

# Part IV. Plant Assessment Form

For use with "Criteria for Categorizing Invasive Non-Native Plants that Threaten Wildlands"  
by the California Exotic Pest Plant Council and the Southwest Vegetation Management Association

Electronic version, February 28, 2003

**Table 1. Species and Evaluator Information**

<b>Species name (Latin binomial):</b>	Linaria genistifolia (L.) Miller ssp. dalmatica
<b>Synonyms:</b>	Linaria dalmatica, Linaria dalmatica ssp. dalmatica, Antirrhinum dalmaticum
<b>Common names:</b>	Dalmation toadflax, broad-leaved toadflax, wild snapdragon
<b>Evaluation date (mm/dd/yy):</b>	1/27/05
<b>Evaluator #1 Name/Title:</b>	Elizabeth Brusati, project manager
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Section below for list committee use—please leave blank

<b>List committee members:</b>	Joe DiTomaso, Alison Stanton, Joanna Clines, Cynthia Roye, Doug Johnson
<b>Committee review date:</b>	7/8/05
<b>List date:</b>	enter text here
<b>Re-evaluation date(s):</b>	enter text here

**General comments on this assessment:**

enter text here

**Table 2. Criteria, Section, and Overall Scores**

<a href="#">1.1</a>	Impact on abiotic ecosystem processes	<b>B</b>	Rev'd, Sci. Pub'n
<a href="#">1.2</a>	Impact on plant community	<b>B</b>	Rev'd, Sci. Pub'n
<a href="#">1.3</a>	Impact on higher trophic levels	<b>B</b>	Other Pub. Mat'l
<a href="#">1.4</a>	Impact on genetic integrity	<b>U</b>	No Information

<p><b>Impact</b></p> <p><i>Enter four characters from Q1.1-1.4 below:</i></p> <p><b>BBBU</b></p> <p><i>Using matrix, determine score and enter below:</i></p> <p><b>B</b></p>
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<a href="#">2.1</a>	Role of anthropogenic and natural disturbance	<b>B (2 pts)</b>	Other Pub. Mat'l
<a href="#">2.2</a>	Local rate of spread with no management	<b>A (3 pts)</b>	Other Pub. Mat'l
<a href="#">2.3</a>	Recent trend in total area infested within state	<b>B (2 pts)</b>	Observational
<a href="#">2.4</a>	Innate reproductive potential <a href="#">Wksht A</a>	<b>A (3 pts)</b>	Rev'd, Sci. Pub'n
<a href="#">2.5</a>	Potential for human-caused dispersal	<b>C (1 pt)</b>	Other Pub. Mat'l
<a href="#">2.6</a>	Potential for natural long-distance dispersal	<b>D (0 pts)</b>	Other Pub. Mat'l
<a href="#">2.7</a>	Other regions invaded	<b>C (1 pt)</b>	Other Pub. Mat'l

<p><b>Invasiveness</b></p> <p><i>Enter the sum total of all points for Q2.1-2.7 below:</i></p> <p><b>12</b></p> <p><i>Use matrix to determine score and enter below:</i></p> <p><b>B</b></p>
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<p><b>Plant Score</b></p> <p><i>Using matrix, determine Overall Score and Alert Status from the three section scores and enter below:</i></p> <p><b>Medium</b></p> <p><b>No Alert</b></p>
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<a href="#">3.1</a>	Ecological amplitude/Range	<b>A</b>	Other Pub. Mat'l
<a href="#">3.2</a>	Distribution/Peak frequency <a href="#">Wksht C</a>	<b>D</b>	Observational

<p><b>Distribution</b></p> <p><i>Using matrix, determine score and enter below:</i></p> <p><b>B</b></p>
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**Table 3. Documentation**

<p><b>Question 1.1</b> Impact on abiotic ecosystem processes</p>	<p>B Rev'd, Sci. Pub'n <a href="#">back</a></p>
<p>Identify ecosystem processes impacted: Plants are highly competitive for soil moisture.</p>	
<p>Rationale: enter text here</p>	
<p>Sources of information: Rose, K. K., A. L. Hild, T. D. Whitson, D. W. Koch, and L. Van Tassel. 2001. Competitive effects of cool-season grasses on re-establishment of three weed species. Weed Technology 15(4): 885-891</p>	
<p><b>Question 1.2</b> Impact on plant community composition, structure, and interactions</p>	<p>B Rev'd, Sci. Pub'n <a href="#">back</a></p>
<p>Identify type of impact or alteration: Displaces existing plant communities through vegetative reproduction. Highly efficient in competing for moisture and usually emerges before competing species (1). Seedlings are less successful where dense stands of grasses are present, but this may not be very important as most of its competitive ability comes from the spread of roots. Plants are highly competitive for soil moisture with winter annuals and shallow-rooted perennials, and large colonies that displace desirable vegetation can develop in natural areas. The toadflaxes are especially problematic in the northwestern states, where thousands of acres of rangeland are heavily infested.</p>	
<p>Rationale: Production of dalmation toadflax declines as seeded grasses increase (2). Plant competition was the main factor influencing seedling counts, suggesting that recruitment of Dalmation toadflax is limited by interspecific resource competition (3).</p>	
<p>Sources of information: 1. Lajeunesse, S. 1999. Dalmatian and yellow toadflax. pp. 202-216 in Sheley, R.L., and J. K. Petroff. Biology and management of noxious rangeland weeds. Oregon State University Press, Corvallis, OR 2. Rose, K. K., A. L. Hild, T. D. Whitson, D. W. Koch, and L. Van Tassel. 2001. Competitive effects of cool-season grasses on re-establishment of three weed species. Weed Technology 15(4): 885-891 3. Grieshop, M. J. and R. M. Nowierski . 2002. Selected factors affecting seedling recruitment of dalmatian toadflax. Journal of Range Management 55(6): 612-619.</p>	
<p><b>Question 1.3</b> Impact on higher trophic levels</p>	<p>B Other Pub. Mat'l <a href="#">back</a></p>
<p>Identify type of impact or alteration: Loss of forage can impact big-game species. Deer browse dalmation toadflax, but it is not know to be heavily used by any native species (1). Livestock typically avoid grazing toadflax; thus, livestock carrying capacity is much reduced in areas where there are large, dense populations of toadflax. Both species contain quinazoline alkaloids that could possibly pose toxicity problems if ingested in sufficient quantity, but intoxications of livestock have not been reported.</p>	
<p>Rationale: enter text here</p>	
<p>Sources of information: 1. Lajeunesse 1999 DiTomaso and Healy. 2006. Weeds of California. UC DANR Publ. #3488.</p>	

<b>Question 1.4</b> Impact on genetic integrity	U No Information <a href="#">back</a>
Identify impacts: There is one native ( <i>L. canadensis</i> , blue toadflax) and several introduced species of <i>Linaria</i> in California (1). A hybrid between <i>L. dalmatica</i> and <i>L. vulgaris</i> was found in Modoc County (2), so presumably it could also hybridize with <i>L. canadensis</i> .	
Rationale: enter text here	
Sources of information: 1. Hickman, J. C. (ed.) 1993. The Jepson Manual, Higher Plants of California. University of California Press. Berkeley, CA 2. Vujnovic K., and R.W. Wein R.W. 1997. The Biology of Candadian Weeds. 106. <i>Linaria dalmatica</i> (L.) Mill. Canadian Journal of Plant Science 77(3): 483-401.	
<b>Question 2.1</b> Role of anthropogenic and natural disturbance in establishment	B Other Pub. Mat'l <a href="#">back</a>
Describe role of disturbance: All papers describe it as occurring in disturbed habitats, but it is frequently invading undisturbed sites.	
Rationale: Many populations have evolved with, and are adapted to, periodic disturbances of agriculture. Can also establish in naturally-occurring disturbances (1). In California, occurs in a range of disturbed areas (see 3.1). In Washington, dalmation toadflax seedings were never found on non-cultivated areas, indicating it may be unable to become established in heavy stands of vegetation (2). See also question 1.2.	
Sources of information: 1. Lajeunesse 1999 2. Gates D.H., Robocker W.C. 1961?. Revegetation with adapted grasses in competition with dalmation toadflax and St. Johnswort. Scientific Paper 1943, Washington Agricultural Experiment Station, Pullman, WA	
<b>Question 2.2</b> Local rate of spread with no management	A Other Pub. Mat'l <a href="#">back</a>
Describe rate of spread: Can expand at a rapid rate in many locations of the west, including California.	
Rationale: enter text here	
Sources of information: DiTomaso and Healy. 2006. Weeds of California. UC DANR Publ. #3488.	
<b>Question 2.3</b> Recent trend in total area infested within state	B Observational <a href="#">back</a>
Describe trend: Spreading, but not rapidly. Some control efforts by CDFA keep populations down.	
Rationale: enter text here	
Sources of information: DiTomaso, observational.	

<b>Question 2.4</b> Innate reproductive potential	A Rev'd, Sci. Pub'n <a href="#">back</a>
Describe key reproductive characteristics: Deep-rooted, short-lived (3-5 yrs) herbaceous perennial (1). Insect-pollinated and self-incompatible (2). Individual patches can persist 13 yrs or more. Flowering begins in June and continues until September or October, but can occur earlier in warmer habitats. Within nine weeks after germination, seedling roots have vegetative buds that can give rise to new, independent plants. Roots of mature plants can reach to 10 ft deep (1). Produces seeds for 3 months. A large plant can produce 500,000 seeds. >90% germination can be obtained from 2 or 3-yr-old seeds in the lab. Seed longevity under field conditions can be up to 10 yrs (3).	
Rationale: enter text here	
Sources of information: 1. Lajeunesse 1999 2. Vujnovic, K. and R. W. Wein 1997. The biology of Canadian weeds: 106. <i>Linaria dalmatica</i> (L.) Mill. Canadian Journal of Plant Science 77(3): 483-491. 3. Robocker, W. C. 1970. Seed characteristics and seedling emergence of Dalmatian toadflax. [ <i>Linaria dalmatica</i> ]. Weed Science 18(6): 720-725.	
<b>Question 2.5</b> Potential for human-caused dispersal	C Other Pub. Mat'l <a href="#">back</a>
Identify dispersal mechanisms: Was used as a garden plant, although is not currently listed in the Sunset Western Garden Book (1). On farm land, root pieces can be spread by farm equipment. Seeds can be transported in mud on bikes, tires, feet of livestock, etc. (2). However, most seed fall directly below parent plant.	
Rationale: enter text here	
Sources of information: 1. Brenzel, K. N. 2001. Sunset Western Garden Book. Sunset Publishing Company, Menlo Park, CA. 2. Lajeunesse 1999	
<b>Question 2.6</b> Potential for natural long-distance dispersal	D Other Pub. Mat'l <a href="#">back</a>
Identify dispersal mechanisms: Seeds can be dispersed by wind, but 80-90% of seeds fall within 0.5m of the parent plant (1), so long distance dispersal does not sound common.	
Rationale: enter text here	
Sources of information: 1. Lajeunesse 1999	
<b>Question 2.7</b> Other regions invaded	C Other Pub. Mat'l <a href="#">back</a>
Identify other regions: Native to the Mediterranean. Serious problem in rangeland of the northwestern U.S. Listed as a noxious weed in Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, South Dakota, Washington, Wyoming (1). Also invasive in Canada, the British Isles, the mideast , and other areas around the world. Dalmatian toadflax and yellow toadflax were brought to North America from Europe as garden ornamentals in the mid- to late-1800s and mid-1600s, respectively, and have since widely escaped cultivation.	

Rationale:	
Sources of information: 1. DiTomaso and Healy. 2006. Weeds of California. UC DANR Publ. #3488.	
<b>Question 3.1</b> Ecological amplitude/Range	A Other Pub. Mat'l <a href="#">back</a>
Describe ecological amplitude, identifying date of source information and approximate date of introduction to the state, if known: Occurs throughout California, except Great Basin and deserts, to 1000m. Grows in disturbed open sites, fields, pastures, rangeland, forest clearings, roadsides, crops. Can tolerate a broad range of climatic conditions and soil types, but grows best in cool, semi-arid climates, and on dry, coarse soils at neutral to slightly alkaline pH. Does NOT occur in the following counties: Amador, Fresno, Imperial, Kings, Marin, Mariposa, Orange, Riverside, San Benito, Santa Clara, Santa Cruz, Stanislaus, Sonoma, Sutter, Tuolumne, Yuba.	
Rationale: enter text here	
Sources of information: DiTomaso and Healy. 2006. Weeds of California. UC DANR Publ. #3488.	
<b>Question 3.2</b> Distribution/Peak frequency	D Observational <a href="#">back</a>
Describe distribution: Not common in state, mainly found in northern areas.	
Rationale: enter text here	
Sources of information: DiTomaso, observational. Joanna Clines, Sierra National Forest, pers. obs.	

**Worksheet A**[back](#)

Reaches reproductive maturity in 2 years or less	<b>Yes: 1 pt</b>
Dense infestations produce >1,000 viable seed per square meter	<b>Yes: 2 pts</b>
Populations of this species produce seeds every year.	<b>Yes: 1 pt</b>
Seed production sustained over 3 or more months within a population annually	<b>No: 0 pt</b>
Seeds remain viable in soil for three or more years	<b>Yes: 2 pts</b>
Viable seed produced with <i>both</i> self-pollination and cross-pollination	<b>No: 0 pt</b>
Has quickly spreading vegetative structures (rhizomes, roots, etc.) that may root at nodes	<b>Yes: 1 pt</b>
Fragments easily and fragments can become established elsewhere	<b>No: 0 pts</b>
Resprouts readily when cut, grazed, or burned	<b>Yes: 1 pt</b>
	<b>8 pts      Total Unknowns</b>
	<b>A (6+ pts)</b>

**Note any related traits:** enter text here

## Worksheet C - California Ecological Types

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(*sensu* Holland 1986)

Major Ecological Types	Minor Ecological Types	Code*
<b>Marine Systems</b>	marine systems	score
<b>Freshwater and Estuarine Aquatic Systems</b>	lakes, ponds, reservoirs	score
	rivers, streams, canals	score
	estuaries	score
<b>Dunes</b>	coastal	score
	desert	score
	interior	score
<b>Scrub and Chaparral</b>	coastal bluff scrub	score
	coastal scrub	score
	Sonoran desert scrub	score
	Mojavean desert scrub (incl. Joshua tree woodland)	score
	Great Basin scrub	D. presen
	chenopod scrub	score
	montane dwarf scrub	score
	Upper Sonoran subshrub scrub	score
	chaparral	score
<b>Grasslands, Vernal Pools, Meadows, and other Herb Communities</b>	coastal prairie	score
	valley and foothill grassland	score
	Great Basin grassland	D. presen
	vernal pool	score
	meadow and seep	score
	alkali playa	score
	pebble plain	score
<b>Bog and Marsh</b>	bog and fen	score
	marsh and swamp	score
<b>Riparian and Bottomland</b>	riparian forest	score
	riparian woodland	score
	riparian scrub (incl. desert washes)	score
<b>Woodland</b>	cismontane woodland	score
	piñon and juniper woodland	score
	Sonoran thorn woodland	score
<b>Forest</b>	broadleaved upland forest	score
	North Coast coniferous forest	score
	closed cone coniferous forest	score
	lower montane coniferous forest	D. presen
	upper montane coniferous forest	D. presen
	subalpine coniferous forest	score
<b>Alpine Habitats</b>	alpine boulder and rock field	score
	alpine dwarf scrub	score

\* A. means >50% of type occurrences are invaded; B means >20% to 50%; C. means >5% to 20%; D. means present but ≤5%; U. means unknown (unable to estimate percentage of occurrences invaded).