\frac{1}{2}$  in of irrigation. All seed was sourced from Mathers Environmental Science Services (MESS), LLC, Gahanna, OH collected in various locations of OH and MI in 2018-2020. The trial was conducted on a gravel pad at MESS. It was bright and sunny and 90°F at the time of initiation. Each rate of herbicide was per-measured by weight according to pot diameter or surface area, and sprinkled by hand over-the-top. Evalutions were conducted at 30 days after treatment (DAT), 60 and 90 DAT, as requested by the sponsor. Conditions were very hot and dry immediately after seeding and for the remainder of July into August. Containers were irrigated as required to keep the surface moist to promote germination. The five weed species were assigned the following order: 1) Hoary Alyssum (Berteroa incana), 2) Field Pennycress (Thlaspi arvense), 3) Pineapple-weed (Matricaria matricarioides), 4) Broadleaf Plantain (Plantago major), and 5) Canada Thistle (Cirsium arvense). The germination of Pineapple-weed and Field Pennycress was poor until temperatures decreased, i.e. August to September, 2020. Hoary Alyssum (Berteroa incana) never germinated and therefore data is not presented for this species. The Broadleaf Plantain (Plantago major) gemination was good from initiation until the trial conclusion. Unfortunately, our Canada Thistle (Cirsium arvense) was contaminated with perennial sowthistle seed, thus Canada Thistle results are not presented.

# **Results:**

**Table 1, B, C, D.** Mathers Environmental Science Services, LLC (Gahanna, OH) with five replications, per species and treatment. Three weed species, **B.** Field Pennycress (*Thlaspi arvense*), **C.** Pineapple-weed (*Matricaria matricarioides*), **D.** Broadleaf Plantain (*Plantago major*) are presented in Table 1. Efficacy ratings are explained in the footnotes below Table 1. Weed counts occurred at 30, 60 and 90 days after treatment (DAT) and an efficacy rating at 90 DAT. This study meets the objective finding a newer herbicide for difficult to control weeds.

#### B. Field Pennycress (Thlaspi arvense)

|   | Treatment | Rate lb/ac | 1 <sup>st</sup><br>Efficacy <sup>x</sup><br>30 DAT<br>(Av. Weed<br>Count) | 2 <sup>nd</sup><br>Efficacy<br>60 DAT<br>(Av. Weed<br>Count) | 3 <sup>rd</sup><br>Efficacy<br>90 DAT<br>(Av. Weed<br>Count) | 3rd<br>Efficacy<br>90 DAT<br>(Rating) |
|---|-----------|------------|---|--|--|---------------------------------------|
| 1 | Fuerte    | 100        | 0.0a <sup>≠</sup>   | 3b   | 6b   | 4.0b                                  |
| 2 | Fuerte    | 150        | 0.0a  | 3b   | 5b   | 7.0c                                  |
| 3 | Fuerte    | 200        | 0.0a  | 1a   | За   | 8.0c                                  |
| 4 | Marengo G | 200        | 0.4a  | 2ab  | 3a   | 4.0b                                  |
| 5 | Control   |            | 0.4a  | 2ab  | 2a   | 1.0a                                  |



**Fig. 2.** Field Pennycress (*Thlaspi arvense*) at 90 DAT showing treatment 1 to 5 from left to right, respectively. Treatment 1-3 are Fuerte at 100, 150 and 200 lb/ac, respectively, treatment 4 is Marengo 200 Lb/ac, and 5 is the untreated control. Photo taken by Hannah Mathers at MESS, Gahanna, OH.

|   | Treatment | Rate lb/ac | 1 <sup>st</sup><br>Efficacy <sup>x</sup><br>30 DAT<br>(Av. Weed<br>Count) | 2 <sup>nd</sup><br>Efficacy<br>60 DAT<br>(Av. Weed<br>Count) | 3 <sup>rd</sup><br>Efficacy<br>90 DAT<br>(Av. Weed<br>Count) | 3rd<br>Efficacy<br>90 DAT<br>(Rating) |
|---|-----------|------------|---|--|--|---------------------------------------|
| 1 | Fuerte    | 100        | 2.2b <sup>≠</sup>   | 4.5b   | 6.0c   | 2.0a                                  |
| 2 | Fuerte    | 150        | 0.2a  | 6.0c   | 5.0c   | 5.0b                                  |
| 3 | Fuerte    | 200        | 0.0a  | 0.0a   | 0.5a   | 8.0c                                  |
| 4 | Marengo G | 200        | 0.2a  | 1.0a   | 3.0b   | 9.0c                                  |
| 5 | Control   |            | 0.8a  | 10.0d  | 6.0c   | 1.0a                                  |

#### C. Pineapple-weed (Matricaria matricarioides)



**Fig. 3.** Pineapple-weed (*Matricaria matricarioides*) at 90 DAT showing treatment 1 to 5 from left to right, respectively. Treatment 1-3 are Fuerte at 100, 150 and 200 lb/ac, respectively, treatment 4 is Marengo 200 Lb/ac, and 5 is the untreated control Photo taken by Hannah Mathers at MESS, Gahanna, OH.

|   | Treatment | Rate lb/ac | 1 <sup>st</sup><br>Efficacy <sup>x</sup><br>30 DAT <sup>z</sup><br>(Av. Weed<br>Count) | 2 <sup>nd</sup><br>Efficacy<br>60 DAT<br>(Av. Weed<br>Count) | 3 <sup>rd</sup><br>Efficacy<br>90 DAT<br>(Av. Weed<br>Count) | 3rd<br>Efficacy<br>90 DAT<br>(Rating) |
|---|-----------|------------|--|--|--|---------------------------------------|
| 1 | Fuerte    | 100        | 4.0b <sup>≠</sup>  | 3.0ab  | 2.0a   | 5.0c                                  |
| 2 | Fuerte    | 150        | 2.0a   | 2.0a   | 3.0ab  | 5.0c                                  |
| 3 | Fuerte    | 200        | 3.0ab  | 4.0b   | 4.0b   | 3.0b                                  |
| 4 | Marengo G | 200        | 4.0b   | 4.0b   | 4.0b   | 3.0b                                  |
| 5 | Control   |            | 12.5c  | 9.5c   | 7.4c   | 0.0a                                  |

D. Broadleaf Plantain (Plantago major)

z = days after treatment

X = Efficacy (Eff.) ratings are based on a 0-10 scale with 10 being complete control, 0 no weed control, and >7 commercially acceptable control.

 $\neq$  = Treatments with different letters signify efficacy was statistically different at p=0.05 using LS means following ANOVA in SAS.





**Fig. 4. A.** and **B. (A. Above). Broadleaf Plantain** (*Plantago major*) (at 90 DAT showing treatment 1 to 5 from left to right, respectively. Treatment 1-3 are Fuerte at 100, 150 and 200 lb/ac, respectively, treatment 4 is Marengo 200 Lb/ac, and 5 is the untreated control. Photo taken by Hannah Mathers at MESS, Gahanna, OH. **B.** (left) shows

the variability in results by replication for treatment 3 in plantain.





**Fig. 5. Broadleaf Plantain (***Plantago major***)** at 30 DAT (left) and 60 DAT in treatment 5 the untreated control. Photo taken by Hannah Mathers at MESS, Gahanna, OH.





Fig. 6. Field Pennycress (far left) and Pineapple weed (left) at 60 DAT in treatment 4, Marengo 200 Ib/ac. Photo taken by Hannah Mathers at MESS, Gahanna, OH.

#### **Conclusions:**

The 200 lb/ac rate of Fuerte provided the best control in the Field Pennycress and Pineapple weed. In the Pineapple weed, however, the 150 lb rate was best. The germination was poor in everything except the broadleaf plantain in the trial. The results for Fuerte 200 lb/ac in pineapple-weed, we speculate were the result of inconsistent weed germination between replications, of treatment 3 (Fig. 4B). This study was requested late in the growing season and no doubt would have preformed better if seeded in the spring.