



JUNGLERICE MANAGEMENT IN CALIFORNIA

What You'll Learn...

- Junglerice is a clumping annual grass that can be troublesome in summer-irrigated crops and orchards.
- Herbicide-resistant biotypes are prevalent in tropical rice producing areas around the world.
- Glyphosate-resistant populations have been found in California cropland, orchards, and roadsides.
- Management strategies should include tillage, postemergence and soil residual herbicides using multiple sites of action, and the prevention of junglerice seed production.

Weed Biology

Junglerice (*Echinochloa colona*) is a summer annual grass that is native to tropical and subtropical areas.¹ In the United States, the weed can be found throughout the west coast and southern states. Junglerice is related to barnyardgrass (*Echinochloa crus-galli*), and can be distinguished by purple bands on its leaves (Figure 1). However, the purple bands are not always visible.² Junglerice tends to be smaller than barnyardgrass, with more stems branching at the base of the plant, and a more spreading or open type of growth.



Figure 1. Purple bands on leaves of junglerice can be a distinguishing characteristic. Photo courtesy Johnny Saichuk, LSU AgCenter.

Junglerice can grow prostrate or erect and reach a height of 2 to 3 feet. Young plants are often flat and spreading in growth appearance (Figure 2). Seedling plants have rolled leaves with pointed tips. Stems are reddish-purple or green, with no ligules or auricles, and have no hairs except at the nodes. Leaf blades have no hairs and can grow to be 4 to 8 inches long. Junglerice is a shallow-rooted plant that prefers damp or moist habitats.

Junglerice grows and matures very rapidly. Seeds germinate in the spring and can continue to germinate throughout the growing season as long as soil moisture and temperature conditions are favorable. Seeds that germinate are typically on the soil surface or at very shallow depths in the soil, and are stimulated by light.¹ Therefore, the plant will favor minimum tillage or no-till cropping systems. Deep tillage can bury junglerice seeds at depths in the soil where they will not germinate.

Shallow tillage can bring seeds to the surface and stimulate germination. Seeds can survive up to 3 years in the soil. Growth of junglerice can be rapid in moist, fertile, and heavy-textured soils where it can produce a large amount of foliage. Although the plant prefers moist soils, excessive moisture and flooded soils can be detrimental to germination and growth. Drought will cause the plant to grow more prostrate, and prolonged dry conditions can kill or suppress growth and seed production.³ The plant can flower 3 to 4 weeks after emergence, and will produce an abundance of highly viable seed under good growing conditions. The seed can be disseminated by wind, irrigation water, animals, humans, and through contaminated feed and crop seed.

Junglerice normally occurs in summer-irrigated crop fields, orchards, vineyards, around ponds and irrigation ditchbanks, pastures, and landscaped or other disturbed moist areas. The weed is very competitive in cropping situations. When left uncontrolled in corn and cotton fields or orchards, junglerice can form a very dense vegetative mat that will compete with the crop for water and nutrients.

Weed Resistance

Biotypes of junglerice can vary in their susceptibility to herbicides. Because of the repeated use of propanil for weed control in rice, propanil-resistant biotypes of junglerice were reported to occur in Costa Rica in 1987.⁴ As a result of resistance to propanil, repeated postemergence applications of fenoxaprop were used to control the weed, and fenoxaprop-resistant biotypes were reported to occur in Costa Rica by 1994. Since then, junglerice biotypes resistant to ALS inhibitors (imazethapyr), synthetic auxins (quinclorac), photosystem II inhibitors (atrazine, metribuzin), and EPSP synthase inhibitors (glyphosate) have been reported to occur in other areas around the world.⁴

Glyphosate-resistant (GR) junglerice was first found in Australia and Argentina cropland as early as 2007.⁵ In 2010, GR junglerice was found in the northern Central



Figure 2. Junglerice plant.

Valley of California.⁶ Since then, it has been spreading north to south in Central Valley cropland, orchards, and vineyards.



JUNGLERICE MANAGEMENT IN CALIFORNIA (continued)

Management Recommendations

Weed management programs should include strategies to mitigate selection of GR junglerice populations. Of importance is stopping seed production and dispersal to avoid spread of populations that are already resistant to glyphosate. Management strategies should target early control of junglerice in crops. Cultural practices, such as increased crop densities or narrow row spacing, and irrigation management can help the crop to be more competitive with the weed. Tillage is an important management practice to be implemented where practical. The use of preemergence (PRE) residual herbicides along with postemergence (POST) herbicides and multiple sites of action is necessary to maintain season-long weed control and manage herbicide resistance.

Roundup Ready® Corn 2 and Corn with Roundup Ready® 2 Technology

- Start clean with tillage or a burndown herbicide application.
- In conventional or minimum tillage systems, apply a PRE residual herbicide containing pendimethalin (Prowl® H₂O), incorporating it into the soil by rainfall, sprinkler irrigation, or mechanical tillage prior to weed seedling emergence. In no-till corn, rimsulfuron (Matrix® or Resolve®) can be an option.⁷
- In-crop, apply a tank mixture of a Roundup® brand glyphosate-only agricultural herbicide plus Laudis® (tembotrione) before junglerice is 4 inches tall. A second application of Laudis can be made before corn reaches the V8 stage of growth. Herbicides containing rimsulfuron (Matrix, Resolve, Steadfast®) applied up to 12-inch tall corn and before junglerice is 4 inches tall can also be an option.⁷

Genuity® Roundup Ready® Flex Cotton

- Start clean with tillage or a burndown herbicide application.
- Apply a PRE residual herbicide, such as trifluralin (Treflan®) or pendimethalin (Prowl®), or a tank mix of s-metolachlor (Dual II Magnum®) + prometryne (Caparol® 4L).
- For control of emerged junglerice in-crop, apply clethodim (Select Max®), fluazifop (Fusilade®), or sethoxydim (Poast®) when the weed is small (2 to 3 inches tall). A tank mix with a Roundup brand glyphosate-only agricultural herbicide can be used to broaden the spectrum of weed control. Caparol alone or in tank mixture with MSMA can be applied as a POST-directed spray on weeds less than 2 inches tall. Refer to the Caparol label for restrictions and limitations.
- A layby application of a Roundup brand glyphosate-only agricultural herbicide plus Caparol can be applied with a shielded or hooded sprayer after cotton is 12 inches tall and when weeds are less than 2 inches tall.

Orchards (Trees, Nuts, and Vines)

- Apply a PRE residual herbicide like Surflan® (oryzalin), Prowl® H₂O (pendimethalin), Visor® (thiazopyr), Alion® (indaziflam), or other PRE grass herbicide labeled for the site, tank mixed with a Roundup brand glyphosate-only agricultural herbicide or Gramoxone® brand herbicide (paraquat) for POST control when weeds are less than 4 inches tall. Matrix (rimsulfuron) tank mixed with an approved POST herbicide can also be an option where it is labeled for the site.⁸
- A POST application of a Roundup brand glyphosate-only agricultural herbicide tank mixed with another POST product labeled for the site, such as Select Max, Fusilade, or Poast should be applied when junglerice is small (2 to 3 inches tall). This application will not provide residual weed control, and follow-up applications may be required to maintain control.

Sources: ¹ Chauhan, B. and Johnson, D. 2009. Seed germination ecology of junglerice: A major weed of rice. *Weed Science* 57: 235-240. ² Junglerice. University of California IPM Weed Gallery. www.ipm.ucdavis.edu. ³ Chauhan, B. and Johnson, D. 2010. Growth and reproduction of junglerice in response to water stress. *Weed Science* 58: 132-135. ⁴ Heap, I. The international survey of herbicide resistant weeds. www.weedscience.com. ⁵ Alarcon-Reverte, R., Garcia, A., Urzua, J., and Fischer, A.J. 2013. Resistance to glyphosate in junglerice from California. *Weed Science* 61: 48-54. ⁶ Moretti, M., Watkins, S., Gary, B., and Hanson, B. 2014. California: Glyphosate-resistant junglerice requires better management practices. *AgFax* 9/30/2014. <http://agfax.com>. ⁷ Wright, S., Frate, C., and Hanson, B. 2014. Managing junglerice in corn. University of California Field Crop Notes. <http://ucanr.edu>. ⁸ Moretti, M., Watkins, S., Gary, B., and Hanson, B. 2014. Managing junglerice in tree nut crops - a summer grass weed resistant to glyphosate. University of California Field Crop Notes. <http://ucanr.edu>. Web sites verified 3/7/16.

This document is intended to provide information about this weed and guidelines for control. As a tough-to-control weed, knowledge about the biology and weed control programs will help in their management. For additional information, contact your local seed representative. Developed in partnership with Technology, Development & Agronomy by Monsanto.

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