Oregon Department of Agriculture
Plant Pest Risk Assessment for
Shiny Geranium (*Geranium lucidum* L.)
February 2009

Common Names: Shiny-leaf geranium, shiny-leaf hawksbill
Family: Geraniaceae

Findings of This Review: *Geranium lucidum* has been determined to be a potential **"B"** listed noxious weed as defined by the Oregon Department of Agriculture (ODA) Noxious Weed Policy and Classification System. Using a rating system adapted from United States Department of Agriculture, Animal Plant Health Inspection Services, Plant Protection, and Quarantine (USDA APHIS PPQ) Weed Risk Assessment Guidelines, *Geranium lucidum* received a score of **28** out of a potential score of **47**. Using the ODA Noxious Weed Rating System, *Geranium lucidum* received a score of **14** supporting a "**B**" listing. Shiny geranium is rapidly moving throughout western Oregon and will become a common component of forested environments in the Pacific Northwest.

Description: *Geranium lucidum* (*G. lucidum*) grows predominantly as an annual weed though it may become biennial depending on moisture conditions. In Europe, it is described as growing up to 0.5 meters high and being very shade intolerant. Here in the Pacific Northwest, it is predominantly a forest understory species, very shade tolerant and only seen up to 10-12" high (Newhouse and Brainerd 2006). Stems are red colored growing from a weak central root. Leaves are rounded, deeply lobed with a beautiful waxy appearance that makes dense infestations easy to recognize. Flowers are pink, 5 petaled and grow interspersed with the leaves; not above them.

Photo courtesy of Bruce Newhouse

Growth Characteristics: Geranium *lucidum* sprouts in the late summer or early fall with the first heavy rainstorm of the season. By early spring, patches of *G. lucidum* are very pronounced. During April and May, dense low-lying patches form and flowering commences. By late June and July, seed formation is completed and the plant material melts back into the forest floor. The seeds are small and rapidly transported to uninfested areas on boots, vehicles, and by wildlife.

Habitat: Shiny geranium grows in the Pacific Northwest predominantly as an understory species intermixed with grasses, forbs, and moss. Oak woodlands and forest openings are ideal locations for *G. lucidum* to establish and dominate. Conifer forests offer suitable habitat for *G. lucidum* though dense second growth plantations often create excessive shade, limiting growth and density.

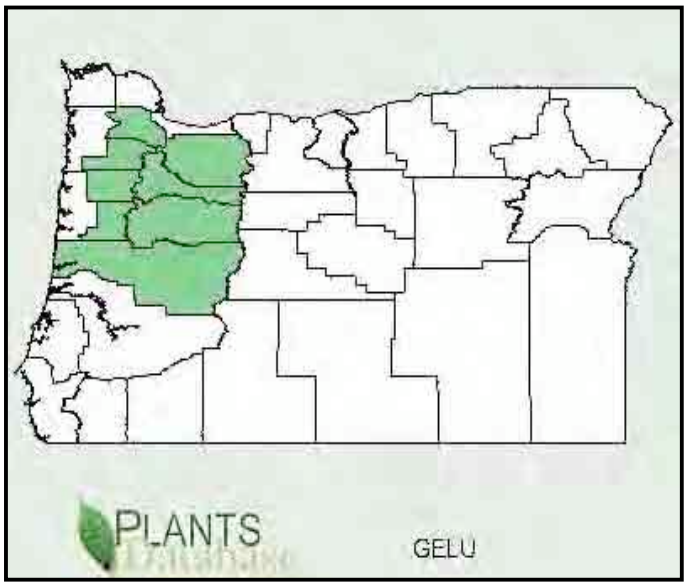
Photo courtesy of Bruce Newhouse 2006

Geographic Distribution: *Geranium lucidum* is common throughout much of Eurasia from the British Isles through the Middle East to the Himalayas and India. It also grows in North Africa. Used throughout history as a medicinal plant, it has probably been introduced in many other locations around the world.

Ecological Impacts: *Geranium lucidum* has a limited distribution in Oregon and the Pacific Northwest though its effects in oak woodlands, seasonally wet ash forests and on forest edges are quite pronounced. . Utilizing the abundance of early spring moisture, *Geranium lucidum* quickly establishes, then dominates sites pushing out many other early season wildflowers and seedlings of perennial plants. As soils dry few other plants are able to establish through the receding weed canopy. Sites dominated by heavy grass stands or false brome (another invasive plant) may be resistant to significant intrusion.

USDA Plants Database, Geranium lucidum

U.S Distribution: USDA Plants profile for *Geranium lucidum* indicates only California and Oregon containing populations though Washington now has many confirmed locations.



Economic Importance: The species has been used in herbal treatments for centuries primarily as a diuretic and an astringent. Such uses may still occur in Europe and Asia but it is less well known in North America, which may limit its use in the herbal market. Negative economic impacts may not be significant and limited to landscape maintenance situations. The species isn't large and doesn't interfere with agriculture or recreational activities.

Control: Information on control options is limited. Manual control can only be successful on very small infestations. Smothering may be useful on small to mid-size infestations also. No good chemical control options have been identified that don't have large non-target effects. Use of residual herbicides in conjunction with foliar products is very effective in controlling shiny geranium but this combination has significant non-target affects. Prevention methods such as boot cleaning stations at trailheads and the use of clean equipment are critical to slow the spread of the plant.

Assessing Pest Risk

The ODA-USDA modified risk assessment identifies several dominant factors that influence plant establishment, reproduction, dispersal, and impacts, and then applies numerical value to these factors. The choices taken by reviewers on each topic can often be very subjective and variable based on the knowledge, observations, and experience of the reviewer. Every effort was made by the authors to be inclusive in the descriptions as reasonably possible with the expectation that some weeds will not fit well in every category. It is intended that the risk assessment serve as a logical process for governmental agencies and weed control professionals for listing plant species as weeds and to help prioritize target species for control. Numerical values are often different for the various factors. This is done to add "weight" or increased value to certain factors over others.

Noxious Weed Qualitative Risk Assessment

Shiny geranium	*Geranium lucidum*
Common name:	Scientific name

POINT CATEGORIES
Intermediate scores apply: (e.g. = 4)

1) Habitat Availability: Habitat availability restrictive/non-restrictive on a plant's ability to survive and establish in the analysis area. *Abiotic* factors favor or restrict the ability of the plant to thrive in the available habitats. Choose the number that best applies and enter.

1. (Low) Susceptible habitat is very limited usually restricted to a small watershed or part of a watershed. Plant is severely confined by certain soil types, soil moisture holding capacity; freeze events, drought, and precipitation.

2. (Medium) Susceptible habitat encompasses 1/4 or less of the analysis area. Plant only moderately confined by environmental factors such as certain soil types, soil moisture holding capacity, weather.

5. (High) Susceptible habitat is enormous covering large regions or multiple counties in the analysis area or limited to a restricted habitat of high economic/ecological value. Plant may demonstrate great adaptability to a variety of environmental conditions.

Score: 5
Explanation: Plant is capable of thriving in most if not all forested regions of the state.

2) Probability of Further Expansion in the State: *Biotic* factors may restrict establishment or expansion of weed in state. If plant is parasitic, do suitable host plants exist for establishment? Choose the number that best applies and enter.

1. Biotic factors *damage* plant growth and/or prevent reproduction. Obligate pollinator not present. Plant not self-fertile. Competing vegetation, and human intervention may restrict establishment. Biocontrol agents already present on related species.

2. Biotic factors *restrict* or moderately impact growth and reproductive potential or plant is poorly or clearly not self-fertile and opposite sex not present or only male plants present.

4. Environment *possesses* ideal conditions for growth and reproduction. Plant expresses full growth and reproductive potential in environment. If dioecious then either sexes present or plant is self-fertile.

Score: 3
Explanation: Plant limited by plant competition, seasonal moisture availability.

3) Dispersal Potential After Establishment: Choose the number that best applies and enter.

0. (Negligible) Weed has no *potential* for natural spread in the analysis area

1. (Low) Weed has *potential* for local spread within a year. Moderate reproductive potential or some mobility of propagules. Propagules may be moved locally by animals, wave action in lakes.

3. (Medium) Weed has moderate *potential* for natural spread with either high reproductive potential or highly mobile propagules. Propagules spread by moving water, humans or animals. Movement possible through long distance commerce.

5. (High) Weed has *potential* for rapid natural spread throughout its potential range. Weed has high reproductive potential and highly mobile propagules. Seeds are wind dispersed.

Score: 4
Explanation: Plant has high reproductive potential and rapid natural dispersion throughout state. Plant not wind dispersed.

4) Economic Impact: Plant has potential to cause or demonstrates negative impacts throughout analysis area resulting in reduced crop yield, lowered commodity value, increased cost of production or a loss of markets due to contamination or weed also may cause financial impacts to recreation, livestock health, fishing and hunting and property values. Control costs to manage infestations also considered. Choose the number that best applies and enter.

0. (Negligible) Weed causes none of the above impacts.

1. (Low) Plant has *potential* to cause or demonstrates moderate to low impacts throughout analysis area in one or few of the above categories.

3. (Medium) Plant has *potential* to cause or demonstrates moderate impacts in few of the above economic categories or moderate to low impacts over a wide range (over 5 types) of economic plants, recreation, products or livestock throughout analysis area.

5. (High) Plant has *potential* to cause or demonstrates significant impacts in many of the above categories throughout analysis area. Plant directly linked to human health concerns (e.g. poisoning, burns or contribute to increases in vertebrate or invertebrate pests which serve as infectious disease carriers). Control costs would be significant.

Score: 1
Explanation: Plant has potential to cause minor economic harm to nursery crop production. Doesn't impact recreation, or other agriculture.

5) Environmental Impact: Descriptions of environmental harm: Causes impacts on ecosystem processes; causes changes in plant community composition and function; causes indirect impacts that are measured by a reduction in aesthetic value, reduced opportunities for recreation and reductions in other non-monetary values. Choose the number that best applies and enter.

0. (Negligible) None of the above impacts probable.

1. (Low) Plant has potential to cause, or demonstrates few or minor environmental impacts throughout analysis area or impacts occur in degraded or highly disturbed habitats.

2. (Medium) Plant has potential to cause, or demonstrates moderate impacts throughout analysis area or impacts occur in less critical habitats.

5. (High) Plant has potential to cause, or demonstrates significant impacts in several of the above categories. Or plant causes impacts in select priority habitats such as aquatic, riparian, salt marsh, T&E plant sites, and other sites deemed critical.

Score: 2
Explanation: Plant distribution is widespread though negative effects are only demonstrated in certain habitats with populations of spring flowering annual forbs. Most other plant communities are unaffected by this plant.

6) Weed is a Pest in Similar Climactic Zones: Choose the number that best applies and enter.

1. Plant is strictly limited to one minor climactic area or zone. Plants exhibit little adaptability to new environments or complete information is lacking on plant distribution in climate zones.

2. Plant demonstrates weedy characteristics in non-origin areas only. Plant limited to a few climactic zones.

4. Plant is known to be a significant pest in similar climactic zones at place of origin or demonstrates significant adaptation to multiple climactic zones wherever it is found.

Score: 3
Explanation: Plant distribution still limited to moist temperate zones. Information on national or worldwide weediness limited.

7) Proximity to State. Choose the number that best applies and enter.

1. Plant found in more distant US regions or foreign country only.

3. Weedy populations found in Western US regions but not directly adjacent to Oregon border.

6. Weedy populations directly adjacent to Oregon border.

Score: 3
Explanation: Plant is common throughout western Oregon and parts of adjacent states.

8) Probability of Detection at Introduction Point: Circle the number that best applies and enter.

1. Plants growing where *probability* of rapid detection high, plants showy, public easily recognizes plant, access not limited.

2. Plant easy to identify by weed professionals, ranchers, botanists, and some survey and detection infrastructure in place.

3. Plant populations growing with high *probability* of no initial detection, plant shape and form obscure/not showy for much of growing season, introduction probable on lands remote or with limited access to weed professionals.

Score: 1
Explanation: Plants easily found and identified by general public.

9) Probability of Weed Imported or Moved to Suitable Habitat by H*uman Factors:* Choose the number that best applies and enter.

1. Low *probability* of introduction or movement. Plant not traded or sold or plant not found in agricultural commodities, gravel, or other commercial products.

2. Moderate *probability* of introduction or off-site movement. Plant not widely propagated, not highly popular with limited market potential or may be a localized contaminant of gravel or landscape products.

5. High *probability* that weed will be introduced or moved within state annually. Plant widely propagated, highly popular and widely sold or traded or plant propagules are a common contaminant of agricultural commodities. Or, high potential exists for movement by contaminated vehicles and equipment or by recreational activities.

Score: 3
Explanation: Plant will be transported unintentionally through vehicles, equipment, contaminated seed, fill material, aggregate.

10) Current Distribution: Choose the number that best applies and enter.

1. Widespread occurrence throughout the state.

3. Regionally abundant (eastern/western Oregon, coastal area, Willamette Valley, central Oregon etc.)

6. Not known to occur, or limited to 1 or a few infestations in state.

Score: 3
Explanation: Primarily limited to western half of state.

Total Points: **28**

The total risk score for *Geranium lucidum* (out of a possible 47) with the USDA APHIS Risk Assessment is: **28.**

36-47 "A" Weed 24-35 "B" Weed Below 24: Unlisted

Risk assessment modified from USDA-APHIS Risk Assessment for the introduction of new plant species. Vers. 1.4 2/13/08

OREGON DEPARTMENT OF AGRICULTURE
NOXIOUS WEED RATING SYSTEM

Shiny geranium	*Geranium lucidum*
Common Name	**Scientific Name**

Points Category

1) 1 Detrimental Effects: Circle all that apply, enter number of circles

1. Health: Causes poisoning or injury to humans or animals
2. Competition: Strongly competitive with crops, forage, or native flora
3. Host: Host of pathogens and/or pests of crops or forage
4. Contamination: Causes economic loss as a contaminate in seeds and/or feeds

5. Interference: Interferes with recreation, transportation, harvest, land value, or wildlife and livestock movement

2) 3 Reproduction and Capacity for Spread: Circle the number that best describes

1. Few seeds, not wind blown, spreads slowly
2. Many seeds, slow spread
3. Many seeds, spreads quickly by vehicles or animals
4. Windblown seed, or spreading rhizomes, or water borne
5. Many wind-blown seeds, high seed longevity, spreading rhizomes, perennials

3) 4 Difficulty to Control: Circle the number that best describes, enter

1. Easily controlled with tillage or by competitive plants
2. Requires moderate control, tillage, competition or herbicides
3. Herbicides generally required, or intensive management practices
4. Intensive management generally gives marginal control
5. No management works well, spreading out of control

4) 3 Distribution: Circle the number that best describes, enter

1. Widely distributed throughout the state in susceptible habitat
2. Regionally abundant in a part of the state, 5 or more counties, more than 1/2 of a county
3. Abundant throughout 1-4 counties, or 1/4 of a county, or several watersheds
4. Contained in only 1 watershed, or less than 5 square miles gross infestation
5. Isolated infestation less than 640 acres, more than 10 acres
6. Occurs in less than 10 acres, or not present, but imminent from adjacent state

5) 3 Ecological Impact: Circle the number that best describes, enter

1. Occurs in most disturbed habitats with little competition
2. Occurs in disturbed habitats with competition
3. Invades undisturbed habitats and crowds out native species
4. Invades restricted habitats (i.e., riparian) and crowds out native species

TOTAL POINTS: **14**

Note: Noxious weeds are those non-native plants with total scores of 11 points or higher. Any plants in 4.1, 4.2, and 4.3 should not be classified as **"A"** rated weeds.

Ratings: **A** = 16+, **B** = 11– 15

References:

Plants for a future. Edible, medicinal, and useful plants for a healthier world. *Geranium lucidum*. www.pfaf.org/database/plants.php
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USDA, NRCS. 2006. The PLANTS Database (http://plants.usda.gov, 20 December 2006). National Plant Data Center, Baton Rouge, LA 70874-4490