

Identification and Management for Two Invasive Geraniums: Herb Robert (*Geranium robertianum*) and Shiny Geranium (*Geranium lucidum*)

Timothy W. Miller¹, Alison D. Halpern², and Cathleen A. Lucero³

¹Washington State University Northwestern Washington Research and Extension Center, Mount Vernon, WA 98273; ²Washington State Noxious Weed Control Board, Olympia, WA; ³Clallam County Noxious Weed Control Board, Port Angeles, WA

Introduction

Two annual geranium species are currently declared noxious weeds in Washington state, herb robert and shiny geranium. While herb robert is found in all western Washington counties, shiny geranium is known only from two sites in southwestern and northwestern Washington. Both species can successfully colonize a range of sites from full sun to under 90% canopy cover, often achieving near monotypic stands (Figure 2).

Identification

Identification of these species often begins with the seedlings. Herb robert cotyledons and first true leaves are usually lightly covered with downy, glandular hairs, while shiny geranium cotyledons and first true leaves are sparsely covered with upright, bristly hairs (Figure 2). Herb robert leaves are divided into 3 to 5 pinnate leaflets which gives the plant a lacy appearance; foliage from first emergence is noticeably aromatic. Shiny geranium leaves are waxy with 3 to 5 shallow, palmate lobes and are not aromatic. Flowers of both species bear 5 pale to dark pink petals, although herb robert petals, at up to 14 mm long, are twice to three times the length of shiny geranium petals (Figure 3). While both species bear a bristle at the tip of the sepal, herb robert sepals are striped with dark red (Figure 3), while shiny geranium sepals are green with a midrib that bows outward forming a dorsal ridge (Figures 3 and 4). The ovary is split into 5 carpels, each bearing one viable seed. Carpels may explosively rupture at maturity, scattering seed some distance from the mother plant.

Figure 1. Infestations of shiny geranium (*G. lucidum*) and herb robert (*G. robertianum*).



Figure 2. Seedlings of (A) shiny geranium (*G. lucidum*), (B) herb robert (*G. robertianum*), and (C) the similar, introduced but non-noxious dovefoot geranium (*G. molle*).

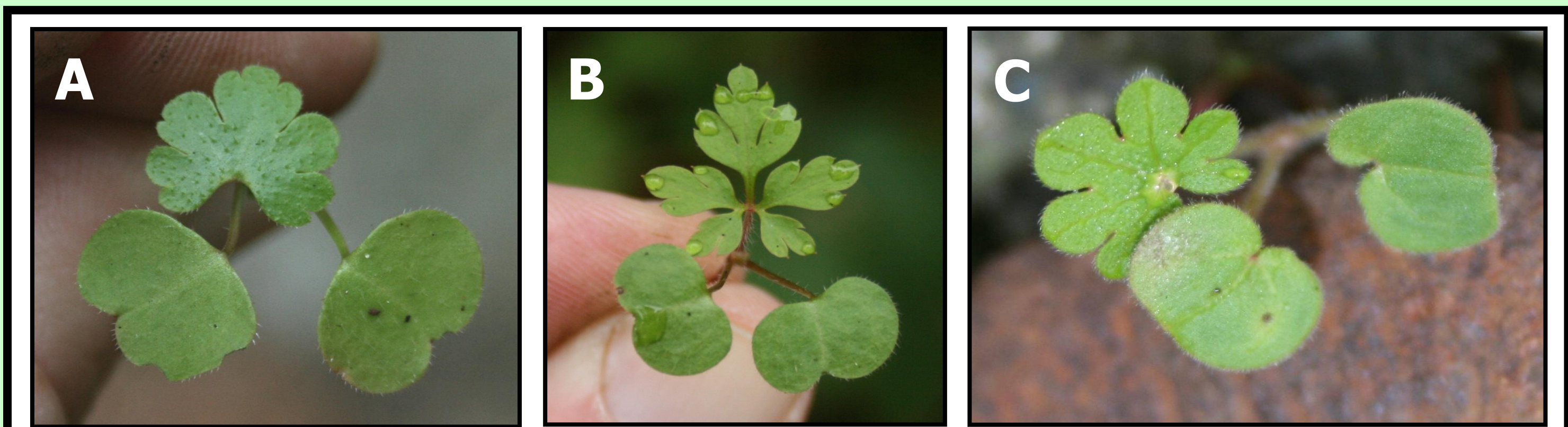


Figure 3. Flowers of (A) herb robert (*G. robertianum*), (B) shiny geranium (*G. lucidum*), and (C) the similar, introduced but non-noxious cutleaf geranium (*G. dissectum*).

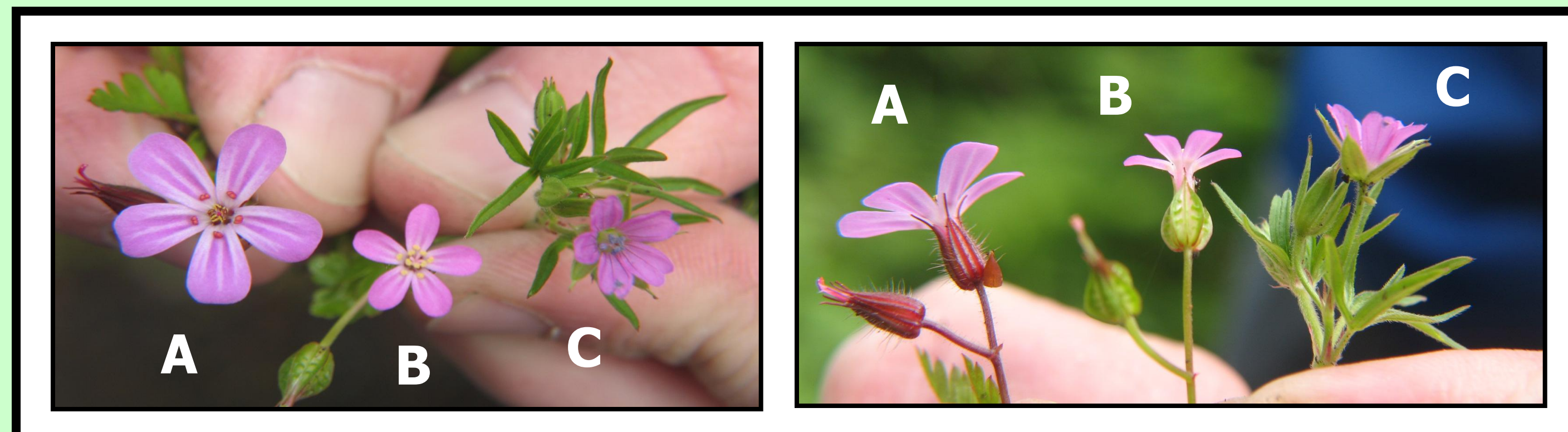


Figure 4. Shiny geranium (*G. lucidum*) with sepals intact or carpels exposed.

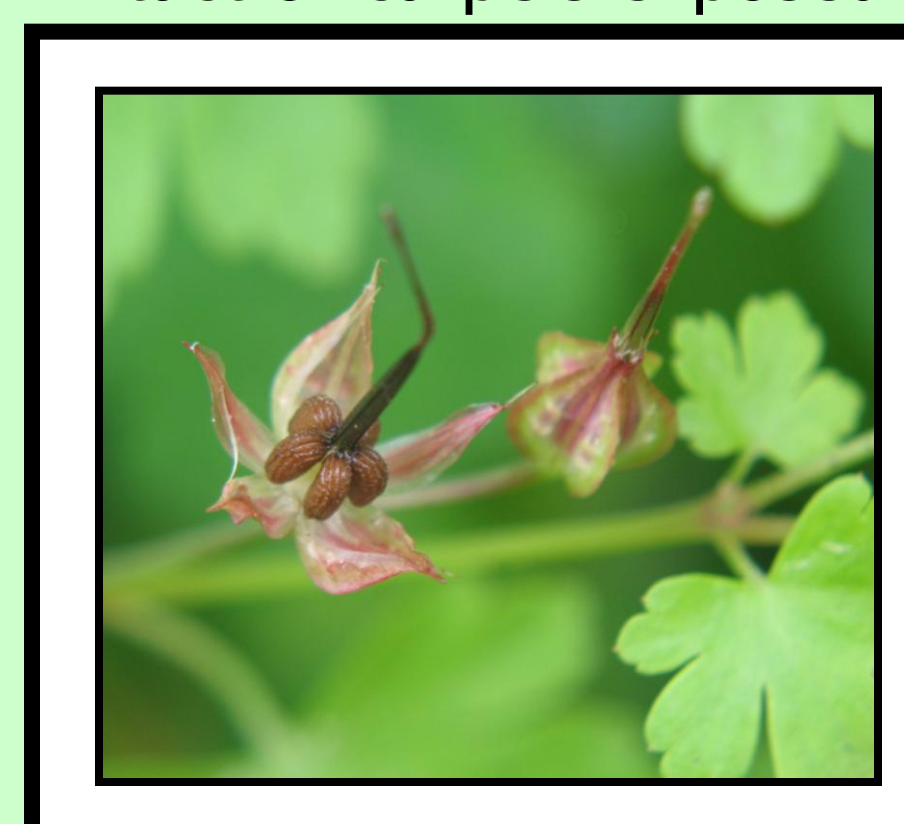
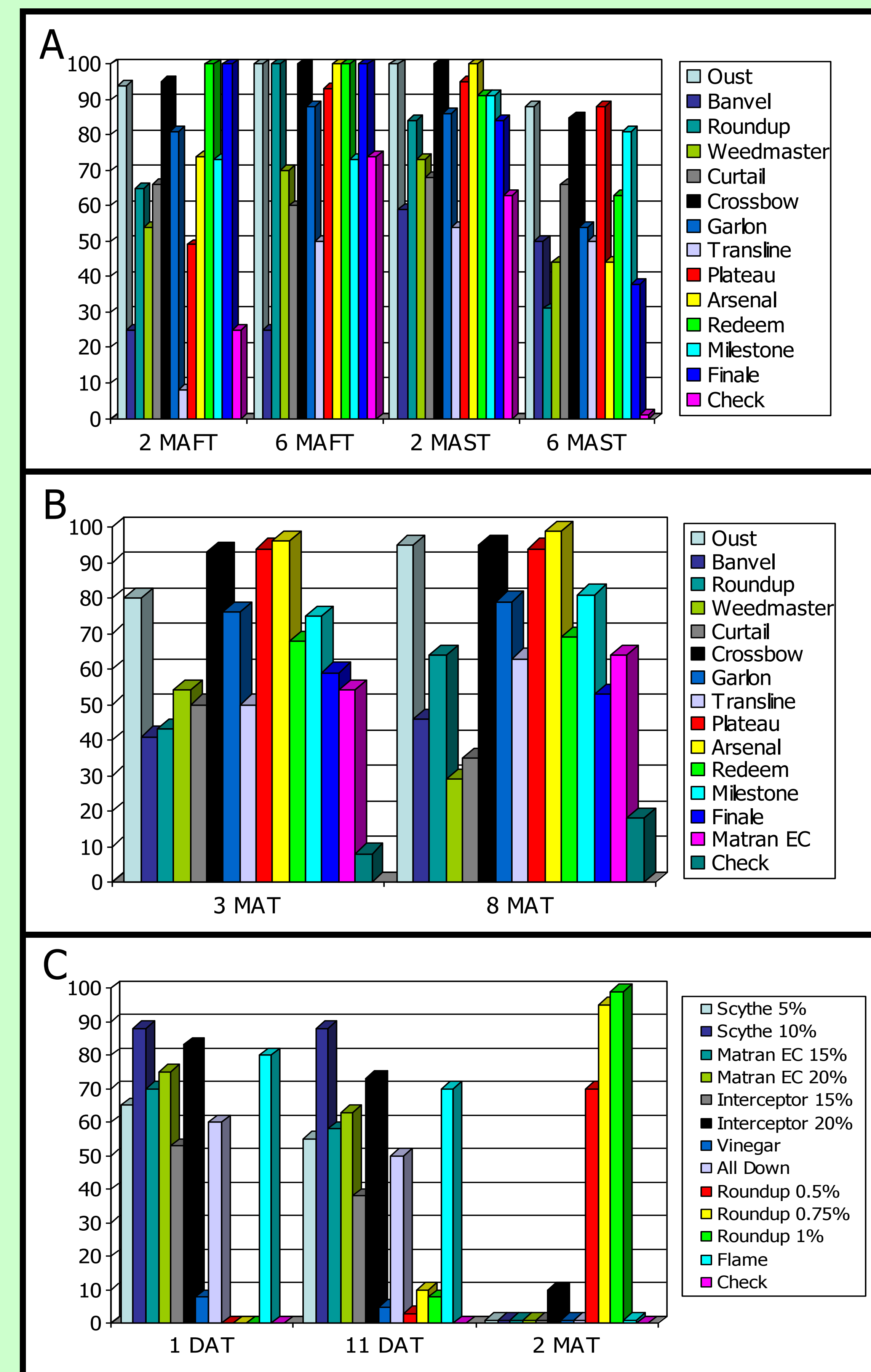


Figure 5. Weed control after application of various herbicides. A. Herb robert control at 2 and 6 MAFT and 2 and 6 MAST. B. Shiny geranium control at 3 and 8 MAT. C. Shiny geranium control at 1 DAT, 11 DAT, and 2 MAT.



Control Trials

Herbicide trials were conducted to determine relative sensitivity of these species to several foliar-applied herbicides:

Herb Robert Herbicide Trial. This trial was conducted along an asphalt road shoulder in Port Angeles, WA. Herbicides were initially applied October 4, 2007 using a CO₂-pressurized backpack sprayer equipped with a 5-nozzle boom; a second application was made on the same plots May 28, 2008. Control of herb robert (0% = no injury, 100% = dead plants) was estimated November 30, 2007 and April 10, 2008 (2 and 6 months after first treatment, MAFT) and July 16, and November 9, 2008 (2 and 6 months after second treatment, MAST). Plots measured 8 by 20 ft and the experiment was a randomized complete block design with 4 replicates.

Shiny Geranium Herbicide Trial. This trial was conducted in the first of two known infestations of this species, along the edge of a gravel road east of Vancouver, WA. Herbicides were applied October 20, 2008 using a CO₂-pressurized backpack sprayer equipped with a 5-nozzle boom. Control of shiny geranium (0% = no injury, 100% = dead plants) was estimated January 26 and June 11, 2009 (3 and 8 months after treatment, MAT). Plots measured 8 by 20 ft and the experiment was a randomized complete block design with 4 replicates.

Shiny Geranium Non-synthetic Herbicide Trial. This trial was conducted in the second of two known infestations of this species, along an asphalt road shoulder and in campsites of Bayview State Park west of Mount Vernon, WA. Herbicides were applied March 5, 2009 using a CO₂-pressurized backpack sprayer equipped with a single-nozzle wand. Control of shiny geranium (0% = no injury, 100% = dead plants) was estimated March 6 (1 day after treatment, DAT), March 16 (11 DAT), and April 28 (2 MAT). Plots were variable in size depending on the size of the infestation in the individual campsites being treated; the experiment was a randomized complete block design with 2 replicates.

Results

Sulfometuron (Oust), imazapic (Plateau), imazapyr (Arsenal), glyphosate (Roundup Pro), glufosinate (Finale), clopyralid + triclopyr (Redeem), and triclopyr + 2,4-D (Crossbow) applied in October, 2007 gave 90+% control of herb robert at 6 MAFT (Figure 5A). Sulfometuron, triclopyr + 2,4-D, and imazapic were still providing at least 85% control by 6 MAST. By January, 2009, herb robert control no longer differed by treatment (data not shown). Shiny geranium response was generally similar to that of herb robert, with imazapyr, sulfometuron, triclopyr + 2,4-D, and imazapic applied in October, 2008 giving at least 85% control by 8 MAT (Figure 5B). Non-synthetic herbicides giving at least 75% shiny geranium control 1 DAT were 10% pelargonic acid (Scythe), 20% pine oil (Interceptor), 20% clove oil (Matran EC), and propane flame (Figure 5C). Only 10% pelargonic acid was still providing at least 75% shiny geranium control by 11 DAT; control from all non-synthetic products was 10% or less by 2 MAT. Glyphosate (Roundup Pro) applied at a minimum concentration of 0.75% was necessary to control shiny geranium greater than 90% by 2 MAT.