Wild Rice Notes

University of California
Agriculture and Natural Resources

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In This Issue

UCCE Wild Rice Meeting
March 7, 2022 (via Zoom)

** CE Credits pending **

2:45pm	Check-in/log-on
3:00pm	Introduction to Wild Rice in California
3:15pm	Wild Rice Database Background and Demonstration
3:30pm	Herbicide Screening and Future Directions
4:00pm	Adjourn

Free Registration: https://forms.gle/a7nH2CKh3md4APLU7
Questions? Call 530-822-7515

Wild Rice (*Zizania palustris* L.) Herbicide Screening 2020

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Background:

Currently only one herbicide is registered for use in wild rice (*Zizania palustris* L.) in California: Shark H_2O (carfentrazone). Due to the similarity in weed spectrum and environment between rice and wild rice, we conducted a screening using all California rice herbicides (registered and those in the registration pipeline) in a greenhouse in 2020. From this preliminary screening, we propose to move forward with a few of the best candidates for field testing for yield and phytoxicity, as well as weed efficacy data.

Methods:

Screenings were conducted at the California Rice Experiment Station in Biggs, CA in a greenhouse in April-May, 2020. Wild rice (*Z. palustris*) seed was donated by Lundberg Family Farms (Richvale, CA). Seeds were pre-germinated and planted in 4-inch square pots filled with rice-field soil, at four seeds to a pot. All herbicide applications were made at approximately the 1-2 leaf stage of wild rice. Herbicides applied were SuperWham/Stam (propanil), Londax (bensulfuron-methyl), Clincher (cyhalofop), Sandea (halosulfuron), Grandstand (triclopyr), Loyant (florpyrauxifen-benzyl), Regiment (bispyribac-sodium), Granite GR (penoxsulam), Cerano (clomazone), Bolero (thiobencarb), Butte (benzobicylon + halosulfuron), and pyraclonil at field rates for rice (Table 1). Florpyrauxifen-benzyl is not currently registered in California rice, but registration is expected in 2023. Pyraclonil is also currently not registered, but the anticipated registration date is unknown.

Each herbicide treatment was replicated 4 times, and there was one untreated control per herbicide application method (granular and liquid formulations). The experiment was set up as a completely randomized design (CRD). Granular formulation appplications were made into the water in individual bins (1 pot per bin), and water was maintained at approximately 4-6 inches (10 cm) above the soil surface. Foliar (liquid) formulations were applied using a cabinet track sprayer with an 8001-EVS nozzle delivering 40 gallons of spray solution per acre (at a pressure of approximately 20 psi). Phytotoxicity (% injury) ratings (bleaching, stunting, death) were made at 7 days after application on a per pot basis. Plants were harvested and fresh weights were measured at 21 days after herbicide application. A final plant count was also taken. Percent reduction in plant number were calculated from the initial number of plants per pot, and percent reduction in fresh weight was calculated in comparison to the untreated control.

Table 1. *Herbicides and rates utilized for 2020 wild rice screening. Rates are in amount of product per acre and grams of active ingredient (a.i.) per hectare.*

Product (trade name)	Active Ingredient	Rate (product)	Rate (a.i.)	Application Method
SuperWham/Stam	propanil	6 qt acre^{-1}	6276 g ha^{-1}	Liquid
Londax	bensulfuron-methyl	1.66 oz acre^{-1}	69.7 g ha^{-1}	Liquid
Clincher	cyhalofop	15 fl oz acre^{-1}	263 g ha^{-1}	Liquid
Sandea	halosulfuron	1.33 oz acre^{-1}	69.8 g ha^{-1}	Liquid
Grandstand	triclopyr	0.67 pt acre^{-1}	282 g ha^{-1}	Liquid
Loyant*	florpyrauxifen-benzyl	1.37 pts acre^{-1}	40 g ha^{-1}	Liquid
Regiment	bispyribac-sodium	0.57 oz acre^{-1}	32 g ha^{-1}	Liquid
Granite GR	penoxsulam	15 lbs acre^{-1}	40 g ha^{-1}	Granule
Cerano	clomazone	12 lbs acre^{-1}	673 g ha^{-1}	Granule
Bolero	thiobencarb	23.3 lbs acre^{-1}	3918 g ha^{-1}	Granule
Butte	benzobicylon + halosulfuron	7.5 lbs acre^{-1}	306 g ha^{-1}	Granule
N/A*	pyraclonil	8.1 lbs acre^{-1}	163 g ha^{-1}	Granule

**Not registered in California rice*

Results:

At 7 days after herbicide application, only Clincher (cyhalofop), Loyant (florpyrauxifen-benzyl), SuperWham/Stam (propanil), Granite GR (penoxsulam), and Grandstand (triclopyr) had less than 50% injury (Figure 1). All other tested herbicides had at least 85% injury.

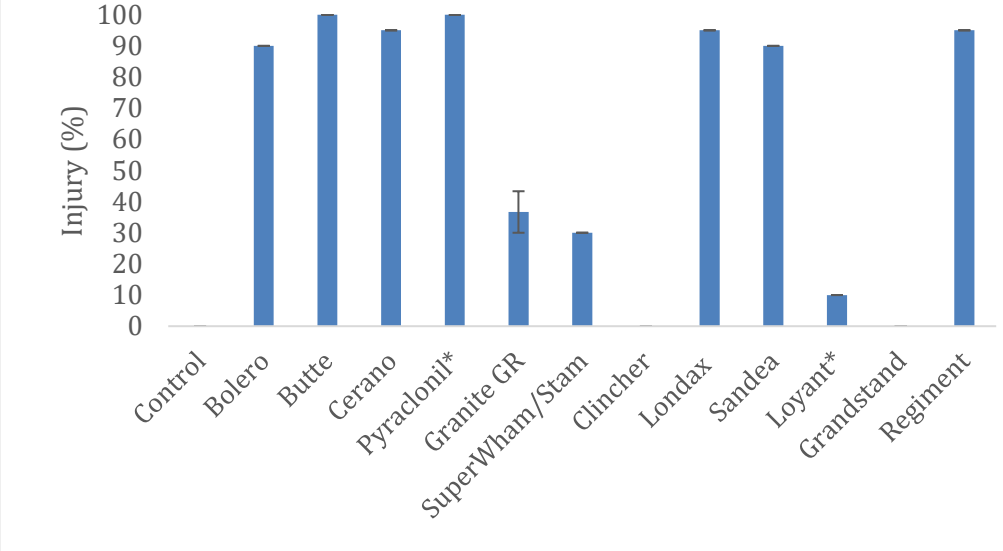


Figure 1. *Phytoxicity rating of percent injury (i.e. bleaching, stunting, death) of wild rice at 7 days after herbicide application. Bars indicate standard errors. (*) indicates herbicides not registered in California rice.*

At 21 days after herbicide application, the granular formulations had similar results in terms of plants remaining and fresh weight to the observations taken at 7 days after application. For the percent reduction in fresh weight, Granite GR (penoxsulam) had the lowest percent reduction, at less than 40% (Figure 2). All other tested granular formulations had at least a 75% reduction in fresh weight (Figure 2).

For the percent reduction in plant number, Granite GR (penoxsulam) had the lowest percent reduction, at 0% (Figure 3). All other tested granular formulations had at least a 35% reduction in plant number (Figure 3).

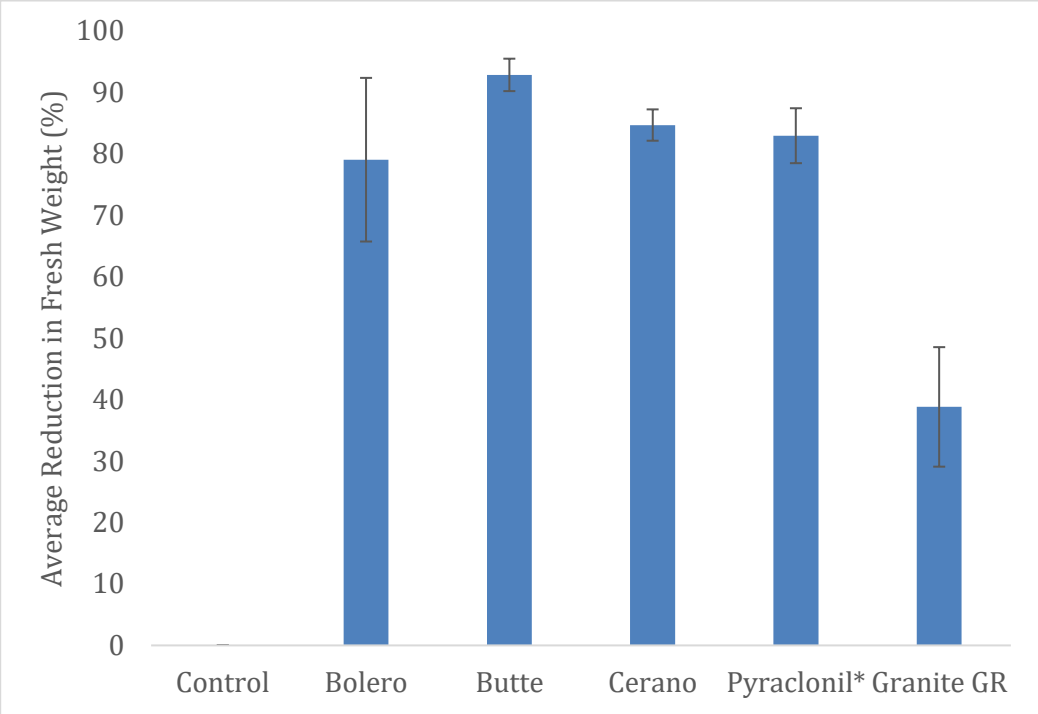


Figure 2. *Average percent reduction in fresh weight in comparison to the control at 21 days after herbicide application. Bars indicate standard errors. (*) indicates herbicides not registered in California rice.*

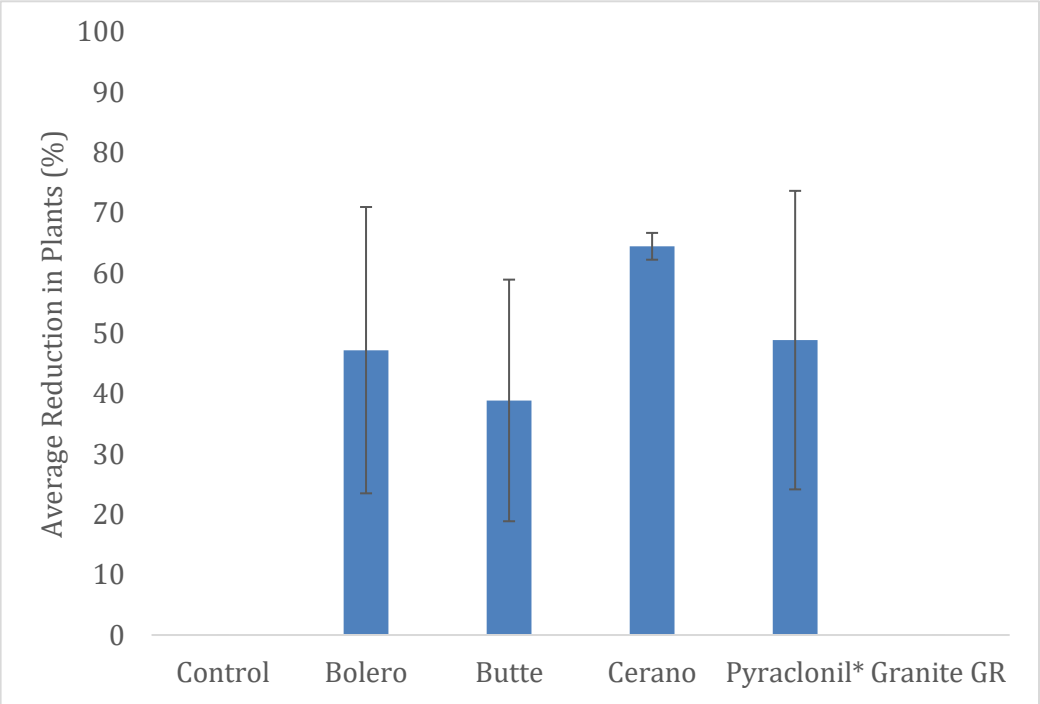


Figure 3. *Average percent reduction in plant numbers in comparison to the control at 21 days after herbicide application. Bars indicate standard errors. (*) indicates herbicides not registered in California rice.*

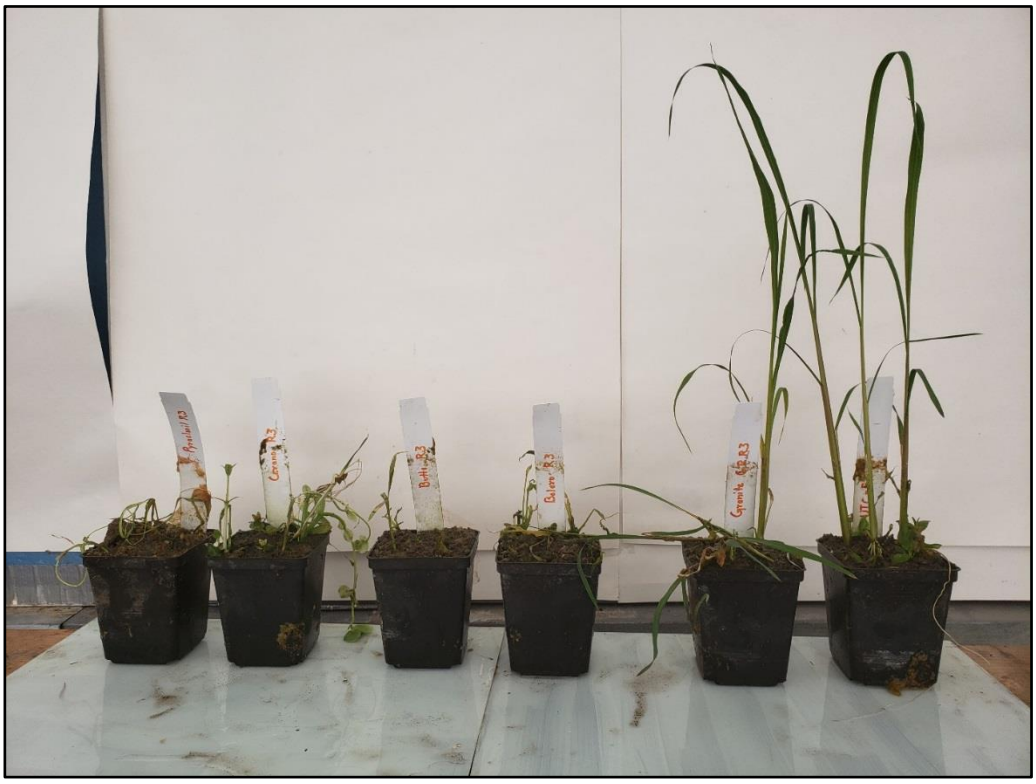
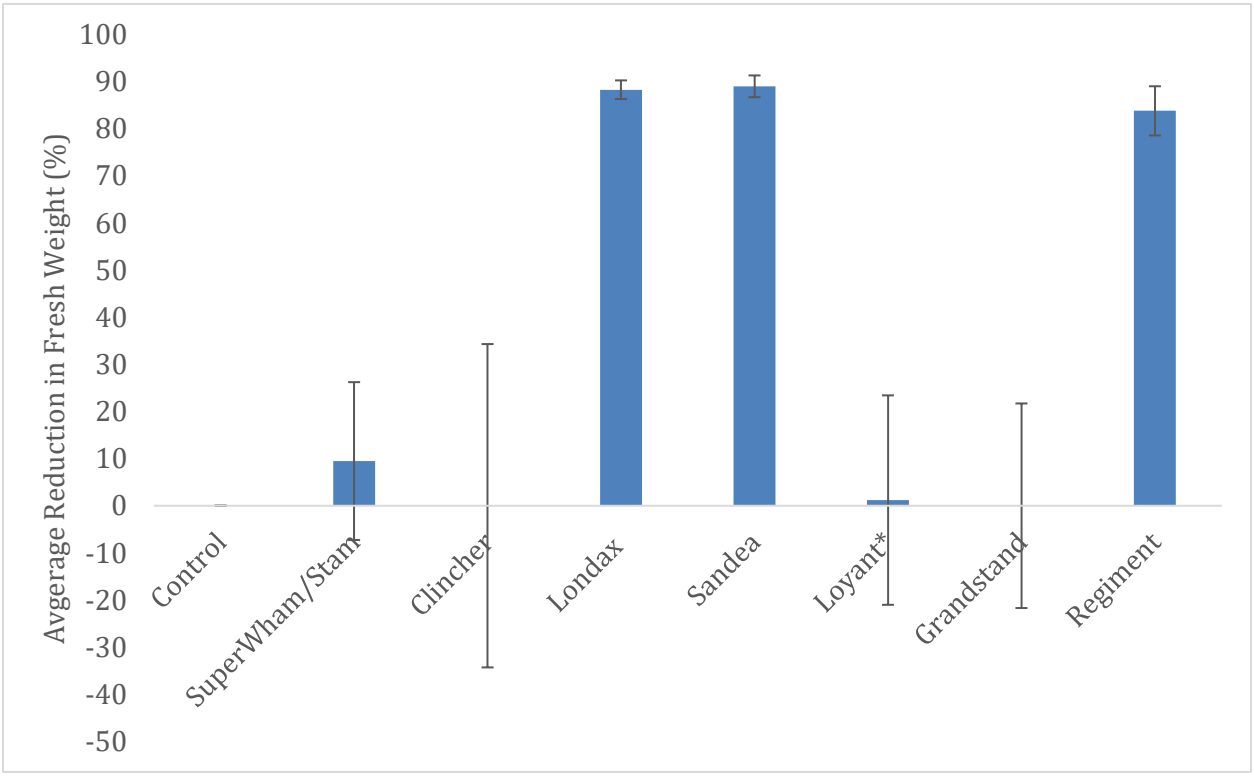


Figure 4. *Wild rice treated with granular herbicide formulations at 21 days after herbicide application. From right to left: pyraclonil, Cerano (clomazone), Butte (benzobicylon + halosulfuron), Bolero (thiobencarb), Granite GR (penoxsulam), and untreated control.*



At 21 days after herbicide application, the foliar-applied formulations had 100% survival of plants (no reduction in the number of plants per pot). For the percent reduction in fresh weight, Clincher (cyhalofop), Loyant (florpyrauxifen-benzyl), SuperWham/Stam (propanil), and Grandstand (triclopyr) had low reductions in fresh weight, all below 10% on average (Figure 5). All other tested foliar-applied formulations had at least a 75% reduction in fresh weight (Figure 5).

Figure 5. *Average percent reduction in fresh weight in comparison to the control at 21 days after herbicide application. Bars indicate standard errors. (*) indicates herbicides not registered in California rice.*

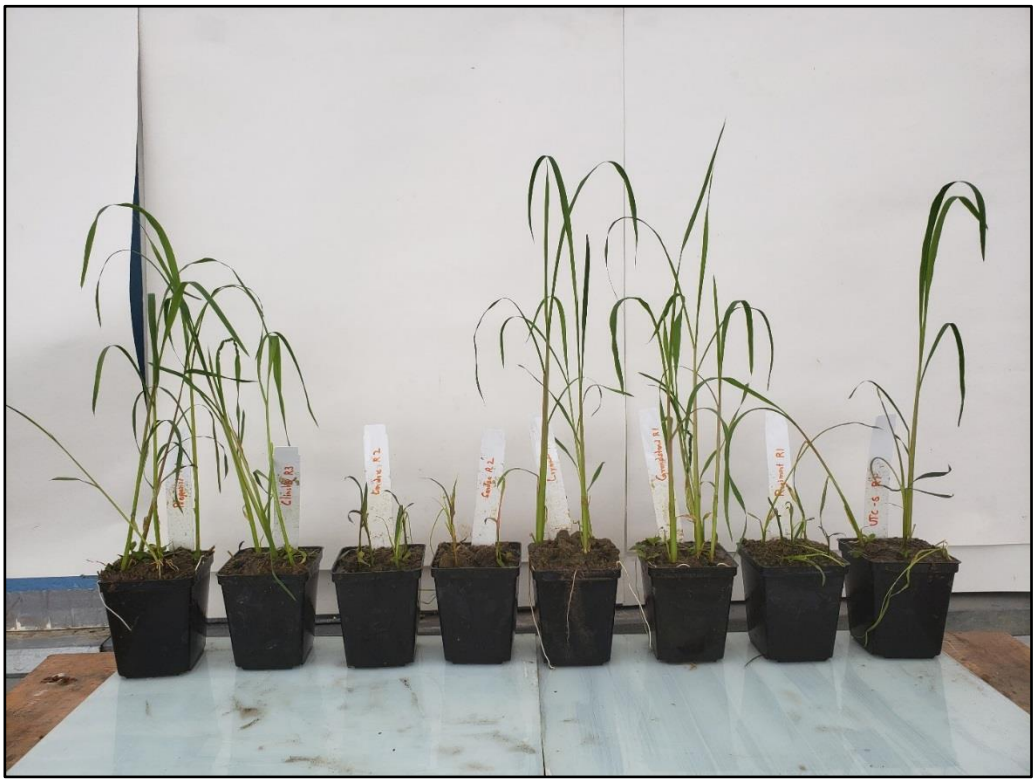


Figure 6. *Wild rice treated with granular herbicide formulations at 21 days after herbicide application. From right to left: SuperWham/Stam (propanil), Clincher (cyhalofop), Londax (bensulfuron-methyl), Sandea (halosulfuron), Loyant (florpyrauxifen-benzyl), Grandstand (triclopyr), Regiment (bisbyribac-sodium), and untreated control.*

Conclusion:

Based on the results of this preliminary screening, a few candidate herbicides look promising for further field testing: Clincher (cyhalofop), Loyant (florpyrauxifen-benzyl), SuperWham/Stam (propanil), Granite GR (penoxsulam), and Grandstand (triclopyr). The next step will be to pursue field testing in wild rice to determine if one or more of these herbicides provide good weed control without significant phytotoxicity or reductions in yields.

A great source to learn more about wild rice production in California – UCANR Wild Rice Database

Whitney Brim-DeForest, UCCE Rice Advisor
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To provide key information for growers and researchers on cultivated wild rice production (*Zizania palustris* L.), the UCCE Sutter-Yuba team and the Agronomy Research and Information Center built a wild rice database in 2020. The database is hosted at https://wildrice.ucanr.edu/, under "Wild Rice Database" (Figure 1). Most articles were scanned and uploaded from the collection of emeriti UCCE Advisor Daniel Marcum.

Figure 1. Wild Rice Database, hosted at https://wildrice.ucanr.edu/

The database contains articles only with research on species *Zizania palustris*. We made the choice to not include research on other wild rice species, so as to be as relevant as possible to California. The database contains peer-reviewed articles as well as non-peer-reviewed articles on a number of topics including varieties and varietal development, processing, and marketing. It also includes publications on pest management, seeds, and water management. Not all articles are from research and production in California, some are from other parts of the world, including the midwestern US and Canada, as there is limited research conducted in California.

Searching and downloading publications from the database is fairly easy. By typing keywords in the search toolbar (Figure 2), the titles of relevant publications, which are linked to PDF files, will appear at the top of the page and are ready to be downloaded. It is also searchable by author. You will need Acrobat Reader installed on your computer to download and read these files.

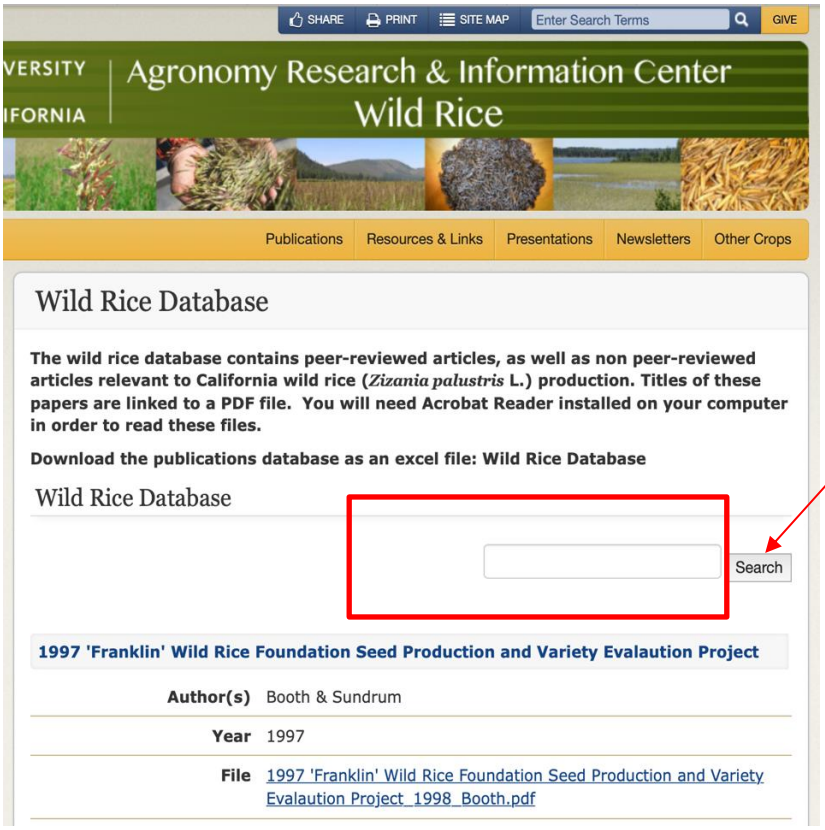

Figure 2. Search Toolbar on Wild Rice Database

For more information about the database, or to suggest additional articles (peer-reviewed and non-peer-reviewed) to be added, please contact Whitney Brim-DeForest (wbrimdeforest@ucanr.edu).