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# Spring 2019 Agronomy and Weed Science Newsletter

*Merced and Madera Counties*

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**Spring 2019**

*University of California Agriculture and Natural Resources*
*Cooperative Extension — Merced and Madera Counties*
*Agronomy and Weed Science Newsletter*

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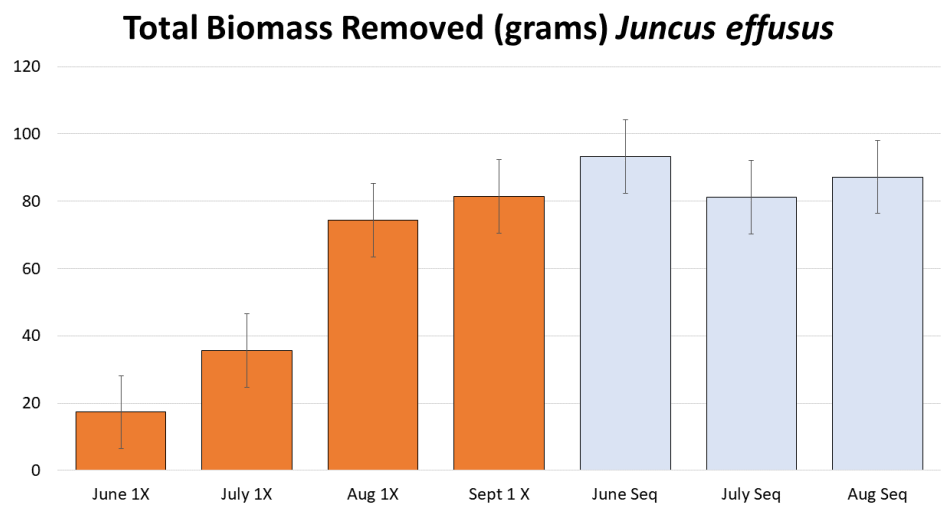
**Research Update:**

Weeds are significant concerns for SJV field crop producers. Examples include interference from field bindweed (*Convolvulus arvensis*), glyphosate-resistant Palmer amaranth (*Amaranthus palmeri*), glyphosate-resistant hairy flea-bane (*Conyza bonariensis*), and glyphosate-resistant junglerice (*Echinochloa colona*). Between March and December of 2018, I developed/participated in several research trials to address regional grower needs. Specifically: 1) the timing and intensity of physical defoliation on common rush (Juncus effuses) regrowth in an irrigated pasture, 2) the tolerance of glyphosate-resistant Palmer amaranth to salt stress, and 3) the response of field bindweed to late-season herbicide applications.

**The timing of cutting/mowing events on common rush (Juncus effuses) regrowth in an irrigated pasture**
Common rush is a clump-forming perennial, with hollow, round stems that can grow up to 3 feet tall. Common rush can produce up to 10,000 seeds per plant which can lie dormant in soils for up to 60 years. Severe infestations can significantly reduce the value of pasture land. The species responds to only a few herbicides (some of which are California restricted materials). In June of 2018, I entered into a collaborative partnership with a local pasture manager to evaluate the timing of single (June, July, Aug, Sept) and sequential (June-July-Aug-Sept, July-Aug-Sept, Aug-Sept) cuttings on common rush biomass removal and regrowth.

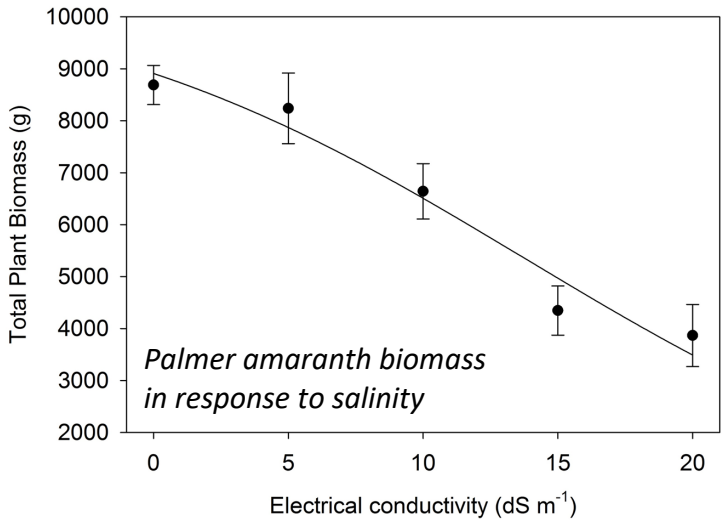



Results from the trial suggest that single late-season (Aug and Sept) cuttings are as effective as season-long sequential defoliation events for removing the most plant biomass and Plant regeneration in the spring of 2019 will be monitored. The study will be expanded in 2019 to include locations in Fresno and Merced Counties. The resulting data will be presented at extension meetings and will be used to develop a handout describing the non-chemical control of common rush in irrigated pastures.

Palmer amaranth is an annual weed that is native to the deserts of the southwestern US. The species is a significant problem in CA, including parts of the San Joaquin Valley that are prone to moisture stress and high soil-salinity conditions. During the summer of 2018, in collaboration with Anil Shrestha at CSU-Fresno, studies were undertaken to look at Palmer amaranth seed germination and plant growth at electrical conductivity (EC) levels up to 15-20 dS m-1 (which describe strong to extremely saline soil conditions).

Although Palmer amaranth growth and development was reduced by 25, 50, 56% at 10 dS m-1, 15 dS m-1, and 20 dS m-1, respectively, flowering and seed production still occurred . Future studies will describe how crop competition with

Palmer amaranth changes at different salinity levels. This is important because most studies to look at crop -weed interference are conducted under optimum growing conditions and don't take into consideration how these dynamics will be altered by a changing production environment. Most crops are less tolerant of salinity than Palmer amaranth including: cotton (7.7 dS m-1 threshold), wheat (6.0 dS m-1), tomato (2.5 dS m-1), and muskmelon (1.0 dS m-1). Additional studies are planned to look at other weed species respon-ses to salinity and other salts and to compare weed and crop growth under a variety of environmental conditions such as increased temperature, drought stress, elevated CO2, etc. Results will be presented at local and regional extension meetings and in printed extension handouts.




*A small sample of field bindweed rhizomes*

Field bindweed, a deep-rooted (up to 20 feet), perennial vine, is another species that has become problematic in California cotton, particularly in crop rotation systems that are characterized by drip irrigation and reduced tillage. In addition to negatively impacting crop yields, bindweed can also serve as an alternate host for the silverleaf whitefly, the honeydew from which is a primary source of sugars that can result in sticky cotton lint. The species is extremely persistent; seed can remain viable for up to 30 years in the soil. Because of the numbers and depths of rhizomes and root tissue, it can take two to three years of cultivations to exhaust underground nutrient reserves .

Because of its systemic nature, glyphosate is the primary tool used by growers to manage established bindweed. However, the level of bindweed control achieved with glyphosate can be highly variable due to: 1) the rates and adjuvants used, 2) vine development at the time of application, and 3) plant vigor in response to environmental stresses. One study that was published in the 1980's reported that field bindweed suppression with glyphosate is maximized in the summer when the vines are actively growing and flowering. There are several reasons for this: 1) sufficient aboveground plant tissue to capture enough herbicide to kill large vines with significant amounts of underground tissue, and 2) active movement of photosynthetic materials to meristems, including root growing points (glyphosate is phloem transported).

That does not mean that late-season applications (i.e. fall) are completely ineffective. In 2018, Kurt Hembree (UCCE—Fresno) and myself applied a series of glyphosate-based herbicide treatments to drought-stress, powdery mildew and whitefly infested vines. Results from the study showed that glyphosate treatments were able to reduce field bindweed cover, relative to the untreated plants, through December. Between September 26th and December 21st, bindweed cover in treated plots was reduced between 66% and 95%. Additionally, plants that received herbicide treatments ceased to flower and set seed; untreated plants continued to reproduce in to winter, despite reports that the plants should have entered dormancy by this time. The Fall 2019 Newsletter will have significantly more bindweed information; We have at least 2-3 studies planned for this coming summer...More information coming in Fall 2019!

**The value of agronomic crops in California**

The California Department of Food and Agriculture's (CDFA) recently released statistics review (https://www.cdfa.ca.gov/statistics/) reports that California led the nation in 2017 agricultural cash receipts ($50 billion) followed by Iowa ($27 billion), Texas ($23 billion), Nebraska ($21 billion), and Minnesota ($17 billion). California's (CA) top commodities were dairy ($6.6 billion, up 8.2% from the previous year), grapes ($5.8 billion, up 3.1%), and almonds ($5.6 billion, up 10.9%), followed by berries, cattle and calves, lettuce, walnuts, tomatoes, pistachios, and broilers. With respect to agronomic commodities, hay (all) and cotton (all) were ranked 13th ($758 million) and 18th ($475 million), respectively. Compared to the rest of the United States (US), California was ranked first in the nation for hay value (CA share of US receipts: 11.9%) and third in the nation for cotton lint value (CA share of US receipts: 7%). Silage hay was the 14th most valuable commodity (gross value) in California at $871 million. Wheat ($107 million), grain corn ($103 million), and irrigated pasture ($101 million) were ranked 51st, 52nd, and 53rd, respectively. Cotton seed ($83 million) was ranked 58th and dry beans ($72 million) were ranked 61st. Grain hay ($67 million) and Sudan hay ($66 million) were ranked 63rd and 64th, respectively.

*Cotton from flower to boll*

The top agricultural county in the state was Kern ($7.3 billion), followed by Tulare ($7.0 billion), Fresno ($7.0 billion), Monterey ($4.4 billion), Stanislaus ($3.6 billion), Merced ($3.4 billion), San Joaquin ($2.5 billion), Ventura ($2.1 billion), Kings ($2.1 billion), and Imperial ($2.1 billion); Madera County ranked 11th ($2.0 billion). Merced County's leading commodities were: milk, almonds, chickens, and cattle and calves; Madera County's leading commodities were almonds, milk, pistachios, and wine grapes. Within California, and with respect to agronomic crops, Merced is the second leading county (behind Imperial) for alfalfa hay gross value ($115 million) and third (behind Kings and Fresno) for cotton lint ($78 million). Merced county is also ranked third for silage ($128 million), fifth for grain corn ($8 million) and irrigated pasture ($5 million) and sudan hay ($3 million), and first for grain hay ($17 million).

Other SJV counties are also important producers of agronomic commodities (according to gross value). Kern and Tulare counties are ranked third and fourth, respectively, for alfalfa hay values. With respect to silage, Tulare is ranked first, Fresno is second, Kern is fourth and Tulare is fifth. Kings County is the number one county with respect to cotton lint value, followed by Fresno; Kern and Tulare counties are ranked fourth and fifth, respectively. With respect to irrigated pasture gross value, Tulare and Stanislaus counties are ranked first and second. Fresno County is second for grain hay gross value and Stanislaus is ranked fifth. For Sudan hay, Tulare county is ranked third and Stanislaus county is ranked fourth. Fresno, Kings, Tulare and San Joaquin Counties rank second, third, fourth , and fifth, respectively, for wheat gross value. For dry beans, Fresno is ranked first, followed by Stanislaus, Tulare, and San Joaquin.

**2019 central SJV field crop needs assessment:**

The foundation of an effective extension program is an understanding of needs. Although I have worked in California, previously (2012-2017), as a weed scientist with the University of California – Davis, most of my time was spent in specialty crop systems (trees and vines, processing tomatoes, and melons). Consequently, I entered my current position as an Agronomy and Weed Science Advisor less familiar with the concerns and requirements of the agronomic crop industry. Although I expect that issues such as the water availability and quality, soil health, varietal improvement, and effective pest management practices are of significant interest to my clientele, I engaged in a needs assessment to define and rank the expressed concerns.

During my first few months as an advisor, I reached out, personally, to many growers, PCAs, and industry members and asked them to identify the agronomic production matters of most importance in the central SJV. These discussions occurred as one-on-one conversations 1) with attendees at UCCE/UCANR extension meetings or industry-sponsored events, 2) while on farm calls, and at 3) informal introductory meetings. Suggested topics for me to focus on were then categorized into classes, which included: water (quantity and quality), weed and pest management, fertilizer/nitrogen management, labor availability, crop improvement/alternate crop development, and climate change.

Based on the results from my initial needs assessment, I am deploying an online survey to better capture the needs of field crop producers in the Central San Joaquin Valley. Please help me to help you by answering this BRIEF online questionnaire. Thanks for your support!

https://ucanr.edu/survey/survey.cfm?surveynumber=26679

*Got questions? Contact Lynn Sosnoskie at 209-385-7403 or lmsosnoskie@ucanr.edu*

**Nematodes and cover crops:**

Cover crops (sometimes referred to as living mulches) are grasses, legumes, and other forbs that are planted for a variety of reasons including: adding nitrogen, suppressing weeds , conserving soil moisture, supporting beneficial soil microbes, improving soil structure and health, providing erosion control, and supporting pollinators, among other factors. They can also be used as hay or silage crops or for grazing livestock. Nematode-suppressive cover crops can be an effective tool for the integrated management of plant pathogenic nematodes (roundworms).

*Root knot nematode egg masses (Photo by: J.K. Clark)*

Many species of plant-parasitic nematodes (that can be particularly damaging to vegetable crops) are found in California, including: root knot nematodes (*Meloidogyne spp.*), cyst nematodes (*Heterodera spp.*), lesion nematodes (*Pratylenchus spp.*), and needle nematodes (*Longidorus spp.*), among many others.

UC ANR has a publication (Cover Cropping for Vegetable Production (2011)) available for purchase through their website (https://anrcatalog.ucanr.edu/) that has a chapter devoted, specifically, to cover crops and nematode management. This includes a table describing the host status of many different cover crops to select nematode species (for example, some sudangrass and sudangrass x sorghum hybrids are largely believed to be non-hosts for root knot species).

Although slightly dated, this publication could serve as a good starting point for growers interested in cover crops for the purpose of pest management. Fallow, too, can be used to help reduce nematode numbers, although the aforementioned benefits of cover cropping would be sacrificed. And there are the costs of production that need to be considered. Anyone interested in exploring cover cropping in their systems can contact the County Extension office of send an email to lmsosnoskie@ucanr.edu and we will work to get you all of the relevant information that you need.

# Upcoming Meetings

## UC Weed Science Day

Thursday, July 11, 2019
UC Davis—Buhler Alumni Visitor Center
Davis, CA

A schedule of events and registration information will be posted at :
**https://wric.ucdavis.edu/index.htm**

## UC Weed School

Tuesday to Thursday, August 20 to 22, 2019
UC Davis—Buhler Alumni Visitor Center
Davis, CA

A schedule of events and registration information will be posted at :
**https://wric.ucdavis.edu/index.htm**

A full-color copy of this newsletter (with active hyperlinks) is available at:

https://ucanr.edu/sites/AgronomyWeedScience/Newsletters_935/

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