NEW CALIFORNIA CICADAS WITH TAXONOMIC NOTES ON OTHER SPECIES

(Homoptera: Cicadidae)

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California has probably the largest cicada fauna of any area of comparable size in the United States. Of the eight genera present, *Okanagana* with 36 species and *Platypedia* with 18 species are the most abundantly represented.

Recent collections by the author have uncovered an apparently new species of *Okanagana*. In addition three new species of the genus *Platypedia* have been found. Specimens of the latter were part of a large collection of cicadas given by Mr. F. H. Wymore to the California Academy of Sciences several years ago.

Okanagana davisi Simons, new species

Male: Head black above, much covered with appressed silvery pubescence, as broad as anterior margin of pronotum. *Pronotum* black, with much silvery pubescence, hind margin with faint edge of pale orange. Mesonotum black, four median orange spots arranged in a semicircle, the X marked anteriorly with orange to form a V, hind margin edged faintly with orange. Metanotum black, hind margin edged faintly with orange. *Abdomen* black above, each tergite with much silvery pubescence and margined laterally very faintly with orange; beneath, each sternite pale orange; laterally the pleurites orange but marked centrally with black. *Aedeagus* black; valve orange marked with black laterally (fig. 1A). *Legs* black; front femora with median dorsal spot of chestnut, tips pale orange. Thorax beneath black with much silvery pubescence. *Forewings*, costa to node pale yellowish, node to apex black, remaining venation mostly black. Membranes of fore and hind wings orange-red, variegated with black.

Measurements: body length 25 mm., wing expanse 63 mm.

Holotype (California Academy of Sciences, San Francisco): MATTOLE RIVER VALLEY, HONEYDEW, HUMBOLDT CO., CALIFORNIA, June 20, 1950 (J. N. Simons). *Paratypes:* 7 ♂ ♂, same data as type; 1 ♂, VAN DUZEN RIVER, HUMBOLDT CO., CALIFORNIA, August 11, 1948 (W. W. Wirth).

O. davisi is closely allied to both *O. canescens* Van Duzee and *O. tristis* Van Duzee. It can be separated from the former on the basis of 1) the silvery pubescence on the notum as opposed to the sparser and more golden pubescence found in *O. canescens*, and 2) the hind margin of the pronotum being very faintly edged with orange while in *canescens* this margin is conspicuously

orange. From *O. tristis* this species can be separated on 1) its silvery pubescent notum contrasted with the almost glabrous notum of *O. tristis*, 2) the entirely pale abdominal sternites which in *O. tristis* are usually blackened laterally, though at times they may be completely pale, and 3) the aedeagus in profile view (fig. 1A) having the lower surface bent upward in the apical fourth while in *O. tristis* this line is turned up in the apical third.

This species is named after the late William T. Davis, the most important single contributor to the knowledge of Cicadidae of North America.

Platypedia usingeri Simons, new species

Male: Head black above, almost glabrous, the supra-antennal plates edged with pale orange. *Pronotum* not hairy, black except for the following pale orange markings: narrowly on the anterior margin, median sulcus, and broadly on the hind margin. Mesonotum not hairy, black except for hind margin which is pale. Metanotum black edged with pale color. *Abdomen* black above, each tergite with much silvery pubescence; beneath, each sternite black, covered with short silvery hairs, especially towards the pleurites. *Aedeagus* black; valve black (fig. 1B). *Legs* mostly pale except for front femora which are chestnut. *Forewings*, costa to node pale yellowish, venation except for darker marginal cells mostly pale yellowish. Membranes of fore and hind wings yellowish-white to white.

Measurements: body length 20 mm., wing expanse 39 mm., width of forewing 7 mm., length of forewing 17.5 mm., length of valve 5 mm.

Female: Same as for male with the exception of the genitalia.

Measurements: body length 17 mm., wing expanse 44 mm., width of forewing 7 mm., length of forewing 19.5 mm.

Holotype male and *allotype* female (California Academy of Sciences, San Francisco): PUTAH CANYON, YOLO–SOLANO Co's., CALIFORNIA, May 7, 1929 (F. H. Wymore). *Paratypes:* 3♂♂. same data as for holotype.

This species appears to be closely related to *P. scotti* Davis, *P. mariposa* Davis, and *P. middlekauffi* n.sp. The author has not been able to identify females of these three species, but the characteristic shape of the aedeagus of the male separates *P. usingeri* from males of the above species. In *P. scotti* the aedeagus is slightly notched apically in dorsal view and in profile it turns up distally. In *P. mariposa* the aedeagus is smoothly arched on top, not sinuate as here, and rather concave on the bottom surface retaining only the subapical sinuation of *P. usingeri*. From *P. middlekauffi* it is distinguished primarily by the smoothly arched upper surface of the aedeagus (fig. 1D).

Platypedia sylvesteri Simons, new species

Male: Head black above, with a few short black hairs, supra-antennal plates margined with orange. *Pronotum* black except for the following orange areas: narrowly on the anterior margin, median sulcus, and broadly on the posterior margin. Mesonotum black, hind margin pale orange, the areas about the mesonotal X with many silvery hairs. Metanotum black, hind margin pale orange. *Abdomen* black above, the tergites, especially on the sides, covered with silvery pubescence; black beneath, densely covered with silvery pubescence and hairs. *Aedeagus* black; valve brownish (fig. 1C). Front *legs*, femora dark chestnut, black beneath, tibiae black in proximal two-thirds, pale distally; middle and hind legs pale, striped with black. *Forewings*, costa to note pale yellow, venation black; hind wings with venation mostly pale except for darker marginal cells. Membranes of fore and hind wings pale orange.

Measurements: body length 20 mm., wing expanse 47 mm., width of forewing 9 mm., length of forewing 20 mm., length of valve 4.5 mm.

Holotype (California Academy of Sciences, San Francisco): PANAMINT MTNS., INYO CO., CALIFORNIA, May 29, 1937 (Thorndike). *Paratype:* 1♂, same data.

Two other species of *Platypedia* having orange basal wing membranes and broad forewings (ratio of width to length 1:2) have been described. They are *P. barbata* Davis and *P. vanduzeei* Davis.

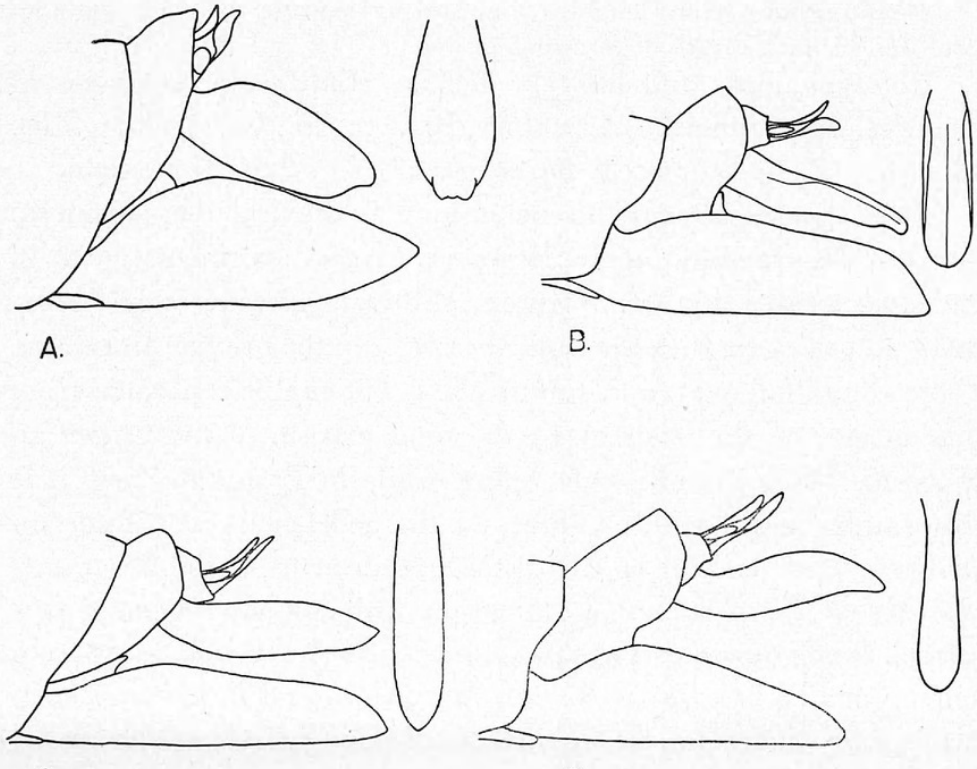

Fig. 1. Lateral (left) and dorsal (right) aspects of the aedeagi of the following species. A. *Okanagana davisi* Simons; B. *Platypedia usingeri* Simons; C. *P. sylvesteri* Simons; D. *P. middlekauffi* Simons.

P. sylvesteri differs from *P. barbata* in not having a densely hairy head, and in having a differently shaped aedeagus. In *P. barbata* the aedeagus is concave on the lower surface and bent down slightly in the apical third. From *P. vanduzeei* this species can be separated on the basis of the hairiness of the head and in differences in the aedeagus. The aedeagus of *vanduzeei* in profile is sharply upturned in the distal two-thirds of its length.

Platypedia middlekauffi Simons, new species

Male: Head above black, almost glabrous, the supra-antennal plates pale orange. *Pronotum* glabrous, mostly pale orange except for a horizontal line paralleling and just anterior to the hind margin and several longitudinal lines which are black. Mesonotum black, the hind margin orange, a few short silvery hairs near the X. Metanotum black, the hind margin orange. *Abdomen* black above, sparsely covered with silvery pubescence; black beneath, with a few silvery hairs. *Aedeagus* black; valve black, with a few short hairs posteriorly. (fig. 1D). *Legs* almost entirely pale except for front femora which are chestnut. *Forewings*, costa to node, pale yellow, venation except for dark marginal cells also pale yellow; hind wings with venation mostly pale. Membranes at base of fore and hind wings pale yellowish.

Measurements: body length 19 mm., wing expanse 42 mm., width of forewing 6 mm., length of forewing 19 mm., valve length 4.5 mm.

Female: Same as for male with the exception of the genitalia.

Measurements: body length 17 mm., wing expanse 44 mm., width of forewing 6.5 mm., length of forewing 20 mm.

Holotype male and *allotype* female (California Academy of Sciences, San Francisco): AUBURN, PLACER CO., CALIFORNIA, June 11, 1929 (F. H. Wymore). *Paratypes:* 2♂♂, 2 ♀♀, same data.

This species appears to be unique in having the pronotum mostly pale orange in color. However, several specimens taken in the same locality by Mr. Wymore, although agreeing structurally in all other details with the type, do not have the orange pronotum. These would fall next to *P. similis* Davis but can be separated from this species on the basis of 1) the hind margin of the pronotum of *similis* being broadly pale yellow while in *P. middlekauffi* it is only faintly edged with chestnut, 2) the aedeagus of *P. similis* in profile is very straight on the distal three-fourths of the lower surface except for a subapical sinuation while in *middlekauffi* this surface bends downward at this point. It is not possible to separate females of *P. scotti* Davis, *P. mariposa* Davis, and *P. usingeri* n.sp. at this time. Characters of the aedeagi of these species are discussed following the description of *P. usingeri.*

Platypedia putnami (Uhler)

Three color varieties of *Platypedia putnami* (Uhler), varieties

keddiensis, occidentalis, and *lutea,* were described by Davis[1]. Subsequently he elevated all of these forms to full species standing. This was done primarily on the basis of differences in distribution of the several forms. Actually *P. lutea* and *P. putnami* now appear to be almost sympatric in distribution, with only slight color differences separating them. In view of this the author proposes 1) to place the name *lutea* in synonymy, *putnami* (Uhler) having priority over *lutea* Davis, and 2) to shift *keddiensis* Davis and *occidentalis* Davis into infraspecific standing along with *putnami* (Uhler).

The known distributions of the forms are listed below and also indicated in fig. 2.

1. *P. putnami putnami* (Uhler). Ariz., Calif., Colo., Nebr., Nev., N. Mex., and Utah.

   P. lutea Davis. Ariz., Calif., Mont., Nev., S. Dak., Utah, and Wyo.
2. *P. putnami keddiensis* Davis. Calif., and Ore.
3. *P. putnami occidentalis* Davis. Calif.

Platypedia bernardoensis Simons, new combination

At the time W. T. Davis described *Platypedia rufipes* var. *bernardoensis* and *P. rufipes* var. *angustipennis*[2] it was suggested that they might be specifically different from *P. rufipes*. To the author it appears that *bernardoensis,* which differs from *rufipes* in the shape of the aedeagus, the coloration of the venation of the forewing, and in being a larger insect, is a different species. He also feels that var. *angustipennis* which is differentiated from *bernardoensis* on the basis of minor color differences is synonymous with that species.

COLOR VARIATION IN CALIFORNIA CICADAS

Several genera of California cicadas have been reported to have species which display considerable variation in coloration, this variation generally being expressed as a non-pigmented or pallid type of individual. The genera involved are *Diceropracta* Stål *(D. apache* Davis and var. *ochraleuca* Davis), *Okanagodes* Davis *(O. gracilis* Davis and var. *pallida* Davis), *Clidophleps* Van Duzee *(C. distanti* Van Duzee and var. *pallida* Van Duzee), and *Okanagana* Distant *(O. triangulata* Davis and var. *crocina* Wymore, *O. arboraria* Wymore and var. *crocea* Wymore, and *O. rub-*

[1] Davis, W. T., 1920. North American Cicadas belonging to the genera **Platypedia** and **Melampsalta.** Jour. New York Ent. Soc., 28:106-109.

[2] Davis, W. T., 1932. Additional records of North American cicadas with descriptions of new species. Jour. New York Ent. Soc., 40:259-260.

rovenosa Davis and var. *rubida* Davis). *Okanagana vanduzeei* Distant has had two partially pigmented forms, var. *consobrina* Distant and var. *californica* Distant described. In *O. pallidula* Davis this variation from predominately dark specimens to lighter col-

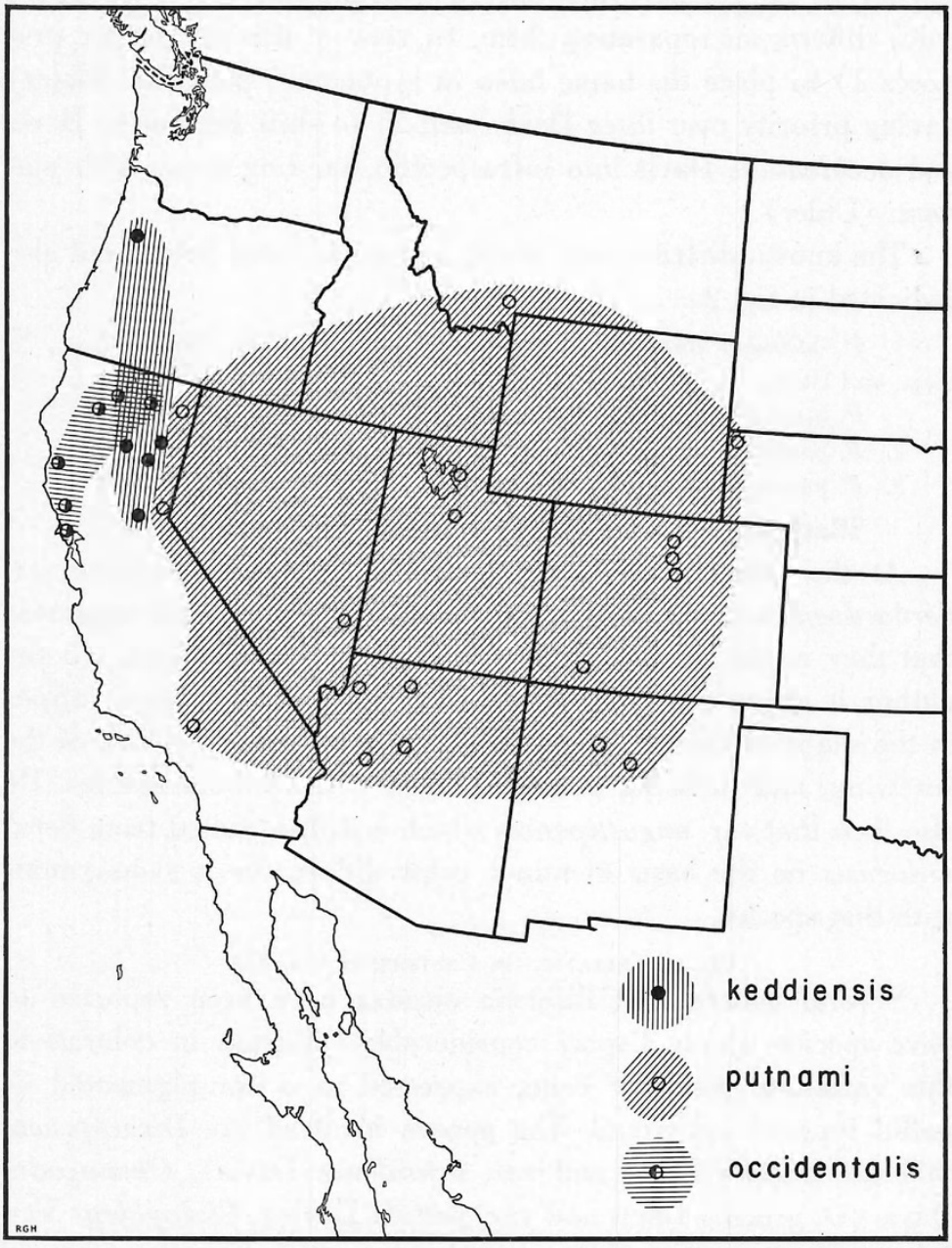

Fig. 2. Distribution of *Platypedia putnami* (Uhler).

ored forms is reversed with the pale specimens being much more common than the darker var. *nigra Davis*.

Recently a series of 19 entirely pale male *O. vanduzeei* Distant were taken near Lake Curry, Napa Co., Calif. In addition to these

specimens 42 *O. vanduzeei* var. *consobrina* Distant (var. *californica* Distant) males and two typically black *O. vanduzeei* Distant males were captured. Previous collections of this species in the San Francisco Bay area had indicated that the ratio of dark forms to the intermediate *consobrina* type was about two to one.

Since the major effort in collecting the Lake Curry population was directed toward first taking the pale forms and later in obtaining the typical *vanduzeei* no claim can be made for a random sample of the population. In addition it should be pointed out that observations of the population indicated that air temperature seemed to exert some influence as to whether the pale or intermediate forms were singing. No records of the actual temperature were made but most specimens of the pallid form were taken between 10:00 A.M. and 11:00 A.M. and as the temperature increased more and more *consobrina* were caught. Since collections were generally made over a period of several hours the tendency to acquire a biased sample was somewhat lessened. However, the observation certainly illustrates one complicating factor in the taking of a truly random sample of such a heterogeneous population.

Additional specimens of this pale form, ranging in distribution from Humboldt Co., Calif. to Inyo Co., Calif. have also been observed in the collection of the California Academy of Sciences.

Another species which exhibits this same variability in color and in which it has not been previously reported is *Okanagana utahensis* Davis. In the collection of the California Academy of Sciences there is a long series of pale examples of this species as well as several typically dark individuals taken by Mr. F. H. Wymore at Davis, Solano Co., Calif. In addition one specimen from Kings Co., Calif. has been seen. So far no records of either this form or the pale form of *O. vanduzeei* have been seen from outside of California, but it would be rather surprising if these cases are restricted geographically, in view of the seemingly sympatric distributions of the other species discussed here. For the present the author will regard all the color forms discussed here as being within-population variants and therefore proposes that the use of varietal names be discontinued for these categories until more positive evidence that infraspecific groups are being dealt with is found.

There are at least two hypotheses which might be proposed to explain color variation in cicadas: 1) a mutation from the dark

to the pale form which has since perpetuated itself, and 2) the expression of genetic factors, possibly multiple recessive in nature. Evidence for the former might be found in the case of *Okanagodes gracilis* Davis where oftentimes the entire sample of a population will be pale. The differences in observed ratios of numbers of dark, intermediate, and pallid individuals of populations of *O. vanduzeei* Distant however could probably be better explained on the basis of the expression of recessive genetic factors. Unfortunately cicadas do not lend themselves to the type of experimental work which it would be necessary to employ in order to work out a solution to this problem.

A NOTE ON OTOBIUS LAGOPHILUS (ACARINA:ARGASIDAE)

This brief note contributes a new locality record of the tick *Otobius lagophilus* Cooley and Kohls, in California. Over 200 unfed larvae and five females of this species were collected from the immediate entrance to an active rodent burrow in Lonetree Canyon near Tracy, San Joaquin County, California, in August, 1951. This burrow was one of several which were dispersed some five to ten feet above the canyon floor in sandstone cliffs. The location was approximately five miles equidistant from a sheep ranch to the east and a cattle ranch to the northwest. Fresh droppings from sheep, cattle, and various rodents were in evidence in the immediate vicinity.

Upon returning to this area in June, 1952, 13 males, 11 females and two cast nymphal skins were recovered. Four specimens were taken from the original site of the 1951 collection and 20 specimens plus the two nymphal skins were taken from the fine sand underneath an old watering trough in the center of the canyon floor. One male *Sylvilagus bachmani* (Waterhouse) was shot immediately south of this area but upon examination proved negative for *O. lagophilus*.

The only other published California record of this species of tick is an account of 17 nymphs taken around Barstow, San Bernardino County in 1924. Other records on the collection of this species are from Alberta, Canada; Colorado, Idaho, Montana, Nevada, Oregon and Wyoming.[1]

These ticks are uually associated with members of the Lagomorpha, namely, species of *Lepus* and *Sylvilagus*. They have also been recorded once from a cat and also once from inside rodent burrows. Such a collection extends the known distribution of this species in California and lends further support to the belief that many small rodents may play a more significant role as a host animal than heretofore suspected.—EDMOND C. LOOMIS, Bureau of Vector Control, 2180 Milvia St., Berkeley 4, Calif.

[1] Cooley, R. A. and G. M. Kohls. 1944. The Argasidae of North America, Central America and Cuba. Amer. Midland Nat., Monograph No. 1.