

## California Pest Rating Proposal for

*Cenchrus clandestinus* (Hochst. ex Chiov.) Marrone: kikuyugrass

Family: Poaceae

Pest Rating: C

---

Comment Period: **09/03/2019 through 10/18/2019**

---

### Initiating Event:

*Cenchrus clandestinus* is currently a C-rated noxious weed [3 CCR § 4500] in California. A pest rating proposal is required to support an official pest rating based on current information.

### History & Status:

**Background:** *Cenchrus clandestinus* (Hochst. ex Chiov.) Morrone (= *Pennisetum clandestinum* Hochst. ex Chiov.; kikuyugrass) is a creeping perennial grass belonging to subfamily Panicoideae. It can reproduce by seed, but its primary spread is vegetative through its rhizomes and stolons (Wilén et al. 1995). The mature seeds are approximately 2 mm long and can remain viable in soil for more than 10 years. The inflorescence has only 2-4 spikelets, each 1-2 cm long with two florets and a circle of short bristles at their base. It produces strong vigorous stolons and rhizomes that spread rapidly in a circular pattern from the parent plant, colonizing bare ground and encroaching on croplands, grasslands, forest, and waste areas (Wilén and Holt 1996). Stolons root readily at the nodes. The thick, white rhizomes spread through the soil to a depth of 30 or more, producing a tough, dense sod that is difficult to plow or penetrate with tillage equipment. Both rhizomes and tillers can survive during heavy tillage and dry period; however, severe desiccation will kill them. The plant can withstand repeated defoliation; hence, it is very resistant to overgrazing or mowing. (Holm et al., 1977).

*Cenchrus clandestinus* was introduced to California for the same reasons it was introduced in other parts of the world: to be used as a ground cover and to prevent soil erosion. It has escaped cultivation and become weedy in some agricultural, urban and coastal areas of California.

*Cenchrus clandestinus* is a Federal noxious weed, but California Department of Food and Agriculture (CDFA) allow its cultivation under a Federal permit in limited areas of California.

**Worldwide Distribution:** *Cenchrus clandestinus* is native to central and east Africa, including Burundi, Democratic Republic of Congo (Zaire), Ethiopia, Kenya, Rwanda, Tanzania, and Uganda (USDA-ARS, 2008). It is naturalized in northern and southern Africa, tropical Asia, Australia, New Zealand, the United States (California and Hawaii), Mexico, Central America, South America, Melanesia, and Polynesia (Cook et al., 2005).

**Official Control:** *Cenchrus clandestinus* is listed as a harmful organism in French Polynesia (USDA PCIT). It is listed as a class A noxious weed in Alabama, North Carolina, and Vermont and a class C noxious weed in California. It is a prohibited noxious weed in Massachusetts and Minnesota. It is considered a plant pest in Florida and a quarantined weed in Oregon (NRCS- USDA).

**California Distribution:** *Cenchrus clandestinus* is present along the immediate coastal region of California and the coastal adjacent areas, as well as occasional occurrences in the Central Valley. Many of these sites represent persistence from turf and cultivation.

**California Interceptions:** *Cenchrus clandestinus* first began to be collected in the 1940s along the coast, probably when it began to be used as salt-resistant turfgrass. CDFA botanist Margaret Bellue collected it in San Diego County in 1944. (PHPPS- PDR Database).

The risk *Cenchrus clandestinus* (kikuyugrass) would pose to California is evaluated below.

## Consequences of Introduction:

- 1) **Climate/Host Interaction:** *Cenchrus clandestinus* can be very invasive in warmer climates. It can tolerate drought and waterlogged and slightly saline conditions. Therefore, its adaptation to coastal habitats in southern California is high; it may be able to establish in a larger but limited part of California. It receives a **Medium (2)** in this category.
  - Low (1) Not likely to establish in California; or likely to establish in very limited areas.
  - **Medium (2) may be able to establish in a larger but limited part of California.**
  - High (3) likely to establish a widespread distribution in California.
- 2) **Known Pest Host Range:** *Cenchrus clandestinus* does not require any one host but grows wherever ecological conditions are favorable. It receives a **High (3)** in this category.
  - Low (1) has a very limited host range.
  - Medium (2) has a moderate host range.
  - **High (3) has a wide host range.**
- 3) **Pest Reproductive and Dispersal Potential:** *Cenchrus clandestinus* reproduces primarily by aboveground stolons and belowground rhizomes and to a lesser extent by seed. It can be moved from one area to another on mowing and landscaping equipment, resulting in new infestations. It receives a **Medium (2)** in this category
  - Low (1) does not have high reproductive or dispersal potential.
  - **Medium (2) has either high reproductive or dispersal potential.**
  - High (3) has both high reproduction and dispersal potential.
- 4) **Economic Impact:** *Cenchrus clandestinus* is considered among the world's worst 100 weeds and is listed as a serious weed in eight countries (Holm et al., 1977). It is deliberately introduced as a useful plant for grazing or soil conservation, but because of its vegetative spread it can become invasive. It can establish in croplands and it interferes with the growth and cultivation of crops. It is believed to have some

allelopathic effects on herbs, if not on trees (Chou, 1989; 1999). It may cause toxicity to livestock, especially sheep (Waghorn et al., 2002). It receives a **High (3)** in this category.

**Economic Impact: A, B, D, F**

**A. The pest could lower crop yield.**

**B. The pest could lower crop value (includes increasing crop production costs).**

C. The pest could trigger the loss of markets (includes quarantines).

**D. The pest could negatively change normal cultural practices.**

E. The pest can vector, or is vectored, by another pestiferous organism.

**F. The organism is injurious or poisonous to agriculturally important animals.**

G. The organism can interfere with the delivery or supply of water for agricultural uses.

**Economic Impact Score: 3**

– Low (1) causes 0 or 1 of these impacts.

– Medium (2) causes 2 of these impacts.

– **High (3) causes 3 or more of these impacts.**

- 5) **Environmental Impact.** *Cenchrus clandestinus* can compete with native vegetation for nutrients, moisture, space, and light and is capable of invading and establishing in warm, coastal areas of California. Rare taxa that might be affected include grassland species such as showy Santa Cruz clover (*Trifolium buckwestiorum*), California filaree (*California macrophylla*), Santa Cruz tarplant (*Holocarpha macradenia*), and Contra costa goldfields (*Lasthenia conjugens*). Infestations of *Cenchrus clandestinus* could trigger additional private treatment programs in infested areas. It receives a **High (3)** in this category.

**Environmental Impact: A, B, C, D**

- A. The pest could have a significant environmental impact such as lowering biodiversity, disrupting natural communities, or changing ecosystem processes.**
- B. The pest could directly affect threatened or endangered species.**
- C. The pest could impact threatened or endangered species by disrupting critical habitats.**
- D. The pest could trigger additional official or private treatment programs.**
- E. The pest significantly impacts cultural practices, home/urban gardening or ornamental plantings.

**Environmental Impact Score: 3**

- Low (1) causes none of the above to occur.
- Medium (2) causes one of the above to occur.
- **High (3) causes two or more of the above to occur.**

**Consequences of Introduction to California for *Cenchrus clandestinus* (kikuyugrass): High (13)**

- Low = 5-8 points
- Medium = 9-12 points
- High = 13-15 points**

**6) Post Entry Distribution and Survey Information:** *Cenchrus clandestinus* is reported to be established along coastal areas in southern and central California (Wilén et al. 1995), and has extended to northern coastal counties (e.g., Marin, Mendocino Counties) but not all populations are supported with vouchered specimens for all localities. There are additional incursions into interior areas and southern arid drylands, but again, these populations are not fully established. It receives a conservative Low (-1) in this category due to the lack of recent surveys and supporting evidence.

- Not established (0) Pest never detected in California or known only from incursions.

–**Low (-1) Pest has a localized distribution in California or is established in one suitable climate/host area (region).**

–Medium (-2) Pest is widespread in California but not fully established in the endangered area, or pest established in two contiguous suitable climate/host areas.

–High (-3) Pest has fully established in the endangered area, or pest is reported in more than two contiguous or non-contiguous suitable climate/host areas.

### **Final Score:**

The final score is the consequences of introduction score minus the post entry distribution and survey information score: **Medium (12)**

### **Uncertainty:**

*Cenchrus clandestinus* introduced to California in 1920s from eastern Africa to reduce erosion on hillsides and then escaped and has become widespread in California. It has been cultivated in several golf courses in southern California, especially those subject to salt spray. It spreads aggressively and quickly but is still mostly confined to coastal areas. Therefore, there is low uncertainty regarding its potential to spread to a much larger portion of California.

### **Conclusion and Rating Justification:**

*Cenchrus clandestinus* is an invasive plant that is still spreading in geographic range but has occupied a significant portion of its potential habitat in California. Because of its relatively widespread distribution and current economic use in California a “C” rating is justified.

### **References:**

Australian Herbage Plant Registration Authority (continuously updated). Register of Australian Herbage Plant Cultivars. Division of Plant Industry, Commonwealth Scientific and Industrial Research Organization (CSIRO). Accessed July 19, 2019: Website <https://research.csiro.au/cultivars/>

Bourke, C. 2007. A review of kikuyu grass (*Pennisetum clandestinum*) poisoning in cattle. *Australian veterinary journal* 85(7):261-267.

CABI Crop Protection Compendium online data sheet. *Pennisetum clandestinum* (kikuyugrass). CABI Publishing 2018. Accessed July 19, 2019: <https://www.cabi.org/isc/datasheet/39765>

CalFlora. 2019. Information on California plants for education, research and conservation, with data contributed by public and private institutions and individuals, including the Consortium of California Herbaria. Accessed July 19, 2019: Website <https://www.calflora.org>

California Department of Food and Agriculture (CDFA). 2019. Pest and Damage Report Database. California Department of Food and Agriculture, Plant Health and Pest Prevention Services (PHPPS), Plant Data Analysis Services (PDAS), Sacramento, CA. Accessed July 19, 2019: <http://phpps.cdfa.ca.gov/user/frmLogon2.asp>

Chemisquy, M. A., L. M. Giussani, M. A. Scataglini, E. A. Kellogg, and O. Morrone. 2010. Phylogenetic studies favour the unification of *Pennisetum*, *Cenchrus* and *Odontelytrum* (Poaceae): a combined nuclear, plastid and morphological analysis, and nomenclatural combinations in *Cenchrus*. *Annals of botany* 106(1):107-130.

Chou CH, 1989. The role of allelopathy in biochemical ecology: experience from Taiwan. *Biologia Plantarum*, 31(6):458-470

Chou CH, 1999. Roles of allelopathy in plant biodiversity and sustainable agriculture. *Critical Reviews in Plant Sciences*, 18(5):609-636

Cook, B.G., Pengelly, B.C., Brown, S.D., Donnelly, J.L., Eagles, D.A., Franco, M.A., Hanson, J., Mullen, B.F., Partridge, I.J., Peters, M. and Schultze-Kraft, R. 2005. *Tropical Forages*. ISBN 0 643 09231 5

Accessed July 19, 2019:

[http://www.tropicalforages.info/key/forages/Media/Html/entities/pennisetum\\_clandestinum.htm](http://www.tropicalforages.info/key/forages/Media/Html/entities/pennisetum_clandestinum.htm)

Cudney, D. W., J. A. Downer, V. A. Gibeault, J. M. Henry, and J. S. Reints. 1993. Kikuyugrass (*Pennisetum clandestinum*) management in turf. *Weed Technology* 7(1):180-184.

Holm LG, Plucknett DL, Pancho JV, Herberger JP, 1977. *The World's Worst Weeds. Distribution and Biology*. Honolulu, Hawaii, USA: University Press of Hawaii.

Noxious Weeds; Cultivars of Kikuyu Grass; Proposed Rule by the Animal and Plant Health Inspection Service. 68 Federal Register 6653 (10 February 2003), pp. 6653-6655. Accessed July 19, 2019:

<https://www.federalregister.gov/d/03-3181>

Noxious Weeds; Final Rule by the Animal and Plant Health Inspection Service. 48 Federal Register 20037 (4 May 1983), pp. 20037-20040.

Thulin, M., and S. Phillips. 2015. The identity of *Pennisetum longistylum* (Poaceae). *Willdenowia* 45(2):173-176.

Tropicos, botanical information system at the Missouri Botanical Garden (TROPICOS). 2019.

Accessed July 19, 2019: Website <http://www.tropicos.org>

Waghorn GC, Adams NR, Woodfield DR, 2002. Deleterious substances in grazed pastures. In: *Sheep Nutrition* [ed. by Freer, M., Dove, H.]. Wallingford, UK: CABI Publishing, 333-356. Accessed May 10, 2019.

<http://www.cabi.org/CABeBooks/default.aspx?site=107&page=45&LoadModule=PDFHier&BookID=124>

Wilén, C. A., J. S. Holt, N. C. Ellstrand, and R. G. Shaw. 1995. Genotypic diversity of kikuyugrass (*Pennisetum clandestinum*) populations in California. *Weed Science* 43(2):209-214.



WILEN, C. A., AND J. S. HOLT. 1996. Spatial growth of kikuyugrass (*Pennisetum clandestinum*). *Weed Science* 44(2):323-330.

USDA-ARS Germplasm Resources Information Network (GRIN). (continuously updated). United States Department of Agriculture (USDA) Agricultural Research Service (ARS), U.S. National Plant Germplasm System (NPGS). Accessed July 19, 2019:

Website <https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch.aspx>

USDA Phytosanitary Certificate Issuance & Tracking System (PCIT), Phytosanitary Export Database (PEXD). Harmful organism report: Genus species. Accessed July 19, 2019:

Website <https://pcit.aphis.usda.gov/PEXD/faces/ViewPEXD.jsp>

USDA, NRCS. 2019. *Pennisetum clandestinum*. The PLANTS database (<http://plants.usda.gov>, 24 January 2019). National Plant Data Team, Greensboro, North Carolina. Accessed July 19, 2019:

Website <https://plants.usda.gov/core/profile?symbol=PECL2>

**Author:** Javaid Iqbal, California Department of Food and Agriculture; 2800 Gateway Oaks Drive, Suite 200 Sacramento, CA 95833; Tel. (916) 403-6695

### Responsible Party:

Robert Price, Primary State Botanist, California Department of Food and Agriculture; 3294 Meadowview Road, Sacramento, CA 955832; Tel. (916) 738-6700; [plant.health\[@\]cdfa.ca.gov](mailto:plant.health[@]cdfa.ca.gov).

---

**\*Comment Period: 09/03/2019 through 10/18/2019**

**\*NOTE:**

You must be registered and logged in to post a comment. If you have registered and have not received the registration confirmation, please contact us at [plant.health\[@\]cdfa.ca.gov](mailto:plant.health[@]cdfa.ca.gov).

---

### **Comment Format:**

- ❖ Comments should refer to the appropriate California Pest Rating Proposal Form subsection(s) being commented on, as shown below.

### **Example Comment:**

Consequences of Introduction: 1. Climate/Host Interaction: [Your comment that relates to “Climate/Host Interaction” here.]

---

- ❖ Posted comments will not be able to be viewed immediately.
- ❖ Comments may not be posted if they:
  - Contain inappropriate language which is not germane to the pest rating proposal;
  - Contains defamatory, false, inaccurate, abusive, obscene, pornographic, sexually oriented, threatening, racially offensive, discriminatory or illegal material;
  - Violates agency regulations prohibiting sexual harassment or other forms of discrimination;
  - Violates agency regulations prohibiting workplace violence, including threats.
- ❖ Comments may be edited prior to posting to ensure they are entirely germane.
- ❖ Posted comments shall be those which have been approved in content and posted to the website to be viewed, not just submitted.

---

### **Pest Rating: C**