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In a Nutshell
Tulare and Kings Counties
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Pecan bud break and bloom dynamics in the southern San Joaquin Valley

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Of the four nut crops grown in California's Central Valley, pecan tends to emerge from dormancy and progress into bloom the latest. Initial signs of vegetative growth are visible in early April (Figure 1), but bloom generally proceeds through the month of May, often exposing flowers to higher temperatures than the other nut crops.

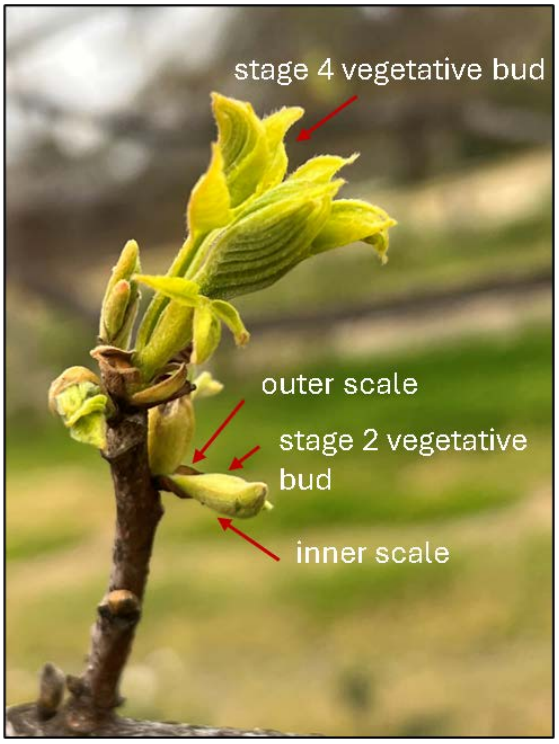

Figure 1. The first signs of bud break are the disruption of the outer scale (brown) from the swell of the emerging bud, thus exposing the inner scales (green).

Pecans and walnuts are in the same plant family (*Juglandaceae*), making their reproductive strategy very similar. Unlike February's showy almond bloom, the pecan bloom is a more subtle event with pollination relying on wind rather than bees. They produce separate male and female flowers on the same tree, a term botanists call *monoecious* (Greek for 'one house'). To promote outcrossing, the trees employ dichogamy, a strategy where the male (Figure 2A and 2B) and female flower parts (Figure 2C and 2D) do not mature concurrently for a particular cultivar. As a result, growers plant at least two cultivars of pecan in each orchard to ensure the overlap of female bloom with the availability of pollen to set a crop.

In the southern San Joaquin Valley, pecan orchards are generally composed of two cultivars, 'Wichita' and 'Western'. In each orchard, the progression of bud break and shoot elongation varies between cultivars and with tree age (Figure 3). The first evidence of bud break is observed when the outer scales surrounding buds are disturbed revealing a set of inner scales that protect the vegetative buds (Figure 1) and male flower buds (catkins) (Figure 2A). Researchers across the pecan-growing regions of the United States employ a uniform scale (1-9) to evaluate bud break progression. This allows for breeders and horticulturists to evaluate the impacts of localized climate conditions on the phenotypic characteristics of cultivars utilized across the country. Stage 1 indicates dormant buds; stage 2 indicates bud swell with the outer scales split and inner scales intact (Figure 1). By stage 3 catkins may be present (Figure 2A) and the inner scales will have split. Stages 4 through 10 are the progressive stages of leaf burst, shoot elongation, and display of preformed leaves. In the southern San Joaquin Valley, the emergence from winter dormancy and early bud swell (stage 2) occurs at the onset of April, whereas leaf burst (stage 4) is observed in mid-April with vegetative growth on 'Wichita' preceding that of 'Western' (Figure 3).

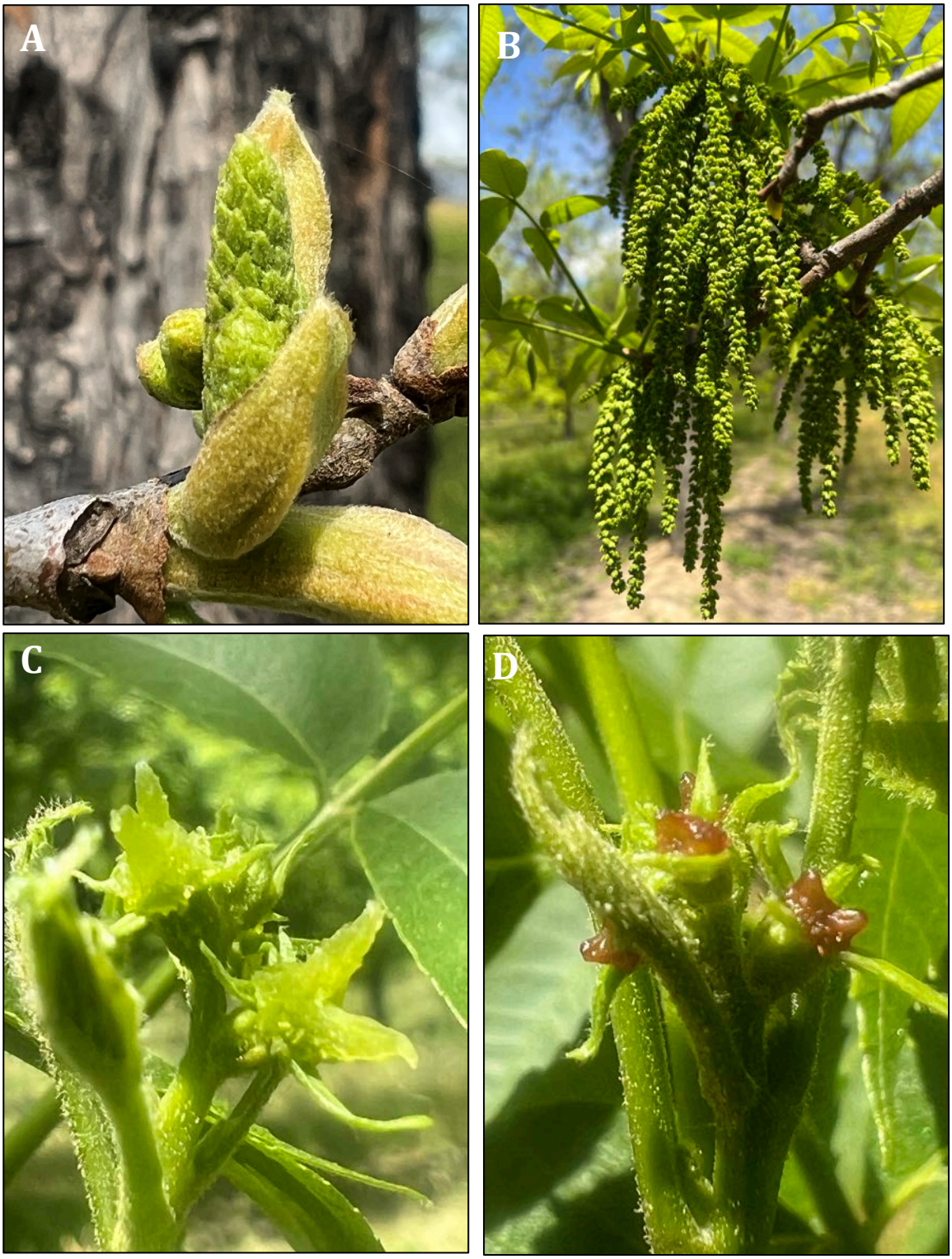

Figure 2. Juvenile catkins emerging from catkin buds (A); mature catkins shed pollen during anthesis (B); female 'Wichita' flowers (C); female 'Western' flowers (D).

The female flower buds are borne on the current season's shoot; therefore, vegetative bud break and shoot elongation progress in advance of bloom. The female bloom of 'Western' and

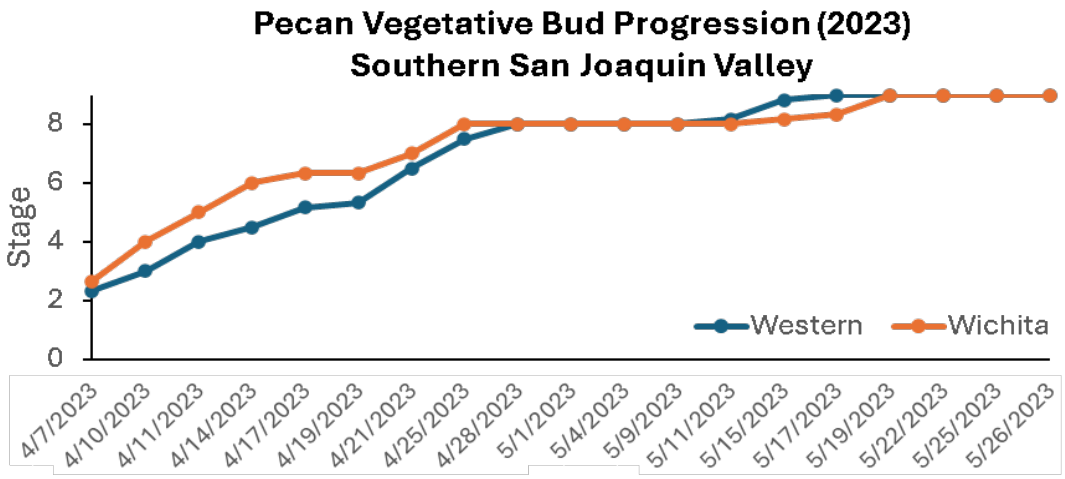

Figure 3. Pecan researchers across the United States utilize a standardized scale to evaluate progress of bud break and shoot growth.

'Wichita' overlap, and the cultivars can be differentiated by the color of the female flowers. The stigmas of the 'Western' flowers are a reddish-brown and the stigmas of 'Wichita' are a greenish white (Figure 2C and D). In the southern San Joaquin Valley, the female flowers mature around the beginning of May (Figure 4). Similar to the rating of bud break and vegetative growth, researchers use a standardized scale to assess the progression of bloom across the United States. At stage 1, flowers have emerged; at stage 2 the female flowers are receptive for pollination. Once the female flowers progress to stage 3, stigmatic receptivity to pollen has passed (Figure 5). During female flower receptivity, maximum air temperatures may routinely range from 80-90°F. 'Western' catkins mature earlier than 'Wichita' catkins and can therefore serve as pollinizers for the earliest 'Wichita' female flowers (Figure 4). Similarly, 'Wichita' catkins mature later and can serve as pollinizers for the 'Western' female flowers.

By mid-late May the bloom season for pecan ends in the southern San Joaquin Valley. Growers can expect a late harvest of 'Wichita' and 'Western', generally around late October through early November. Wet weather, however, may push harvest later into December. 'Pawnee', an earlier maturing cultivar is more frequently grown in the Sacramento Valley, where harvest may be anticipated in late September through early October.

Pecan bloom timing and duration in the southern San Joaquin Valley

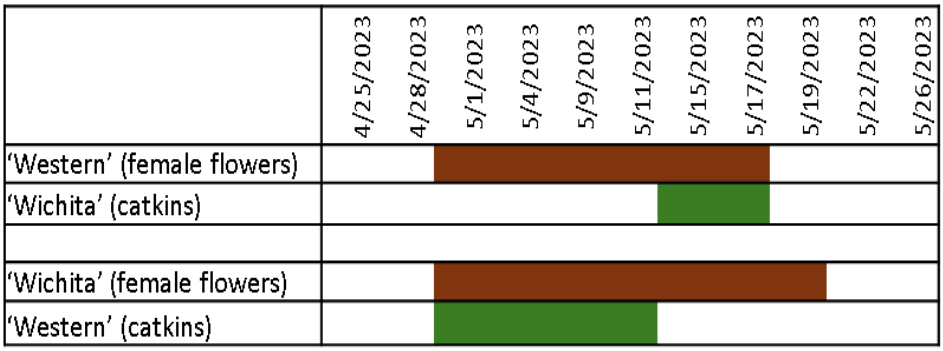

Figure 4. In the southern San Joaquin Valley, 'Wichita' and 'Western' are interplanted to ensure pollen is available across the bloom period of both varieties.

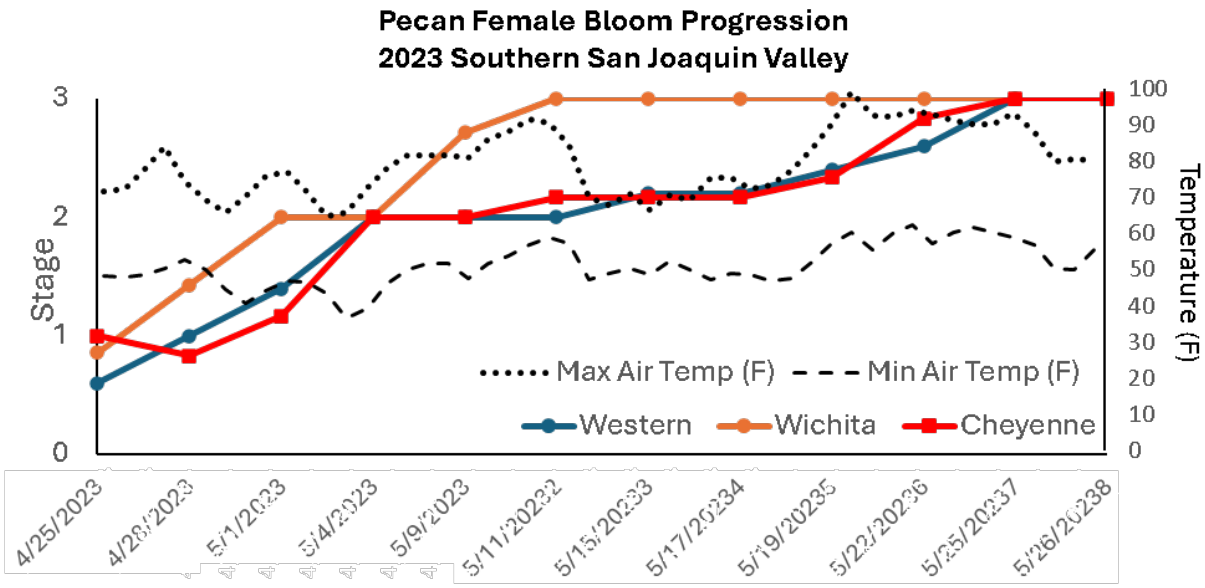

Figure 5. At stage 2 pecan flowers are receptive for pollination.

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To whom it may concern,

Scan this QR code from your mobile device to complete the survey online!

To better serve our clientele, Southern San Joaquin Valley Advisors are conducting a short survey to get your input on the desired direction of our agriculture research, extension, and education programs.

The survey can be completed online in less than 5 minutes. Please visit https://forms.gle/mBNcHgstafiD6uzH7 or use the QR code at the top of this page. Simply scan the QR code using the camera of your mobile device and you will be directed to the survey's page.

The information you provide will allow us to better understand your needs and how to best direct and deliver our programs. Survey responses will be used for program planning, and summary of the results will be provided to you. Your participation is voluntary, and **your responses will be confidential**. Responses will be compiled with survey data from farms throughout the Southern San Joaquin Valley.

If you have any questions, or would like to discuss the survey, please feel free to contact us. Each advisors contact information is included below.

We look forward to working and serving you. Thank you for your continued collaboration with the University of California.

Sincerely,

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UNIVERSITY OF CALIFORNIA
Agriculture and Natural Resources

Produce Safety Alliance Grower Training Course

Lindcove Research & Extension Center
22963 Carson Ave, Exeter, CA 93211

Tuesday - June 17, 2025
7:30 AM - 5:00 PM

❖ ABOUT THE TRAINING:

This in-person, interactive training course covers seven modules. Trainers will spend approximately seven hours of instruction with ample time for questions an3d discussion, so participants should come prepared to share their experiences and produce safety questions. Topics to be covered include:

1. Introduction to Produce Safety,
2. Worker Health, Hygiene, and Training.
3. Soil Amendments.
4. Wildlife, Domesticated Animals, and Land Use,
5. Agricultural Water (Part I: Pre-harvest Water; Part II: Postharvest Water),
6. Postharvest Handling and Sanitation, and
7. How to Develop a Farm Food Safety Plan.

❖ WHO SHOULD ATTEND:

Fruit and vegetable growers and others interested in learning about produce safety, the Food Safety Modernization Act (FSMA) Produce Safety Rule, Good Agricultural Practices (GAPs), and co-management of natural resources and food safety. ***The PSA Grower Training Course is one way to satisfy the FSMA Produce Safety Rule requirement outlined in § 112.22(c).***

❖ WHAT YOU GET:

In addition to valuable food safety information and on-hand training, growers will receive a certificate of completion, a PSA Grower Manual, and lunch/refreshments.

❖ REGISTRATION DETAILS:

- Fee: $50 per person (online payment only; no cash/checks)
- Capacity: Limited to 50 participants
- Deadline: Registration closes once capacity is reached.
- Register Online:

Click here to register

More Information: Please contact Thais Ramos tramos@ucanr.edu; or Ahmed El-Moghazy aelmogha@ucr.edu

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UNIVERSITY OF CALIFORNIA Agriculture and Natural Resources

2025 INTERNATIONAL SCHOOL ON MICROIRRIGATION FOR CROP PRODUCTION

CALIFORNIA IRRIGATION INSTITUTE

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CLASS LECTURES: OCTOBER 13-15
FIELD TRIPS: OCTOBER 16-17

Class lectures will be held in the UC Davis Conference Center. Field trips will be in the San Joaquin Valley and Central Coast of California.

ATTENDING THIS SCHOOL WILL PROVIDE:

- 3 days of practical class lectures on principles and implementation of microirrigation systems and management practices for crop production
- 2 days of field demonstration visits (one day in the San Joaquin Valley for modernized irrigation delivery systems, and fruit and nut crops; one day in the Central Coast for vineyards, vegetable crops, and berries)

SIGN UP TO THE MAILING LIST TO GET MORE INFORMATION!

QUESTIONS? PLEASE CONTACT US:

Daniele Zaccaria - UC Davis: dzaccaria@ucdavis.edu
Mary Ann Dickinson: maryann@dickinsonassociates.com

Instructors of the School are professionals with extensive experience on principles and practical applications of microirrigation for resource-efficient crop production.

WHAT YOU WILL LEARN:

- Technical aspects of water delivery systems to allow for successful adoption and management of microirrigation systems
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- Microirrigation systems design, operation, maintenance, automation, and performance evaluation
- Methods and tools for microirrigation scheduling
- Managing microirrigation for different crops (field and agronomic crops; vegetable crops; berry crops; fruit crops; nut crops; vineyards)
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- Salinity management with microirrigation

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May 2025

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