**Dormancy Requirements of Hairy Fleabane (*Conyza bonariensis*) Seeds.** Vivian Maier and Anil Shrestha Department of Plant Science, California State University, Fresno, CA 93740

Hairy fleabane (*Conyza bonariensis* L. Cronq.) is considered a summer annual weed in California. However, it is often seen to be growing year round in the Central Valley. This is primarily because there are two major periods of germination of this species in the Central Valley. It either germinates and emerges in fall, over-winters as a rosette, and completes its life cycle in early summer or it germinates and emerges in late winter and completes its life cycle in late summer or early fall (Shrestha et al. 2008). This species is known to produce as many as 226,000 seeds per plant (Kempen and Graf 1981). Although the optimal temperature of seed germination for this species ranges between 65º to 75º F, it has been reported to germinate at temperatures as low as 39.5° F (Wu et al. 2007). The seeds are also reported to be able to germinate under moderate water stress of up to -0.4 MPa (Karlsson and Milberg 2007). This species, similar to horseweed, is primarily a surface germinating type, i.e. its germination is reduced when buried more than 1 mm deep. Although much information is available on germination ecology of horseweed (*C. canadensis* L. Cronq.), very limited information is available for hairy fleabane. For example, it has been suspected that its seeds may not have a long dormancy period for germination. Therefore, the objectives of this study were to determine the dormancy and moisture requirement of hairy fleabane seeds for germination.

A study was conducted in Fresno, CA in 2016 in a lab under room temperature of 72º F and ambient light conditions. Seeds of hairy fleabane plants were collected from vineyards in Fresno. Seeds of five random plants were collected and bagged separately. Twenty five seeds from each hairy fleabane plant were placed on Whatman No. 1 filter papers placed in separate 100 by 15 mm Petri dishes. Ten ml deionized water was added to each petri dish with a pipette. The seeds were tested for germination, a) the day they were harvested, b) one week after they were harvested, c) two weeks after they were harvested, and d) three weeks after they were harvested. The petri dishes were periodically examined for germination till the process ceased. A seed was considered to have germinated if they had a 1 mm long radicle and plumule. The experiment was arranged as completely randomized design where the different days after harvest were the treatments and each plant was a replicate.

Another study was conducted to determine the level of tolerance to moisture stress during germination. The study was also conducted in the same lab under similar environmental conditions. Solutions of various water potentials (0, -0.149, -0.51, -1.09, -1.88, -2.89, -4.12, and -5.56 MPa) were prepared using polyethylene glycol (PEG 6000; Fisher Scientific, Houston, TX). Twenty seeds from each hairy fleabane plant were placed on Whatman No. 1 filter paper placed in separate 100 by 15 mm Petri dishes. Ten ml of the different $\psi$ solutions were added to each Petri dish with a pipette. The Petri dishes were then sealed with parafilm (Parafilm M™ Wrapping Film, Fisher Scientific, Houston, TX). Germination was monitored as described above. Total germination at 0 MPa was considered 100% and the percent germination in the other treatments were calculated relative to germination at 0 MPa. The experimental set up was a completely randomized design where each plant was a replicate. The experiment was repeated. Data for both experiments were analyzed using analysis of variance procedures and the means

were separated by Fisher's least significant difference process at a 0.05 level of significance. A non-linear regression was also fit to the data on moisture stress.

More than 54% of the seeds that were put in the petri dishes the day they were harvested germinated; although, the germination percentage was significantly lower than the other treatments. Total germination in the other treatments ranged between 68% to 72% and there were no significant differences between the treatments in total germination percentage of the seeds. In the moisture-stress study, up to 71% of the seeds germinated at – 0.149 MPa, a few (approximately 10%) seeds germinated at -0.51 MPa but none of the seeds germinated in the other treatments. The non-linear regression estimated that the water potential to reduce germination by 50% was approximately -0.28 MPa.

This study showed that hairy fleabane seeds could germinate the day they fall off from the mother plants. However, they need adequate moisture to germinate and it is not very drought-tolerant in terms of seed germination compared to several other weed species.

**References:**

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