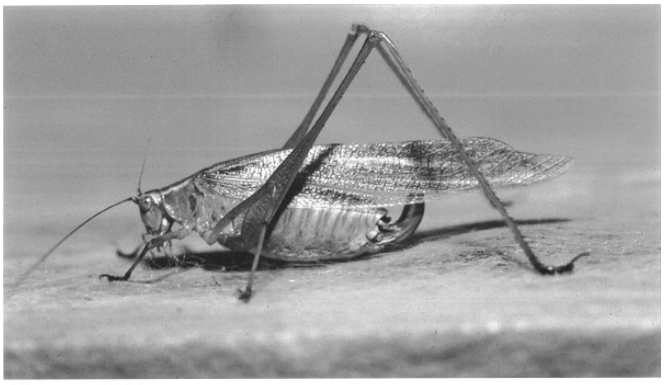
Fork-tailed Katydid Studies

Project Leader:
David Headrick
Department of Crop Science, California Polytechnic State University, San Luis Obispo

The fork-tailed katydid, *Scudderia furcata* Brunner (Orthoptera: Tettigoniidae) was considered a minor pest of citrus in California, but in the last few years has increasingly become a problem due to reduction in organophosphate and carbamate pesticides (Grafton-Cardwell 1999). Our objective is to study the biology and behavior of the fork-tailed katydid as a pest of commercially grown citrus in order to develop ecologically-based control methods for application in commercial citrus production.

Findings:
Distribution and Abundance: Katydid populations were highest in the southern citrus growing areas of the San Joaquin Valley. All katydid populations were observed to have an aggregated distribution, with densities at one study site as high as 25 katydids per tree throughout spring. High-density spots occur from year-to-year, thus previous populations appear to remain consistent despite control measures.



Lifecycle & Development:
The lifecycle includes six instars and the adult. Under laboratory conditions, at 26.7ºC, females (n = 30) survived for 92.6±9.96 days. First and second instars (n = 20) lived 6.95±3.35 days and 7.30±3.13 days, respectively, at 4.5ºC. First and second instars (n = 20) lived 8.38±2.8 days and 8.55±2.9 days, respectively, at 7.5ºC. Third instars (n = 8) lived 14.88±2.6 days at 7.5ºC. There are as many as five instars present from spring to late summer.

Egg Biology:
Eggs of *Scudderia furcata* exhibit an obligatory diapause, and the egg is the overwintering stage. Eggs are deposited during summer and fall and hatch the following spring. Adult female katydids oviposit eggs into the margins of leaves found around the perimeter of trees.

Eggs are curved and flattened, resembling the shape of the female ovipositor. One to several eggs are deposited per leaf, and any given tree can host eggs from several different females. Females can lay on average 175 eggs.

Feeding Behavior & Damage:
Katydid damage occurs during the early spring and summer. Young citrus fruit (5 – 15 mm) was highly susceptible to katydid damage. First – fourth instars were present during initial bloom and through to petal-fall. Field observations and laboratory feeding trials confirmed katydid feeding preference for the stigma, style, stamen, and ovary, when exposed within a citrus flower, just before and following petal-fall. Post-petal-fall feeding by younger instars consisted of small fruits and sepals until the rind of these fruits became too hard for the apparently softer mouth parts of the earlier katydid instars. There was a shift in feeding toward new foliar growth consisting tender leaves. Significantly damaged fruit was observed to have naturally abscised from the tree. Katydid-damaged fruit not naturally abscised from the tree can mature with elongated circular rind scars.

Conclusions, Continuing Work, & Future Studies:
Katydid Control: Efforts at managing the fork-tailed katydid have traditionally involved broad-spectrum insecticide applications that target several pests at one time (Grafton-Cardwell 1999). Selective insecticides appear to be less effective at controlling katydids. Low-dose spot insecticidal treatments within blocks having certain history of katydid damage, combined with cultural practices such as a late fall or early winter mechanical hedging of trees to eliminate leaves containing eggs, may prove more effective in the future.

Lower Developmental Threshold: Katydid development typically coincides with citrus flower/fruit development, therefore an accurate degree-day model will enable better predictions of initial instar emergence and anticipated feeding damage in the spring. 50% eclosion is suggested as a biofix date because of the ease of monitoring for eggs in the field.

Cooperating Personnel: *JoAnn C. Wheatley, Judy Stewart-Leslie, Beth Grafton-Cardwell*