



### Efficacy of herbicides on invading *Parthenium* weed (*Parthenium hysterophorus* L.)

(42)

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*Parthenium* weed is an alien invasive weed in China. It poses a serious threat to crops, livestock, humans, and to biodiversity. Herbicides are one of the important methods of control. Reports of herbicide activity on *parthenium* weed in the field are lacking in China. Field experiments were conducted to determine the activity of eight pre-emergence (PRE) and 13 post-emergence (POST) herbicides on *parthenium* weed at the recommended China field rates. Fresh weight (FW) was measured at 90 days after PRE treatments, and 45 days after POST treatments. The results showed that clomazone PRE at 400 g ha<sup>-1</sup> effectively controlled *parthenium* weed with a reduction of 92.3% FW, followed by rimsulfuron 20 g ha<sup>-1</sup> with 87.4%. The other six PRE herbicides, acetochlor 1000 g ha<sup>-1</sup>, mesotrione 150 g ha<sup>-1</sup>, atrazine 1140 g ha<sup>-1</sup>, mesotrione+ atrazine 742.5 g ha<sup>-1</sup>, clomazone+ acetochlor 600 g ha<sup>-1</sup>, acetochlor+ atrazine 1350 g ha<sup>-1</sup>, provided < 50% FW reduction. The POST herbicides, tribenuron-methyl 20 g ha<sup>-1</sup>, imazapyr 1125 g ha<sup>-1</sup>, atrazine 1140 g ha<sup>-1</sup>, mesotrione 150 g ha<sup>-1</sup>, clopyralid 200 g ha<sup>-1</sup>, picloram 1200 g ha<sup>-1</sup>, mesotrione + atrazine 742.5 g ha<sup>-1</sup> provided excellent control of the weed at both the 2-5 leaf and 5-8 leaf stages with FW reduction >97.2%. Isoproturon 1000 g ha<sup>-1</sup> and topramezone 22.5 g ha<sup>-1</sup> achieved good control of 90.3%~92.2% when sprayed at 2-5 leaf stage, but was reduced to 83.2%~85.3% when treated at 5-8 leaf stage. In contrast, rimsulfuron 20 g ha<sup>-1</sup>, glyphosate 800 g ha<sup>-1</sup>, triclopyr 2000 g ha<sup>-1</sup> achieved 81.5%~97.6% FW reduction when sprayed at 5-8 leaf stage, but only controlled 49.2%~65.5% when sprayed at 2-5 leaf stage. Metribuzin 400 g ha<sup>-1</sup> failed to control *parthenium* weed with 36.5%~49.3%.

**Keywords:** *Parthenium hysterophorus*, pre-emergence, post-emergence, herbicides, control



### Control of *Ailanthus altissima* in a historical fortress (625)

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The Citadel of Alessandria is a military fortress built in the 18<sup>th</sup> century, located in the northwest of Italy. It spans over 70 hectares and is composed of buildings, bastions, roads, all enclosed by a moat. Since 2007, the fortress was abandoned and gradually became invaded by weeds. One of the most problematic weeds is *Ailanthus altissima*, a tree that colonized many areas in the fortress, including buildings and roofs, accelerating their deterioration. In July 2015, different control techniques were compared. In particular, cut stump and basal bark applications were tested in three areas of the fortress. The herbicides used were: glyphosate 360 g/l, fluroxypyr 20 g/l+triclopyr 60 g/l and aminopyralid 35.5 g/l+ fluroxypyr 144.1 g/l, each diluted 1:10 with water. For the cut stump application, the plants were first cut at the base and immediately sprayed on the cut surface. Herbicides were applied using a 2 l pressure spray bottle. Untreated cut plants were used as a comparison. For basal bark application, the lower 50 cm of the plants were sprayed with the herbicides by using a backpack sprayer. Fifty days after treatment, an efficacy assessment was performed by counting and measuring the height of the resprouts the cut stump application, and by observing the symptoms in the basal bark treatment. In the case of cut stump treatments, the number of resprouts ranked as follows: untreated > glyphosate > fluroxypyr+triclopyr > aminopyralid+fluroxypyr, with 4.7, 2.0, 1.3, and 0.06 resprouts per plant, respectively. The same ranking was observed for the height of the resprouts, with 20 cm observed for aminopyralid+fluroxypyr and up to 75 cm for untreated plants. For the basal bark application, very limited symptoms were observed on the treated plants.

**Keywords:** Cut stump application, basal bark application, invasive alien species, historical sites