Part IV. Plant Assessment Form

For use with "Criteria for Categorizing Invasive Non-Native Plants that Threaten Colorado's Wildlands and Agriculture"
By the Colorado Noxious Weed Advisory Committee

Electronic version: December 4, 2008

Table 1. Species and Evaluator Information

Species name (Latin binomial)**:**	Zygophyllum fabago L.
Synonyms:	Zygophyllum fabago L. var. brachycarpum auct. non Boiss
Common names:	Syrian Bean Caper
Evaluation date (mm/dd/yy)**:**	4/2/10
Evaluator #1 Name/Title:	Ryan Edwards, Graduate research assistant
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Section below for list committee use—please leave blank

List committee members:	enter text here
Committee review date:	enter text here
List date:	enter text here
Re-evaluation date(s):	enter text here

General comments on this assessment:
Syrian bean caper is an invasive weed that has been sighted in the state of Colorado. The latest report of Syrian bean caper was in 2006 in Mesa County. Syrian bean caper specimens were also found in the CSU herbarium from the 1950's, indicating that this plant has been in Colorado before, and may be encroaching on our state again.

Syrian bean caper is a herbaceous perennial forb, which produces waxy leaves and is considered drought tolerant. The plant typically grow is dry or alkaline soils, where it forms dense patches and displaces other native plants. Plants can grow upwards of three feet tall. Flowers are produced on each stalk and are white with five petals with a slight pink tinge. Seeds are produced in five chambered pods, similar to agronomic capers (which gives the plant its name), and are cylinder shaped. Syrian bean caper reproduces both from seeds and from its extensive root structure. Syrian bean caper is related to both Puncture vine and African rue.

Syrian bean caper populations in the state should be monitored and at minimum, the plant should be placed on a watch list.

Table 2. Criteria, Section, and Overall Scores

1.1	Impact on abiotic ecosystem processes	**D**	**Other Pub. Mat'l**		**Impact** *Enter four characters from Q1.1-1.4 below:* **DABD** *Using matrix, determine score and enter below:* **B**		
1.2	Impact on plant community	**A**	**Other Pub. Mat'l**				
1.3	Impact on higher trophic levels	**B**	**Other Pub. Mat'l**				
1.4	Impact on genetic integrity	**D**	**Other Pub. Mat'l**				
2.1	Role of anthropogenic and natural disturbance	**A (3 pts)**	**Other Pub. Mat'l**		**Invasiveness** *Enter the sum total of all points for Q2.1-2.7 below:* **12** *Use matrix to determine score and enter below:* **B**		**Wildlands Plant Score** *Using matrix, determine Overall Score and Alert Status from the first, second, and third section scores and enter below:* **Moderate** **Red Alert**
2.2	Local rate of spread with no management	**A (3 pts)**	**Other Pub. Mat'l**				
2.3	Recent trend in total area infested within state	**C (1 pt)**	**Observational**				
2.4	Innate reproductive potential Wksht A	**B (2 pts)**	**Other Pub. Mat'l**				
2.5	Potential for human-caused dispersal	**C (1 pt)**	**Other Pub. Mat'l**				
2.6	Potential for natural long-distance dispersal	**D (0 pts)**	**Anecdotal**				
2.7	Other regions invaded	**B (2 pts)**	**Other Pub. Mat'l**				
3.1	Ecological amplitude/Range	**D**	**Observational**		**Distribution** *Using matrix, determine score and enter below:* **D**		
3.2	Distribution/Peak frequency Wrksht B	**D**	**Observational**				

4.1	Poisonous to livestock	**D (0 pts)**	**Other Pub. Mat'l**
4.2	Detrimental to economic crops	**U (0 pts)**	**No Information**
4.3	Detrimental to management of agricultural system, rangeland and pasture	**B (2 pts)**	**Other Pub. Mat'l**
4.4	Human impacts Wrksht C	**B (2 pts)**	**Rev'd, Sci. Pub'n**

Agricultural / Human Impact

Enter the sum total of all points for Q4.1-4.4 below:

4

Use matrix to determine score and enter below:

C

Agricultural Plant Score

Using matrix, determine Overall Score and Alert Status from the second, third and fourth section scores and enter below:

Moderate

No Alert

Table 3. Documentation

Question 1.1 Impact on abiotic ecosystem processes	D Other Pub. Mat'l back
Identify ecosystem processes impacted: From the literature, there does not appear to be any instances of Syrian bean caper altering the surrounding ecosystem (1).	
Rationale: Syrian bean capper grows well on dry or alkaline soils (1). However, there does not appear to be any instances in which Syrian bean capper lead to the drier or more saline soils.	
Sources of information: (1) Davison, J., and Wargo, M. Syrian Beancaper: Another New Noxious Weed Threatens Nevada. University of Nevada Cooperative Extenson factsheet: FS-01-46.	
Question 1.2 Impact on plant community composition, structure, and interactions	A Other Pub. Mat'l back
Identify type of impact or alteration: Syrian bean caper can form dense colonies that can exclude other surrounding native plants (1).	
Rationale: Due to its thick waxy leaves, Syrian bean caper is capable of withstanding drought. Syrian bean caper also has an extensive root system, alowing it to uptake more resources then surounding plants.	
Sources of information: (1) Davison, J., and Wargo, M. Syrian Beancaper: Another New Noxious Weed Threatens Nevada. University of Nevada Cooperative Extenson factsheet: FS-01-46.	
Question 1.3 Impact on higher trophic levels	B Other Pub. Mat'l back
Identify type of impact or alteration: Syrian bean caper is not palatable to livestock and wildlife (1).	
Rationale: Syrian bean caper can affect the surrounding vegetation , and can decrease the numbers of foraging plants, in-directly effecting higher trophic levels (1).	
Sources of information: (1) Davison, J., and Wargo, M. Syrian Beancaper: Another New Noxious Weed Threatens Nevada. University of Nevada Cooperative Extenson factsheet: FS-01-46.	
Question 1.4 Impact on genetic integrity	D Other Pub. Mat'l back
Identify impacts: There is no information in the literature indicating Syrian bean caper hybridizing with other members of the Zygophyllaceae family (1,2).	
Rationale: Syrian bean caper is closely related to Puncture Vine and African Rue, however, there are no know instances in which Syrian bean caper and these plants have hybridized.	

Sources of information:

(1) Davison, J., and Wargo, M. Syrian Beancaper: Another New Noxious Weed Threatens Nevada. University of Nevada Cooperative Extenson factsheet: FS-01-46.

(2) Belchi-Hernandez, J., Moreno-Grau, S., Bayo, J., Rosique, C., Bartolome, B., and Moreno, J.M. 1997. Zygophyllum fabago L. : A new source of allergenic pollen. Journal of Allergy and clinical Immunology. 99: 493-496.

Question 2.1 Role of anthropogenic and natural disturbance in establishment A Other Pub. Mat'l back

Describe role of disturbance: Syrian bean capper grows well in areas that have a high disturbance regime (e.g. roadsides, pastures, gravel pits, overgrazed areas, etc) (1).

Rationale: Syrian bean caper can establish in areas with decreased competition. Following establishment, Syrian bean caper can quickly dominate an area and outcompete the remaining other plants.

Sources of information:

(1) Davison, J., and Wargo, M. Syrian Beancaper: Another New Noxious Weed Threatens Nevada. University of Nevada Cooperative Extenson factsheet: FS-01-46.

Question 2.2 Local rate of spread with no management A Other Pub. Mat'l back

Describe rate of spread: Left uncontrolled, Syrian bean caper can quickly form a dense colony of plants which will exclude surrounding native plants (1).

Rationale: Reports in the literature indicate that Syrian bean caper grows quickly, and can form dense patches of plants. These dense patches quickly outcompete surrounding vegetation, and reduce their numbers.

Sources of information:

(1) Davison, J., and Wargo, M. Syrian Beancaper: Another New Noxious Weed Threatens Nevada. University of Nevada Cooperative Extenson factsheet: FS-01-46.

Question 2.3 Recent trend in total area infested within state C Observational back

Describe trend: Syrian bean caper has been found in Colorado as recently as 2006.

Rationale: The most recent reports of Syrian bean capper in the sate come from the CWMA website, where Syrian bean caper was found in 2006, in Mesa County by Jude Sirota. On the CWMA website, the report of the infestion indicated a small patch along the westbound side of I-70 2 miles from Fruita. Reports of Syrian bean caper in that area were also reported in the 1950's (3).

Sources of information:

(3) Colorado weed management association. weed spotter archive: Syrian bean caper. available at : www.cwma.org/weedspotter_archive.html.

Question 2.4 Innate reproductive potential	B Other Pub. Mat'l back
Describe key reproductive characteristics: Syrian bean caper reporduces by seeds and by spreading rhizomes (1). Rhizome pieces can produce new plants when cut and transported to new locations (2).	
Rationale: Reports in the literature indicate that Syrian bean caper can spread quickly, and thrives in dry soils.	
Sources of information: (1) Davison, J., and Wargo, M. Syrian Beancaper: Another New Noxious Weed Threatens Nevada. University of Nevada Cooperative Extenson factsheet: FS-01-46. (2) Belchi-Hernandez, J., Moreno-Grau, S., Bayo, J., Rosique, C., Bartolome, B., and Moreno, J.M. 1997. Zygophyllum fabago L. : A new source of allergenic pollen. Journal of Allergy and clinical Immunology. 99: 493-496.	

Question 2.5 Potential for human-caused dispersal	C Other Pub. Mat'l back
Identify dispersal mechanisms: Syrian bean caper can grow from root stalks, which can be transported to new sites (1).	
Rationale: Accidental transport of Syrian bean caper, especially a root fragment, could begin a new colony.	
Sources of information: (1) Davison, J., and Wargo, M. Syrian Beancaper: Another New Noxious Weed Threatens Nevada. University of Nevada Cooperative Extenson factsheet: FS-01-46.	

Question 2.6 Potential for natural long-distance dispersal	D Anecdotal back
Identify dispersal mechanisms: Syrian bean caper reproduces by seed and root fragments (1). Syrian bean caper is also unpalatable to livestock and wildlife (1).	
Rationale: Potential for Syrian bean caper to be eaten by a animal and defecated into a new environment is not an issue, due to Syrian bean capers unpalatableness. Dispersal by root fragments and seed appears to be a localized means of spread.	
Sources of information: (1) Davison, J., and Wargo, M. Syrian Beancaper: Another New Noxious Weed Threatens Nevada. University of Nevada Cooperative Extenson factsheet: FS-01-46.	

Question 2.7 Other regions invaded	B Other Pub. Mat'l back
Identify other regions: Syrian bean caper appears to grow well in dry or alkaline soils (1).	
Rationale: Reports in the literature indicate that Syrian bean caper is primarily a problem in desert soils that are relatively dry and alkaline. Syrian bean caper has thick waxy leaves which allow it to be drought tolerant, and an extensive underground root system for capturing moisture lower in the soil column.	

Sources of information:

(1) Davison, J., and Wargo, M. Syrian Beancaper: Another New Noxious Weed Threatens Nevada. University of Nevada Cooperative Extenson factsheet: FS-01-46.

Question 3.1 Ecological amplitude/Range D Observational back

Describe ecological amplitude, identifying date of source information and approximate date of introduction to the state, if known: The most recent reports of Syrian bean capper in the sate come from the CWMA website, where Syrian bean caper was found in 2006, in Mesa County by Jude Sirota. On the CWMA website, the report of the infestion indicated a small patch along the westbound side of I-70 2 miles from Fruita. Reports of Syrian bean caper in that area were also reported in the 1950's (3).

Rationale: No further reports of Syrian bean caper were found on the CWMA website. However, the observation did include a tag that the CSU herbarium has samples of Syrian bean caper from 50 years ago in the same area as the more recent samples were found. 3 samples found in the CSU herbarium were from 1954-1956 and all were collected in Mesa county (4). This new sighting could possibly mean that there is a population of Syrian bean caper in the state, all though no other evidence has been found.

Sources of information:

(3) Colorado weed management association. weed spotter archive: Syrian bean caper. available at : www.cwma.org/weedspotter_archive.html.

(4) CSU herbarium. Zygophyllum fabago (Syrian beancaper). Available at: http://wsprod.colostate.edu/cwis440/herbarium/plantinfo.asp?PlantID=3475

Question 3.2 Distribution/Peak frequency D Observational back

Describe distribution: Syrian bean caper thrives well is areas that are dry and contain alkaline soils (1).

Rationale: Dry regions in the state could house Syrian bean caper populations. These could include the foothills shrublands and the sagebrush shrublands.

Sources of information:

(1) Davison, J., and Wargo, M. Syrian Beancaper: Another New Noxious Weed Threatens Nevada. University of Nevada Cooperative Extenson factsheet: FS-01-46

Question 4.1 Poisonous to Livestock D Other Pub. Mat'l back

Describe impacts in terms of high probability of death, long-term health impacts, or short-term health impacts: Syrian bean caper is unpalatable to livestock and wildlife (1).

Rationale: There are no reports in the literature indicating any poisonous compounds in the leaves of Syrian bean caper. However, it is stated in several sources that Syrian bean caper is unpalatable to livestock, although the reasoning is not listed.

Sources of information: (1) Davison, J., and Wargo, M. Syrian Beancaper: Another New Noxious Weed Threatens Nevada. University of Nevada Cooperative Extenson factsheet: FS-01-46
Question 4.2 Detrimental to Economic Crops U No Information back
Describe impacts to all aspects of cropping systems (see guidelines): There is no information in the literature documenting Syrian bean caper infesting agronomic crops.
Rationale: Syrian bean caper prefers alkaline and dry soils. Potentially, the avenue would exist for Syrian bean caper to infest dryland agriculture; however there are no reports of such events happening.
Sources of information: Observational
Question 4.3 Detrimental to Mgmt of Agricultural System, Rangeland and Pasture B Other Pub. Mat'l back
Describe impacts to water diversion systems, increased water use, reduced forage for livestock: Syrian bean caper can form dense patches when it becomes established. These dense patches can outcompete and push out many native species which surround Syrian bean caper infestations (1).
Rationale: Dense patches of Syrian bean caper could decrease forage species on dry rangeland areas
Sources of information: (1) Davison, J., and Wargo, M. Syrian Beancaper: Another New Noxious Weed Threatens Nevada. University of Nevada Cooperative Extenson factsheet: FS-01-46.
Question 4.4 Human Health Impacts B Rev'd, Sci. Pub'n back
Describe key human impacts such as; irritants, property values, recreational values, and industry impacts: Syrian bean caper has been shown to undergo ambophilous pollination (both wind and insect pollinated) that disperses lots of pollen into the air. This type of pollination has been linked to multiple allergenic situations (2,5).
Rationale: Studies have been conducted on the pollen of Syrian bean caper, and it has been shown that the pollen of Syrian bean caper triggers a increase in allergenic proteins in the mucosa (2,5). Studies were conducted to test the percentage of patients who could detect the sensitization to Syrian bean caper, and it was found to be similar to other allergenic pollens (2).
Sources of information: (2) Belchi-Hernandez, J., Moreno-Grau, S., Bayo, J., Rosique, C., Bartolome, B., and Moreno, J.M. 1997. Zygophyllum fabago L. : A new source of allergenic pollen. Journal of Allergy and clinical Immunology. 99: 493-496. (5) Castells, T., Arcalis, E., Moreno-Grau, S., Bayo, J., Elvira-Rendueles, B., Belchi, J., Seoane-Camba, J., and Suarez-Cervera, M. 2002. Immunocytochemical localization of allergenic proteins from mature to activated Zygophyllum fabago L. (Zygophyllaceae) pollen grains. European Journal of Cell Biology. 81:117-115.

Worksheet A

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Reaches reproductive maturity in 2 years or less	**Unknown: 0 pts**
Dense infestations produce >1,000 viable seed per square meter	**Unknown: 0 pts**
Populations of this species produce seeds every year.	**Yes: 1 pt**
Seed production sustained over 3 or more months within a population annually	**Unknown: 0 pts**
Seeds remain viable in soil for three or more years	**Unknown: 0 pts**
Viable seed produced with *both* self-pollination and cross-pollination	**Unknown: 0 pts**
Has quickly spreading vegetative structures (rhizomes, roots, etc.) that may root at nodes	**Yes: 1 pt**
Fragments easily and fragments can become established elsewhere	**Yes: 2 pts**
Resprouts readily when cut, grazed, or burned	**Yes: 1 pt**
	5 pts 5 unknowns
	U (3+ unknowns)

Note any related traits: Syrian bean caper reproduces from seed and from root stalks. Flowers are ambophilous. Fragments of the root stalks can resport and form new colonies of Syrian bean caper. Root stalks can also resprout from cut root stalks. No information was found on soil seed bank, viability, or seed

Worksheet B - Colorado Ecological Types and Land Use

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Major Ecological and Land Use Types	Minor Ecological and Land Use Types	Code*
Freshwater and Aquatic Systems	lakes, ponds, reservoirs	**Unknown**
	rivers, streams, canals	**Unknown**
Riparian and wetlands	Riparian forest	**Unknown**
	Riparian shrublands	**Unknown**
	Wet meadows	**Unknown**
Grasslands	Shortgrass prairie	**Unknown**
	Tallgrass prairie	**Unknown**
	Sandsage prairie	**Unknown**
	Montane meadows	**Unknown**
Irrigated Agriculture	Hay meadows	**Unknown**
	Irrigated crops (alfalfa, corn, sugar beets)	**Unknown**
Dryland Agriculture	Dryland crops (wheat, corn, millet, dryland grass hay, sunflowers, mustard for biodiesel)	**Unknown**
Developed Lands	Urban, exurban, industrial	**Unknown**
Arid Shrublands	Sagebrush shrublands	**D. presen**
	Foothills shrublands	**D. presen**
	Gambel oak shrublands	**Unknown**
Woodlands	Pinyon - juniper	**Unknown**
	Ponderosa pine	**Unknown**
	Limber pine	**Unknown**
Forest	Lodgepole pine	**Unknown**
	Spruce-fir	**Unknown**
Alpine	Boulder and rock fields	**Unknown**
	Dwarf shrublands	**Unknown**
	Tundra	**Unknown**
Barrens (lower elevation)	Dunes	**Unknown**
	Rock outcrops	**Unknown**
	Canyonlands	**Unknown**

* 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).

Worksheet C – Human Impacts

Human health impacts; irritants (sap), spines, poisonous, and/or smoke impacts	**Yes: 1 pt**
Property values are decreased due to increased risk of fire	**No: 0 pts**
Decreased property value due to moderate to heavy infestations	**Yes: 2 pts**
Decreased land value for recreational use; boating, fishing, camping, etc.	**No: 0 pts**
Impact of listing detrimental to industry; agriculture, horticulture, nursery, and/or seed	**No: 0 pt**
	3 pts Total Unknowns
	B (3 pts)

Note any related traits: Multiple studies have been conducted on the pollen of Syrian bean caper, and have found its allergenicity similar to other allergen inducing plants. Dense patches of Syrian bean caper can decrease the overall production pasture lands, and could decrease property values.