A New *Comadia* from the San Joanquin Valley of California

(Lepidoptera: Cossidae)

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Barnes and McDunnough (1911) proposed *Comadia* to include four species taken from *Hypopta* (Hubner) and designated *H. bertholdi* (Grote) the type species. Barnes and Benjamin (1923) described six additional species and subsequently described *C. polingi*, the last species to be named (Barnes and Benjamin 1927). *Comadia* has thus stood until the present. Interest in the genus was revived with the discovery of lepidopterous larvae in the roots of Alkali Blite, *Suaeda fruticosa* (L.) Forsk. by the junior author about 1950.

Preliminary study by Harry K. Clench of Carnegie Museum, Pittsburgh, Pennsylvania, indicated this to be a new species, described herein. We thank Mr. Clench for suggesting the name used and releasing his notes, without which this paper would have been more difficult.

Comadia suaedivora Brown and Allen, new species

MALE.—*Head*: Antennae bipectinate to end; longest pectinations three times shaft diameter; shaft white dorsally to end. Palpi upturned close to front, not reaching middle of eye; dark laterally. Front and vertex creamy-white with scattered brown scales. Tongue absent. *Thorax*: Vestiture long, loose, creamy-white, lighter ventrally; collar and posterior edge of thorax dark brown; partagia darker and edged in darker brown. Legs with long hair-like scales; prothoracic coxae and femora with considerable dark brown scaling; mesothoracic and metathoracic legs lighter; metathoracic tibiae and first two segments of tarsi swollen; two pairs of spurs present; tarsi ventrally spined; tarsal segments with brown rings in middle. Forewing dorsally white along costa to subterminal line, white invading upper and distal part of cell; eleven dark brown costal spots; base of cell M_3–Cu_1 white; caudal edge of median vein to Cu_2 white; both sides of A_2 white; end of discal cell dark brown; basal area of cells M_2–M_3 and Cu_1–Cu_2 dark brown; distal of subterminal line fuscous; finge white with brown checks at end of veins, ochreous patches distad of cell, below origin of Cu_2 and central portion of cell A_1–A_2. Forewing ventral, costa with basal three-fifths dark brown, remainder white with costal spots as above; dark subapical patch; subterminal line present, distally dark between veins; remainder of wing light gray, fringed as above. Length of wing, 15 mm. Hindwing dorsally white basad, distad light gray; veins darkened; fringe white. Hindwing ventrally creamy-white with dark brown scales; fringe white. *Abdomen*: Dorsally creamy-white cephalad, caudad darker; extending well beyond hind wings; ventrally creamy-white with evenly scattered brown scales. Length of body 16 mm. Male genitalia with harpe upturned, square at posterior edge,

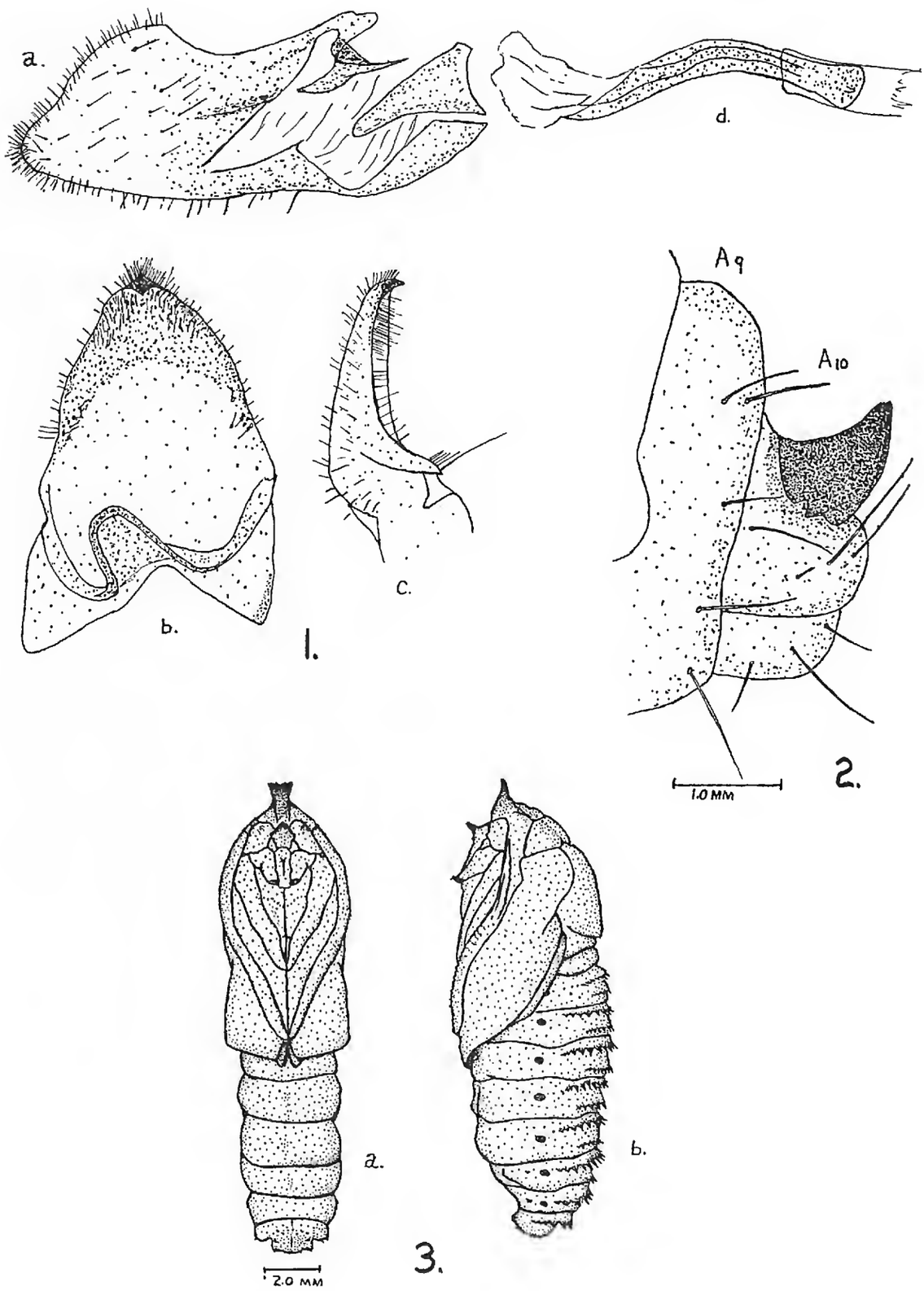

FIG. 1. Male genitalia of *C. suaedivora*, a) left harpe, b) tegumen and uncus (ventral), c) tegumen and uncus (lateral), d) aedeagus, (all 22.5×). FIG. 2. Last two larval segments of *C. suaedivora*. FIG. 3. Pupa of *C. suaedivora*, a) ventral, b) lateral.

inner surface lightly excavated; harpe with large hook shaped process at base just below costa (Fig. 1a); transtilla reduced; gnathos spoon shaped just above transtilla; tegumen, broad, hood-shaped, four to six strong setae at inner anterior corners of base; uncus small, turned down in short strong hook (Fig. 1b–c).

FEMALE.—Antennae ventrally serrate; serrations shallowly bifid, each with one seta about as long as free part of projection. Wing pattern similar to that of male, somewhat darker; subterminal line reduced. Abdomen heavier and considerably longer than male. Length of forewing 17 mm.; of body 22 mm.

Holotype male, (California Academy of Sciences, type #11608), TIPTON, TULARE COUNTY, CALIFORNIA, 17 May 1958, R. P. Allen. Allotype, 3 mi. N. Corcoran, Kings County, California, 20 May 1972, R. M. Brown. Paratypes, 80 males, 12 females; California, Fresno Co.: Kerman 1♂ 14 May 1962, R. P. Allen; 1♂ 9 May 1962, H. E. Gleason; 10 mi. S. Kerman 2♂ 3 June 1960, R. P. Allen; Tranquility 1♂ 14 May 1962, H. E. Gleason. Kings Co.: 3 mi. N. Corcoran, 3♂ 20 May 1972, R. M. Brown. Tulare Co.: Earlimart, 3♂ 14 May 1962, 1♂ 21 May 1962, 1♀ 31 May 1962, D. Rush; Tipton, 1♂ 15 May 1953, 1♂ 10 May 1956, 15♂ 15 May 1956, 33♂ 17 May 1958, 4♀ 7 May 1956 (reared), 1♀ 27 May 1959 (reared), 1♂, 1♀ 30 May 1959 (reared), 1♀ 5 June 1959 (reared), 2♂, 1♀ 1 May 1960 (reared), 1♂ 10 June 1960, 11♂ 18 May 1961, 3♂, 2♀ 21 March 1969 (reared), R. P. Allen.

TYPE DISPOSITION.—The holotype and allotype will be permanently deposited in the collection of the California Academy of Sciences, San Francisco. One pair of paratypes will be deposited in each of the following collections; Carnegie Museum, Pittsburgh, Pennsylvania; Los Angeles County Museum of Natural History, Los Angeles, California; Canada Department of Agriculture, Ottawa, Ontario; American Museum of Natural History, New York, N. Y.; and the collection of the senior author. The remaining paratypes will be placed in the collection of California Department of Agriculture, Sacramento, California.

REMARKS.—Barnes and Benjamin (1923) divided *Comadia* into three groups based on thoracic vestiture as follows: (1) Thoracic scales broad, (*engelhardti* B&B); (2) Thoracic scales hair-like, spatulate at end (see below); (3) Thoracic scales long, narrow to end (*henrici* Grt. & *menfredi* Neum.).

The second group at present is the largest and the most difficult. This group now contains six species and three subspecies: *C. bertholdi bertholdi* Grt., Colorado; *C. bertholdi fusca* B&B, Durango, Colorado; *C. bertholdi edwardi* Neum. & Dyar, Colorado; *C. intrusa* B&B Southern California; *C. dolli* B&B Clark Co. Nevada; *C. stabilis* B&B Trout

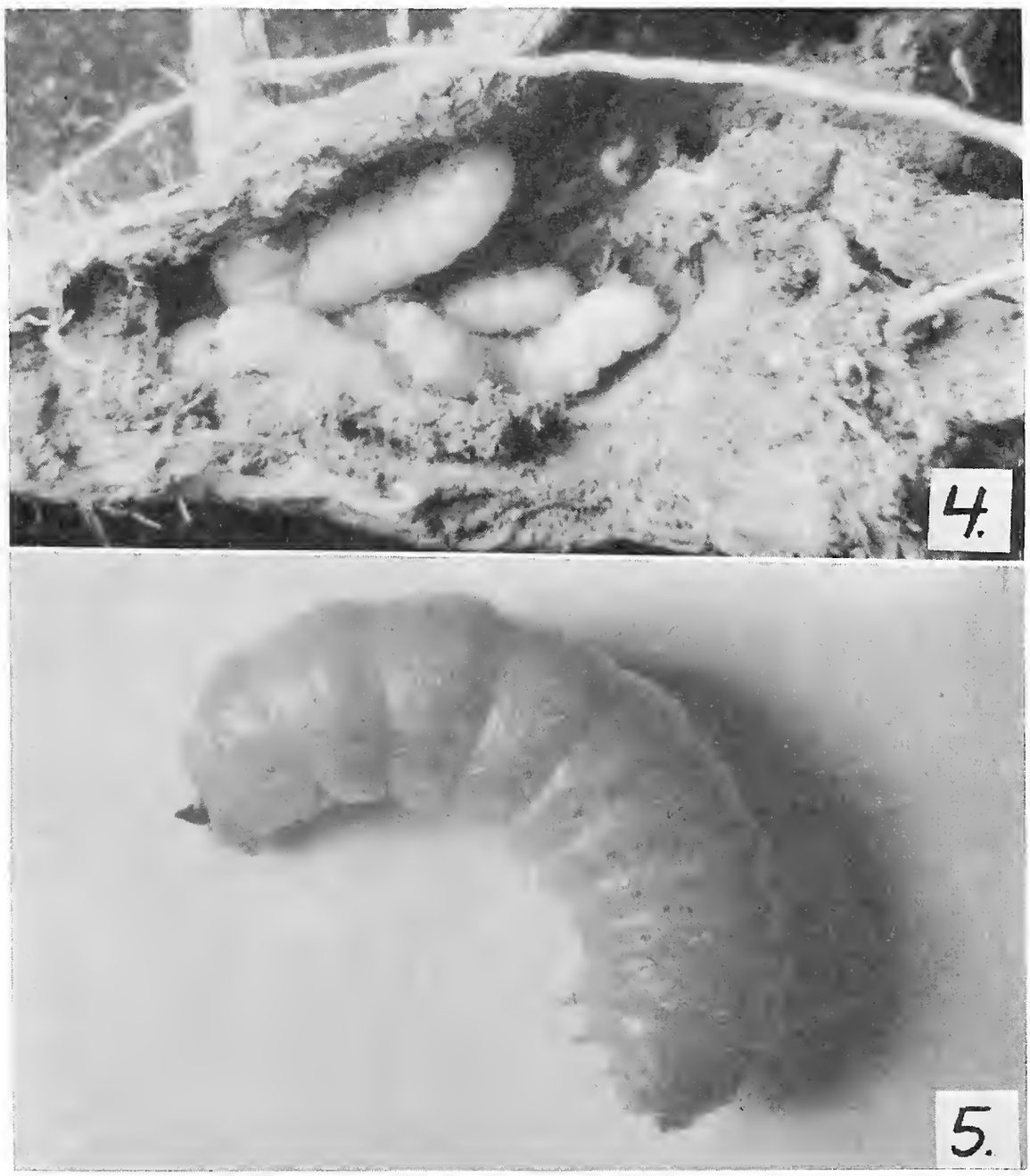

FIG. 4. A cluster of larvae in the hollowed crown of the host, *Suaeda fruticosa*.
FIG. 5. Mature larvae showing lack of setae and the prominent anal horn.

Creek, Juab Co. Utah; *C. polingi* B&B Bert, Otero Co. New Mexico; *C. suaedivora* Brown & Allen Tipton, California; *C. subterminata* B&B Redington, Arizona.

Comadia suaedivora like the other species, shows considerable variation. The amount of dark shading is the most variable character; only the few white areas described seem to be stable. The majority of females in the type series are smaller than the males. These probably were dwarfed while being reared under artificial conditions. The two females taken at light are the same size or larger than the males.

Comadia suaedivora can be told from *C. dolli*, *C. stabilis*, *C. intrusa* and *C. polingi* by the greater amount of dark suffusion and the whiter costa. The *C. bertholdi* group begins to approach it with *C. b. fusca* being the closest. From this subspecies it can be told by the lack of a prominent dark spot on the forewing below Cu_2. From *C. subterminata* it can be told by its smaller size and narrower, less rounded forewings, plus the lack of reticulations. This is an arbitrary placement until further study is made.

BIOLOGY

Larvae of *C. suaedivora* bore in the crown and roots of *Suaeda fruticosa* a low, woody halophytic shrub common to the semialkaline soil found in the San Joaquin Valley. Larvae are gregarious and completely hollow the woody area in which they feed (Fig. 5), usually killing the host. They are easily found by digging out and breaking open the crown and roots of the host. Various stages in development of larvae found together in the host indicates a possible two year larval cycle.

The known range of the moth extends from southern Madera County to northern Kern County, including portions of Fresno, Kings, and Tulare counties. A large population at Tipton, Tulare Co. has declined over the years due to host removal by development of cotton storage yards, and perhaps in part by the junior author's intermittent digging of plants in search of larvae. The host does not readily extend itself.

Adults fly from early May to mid June. The males are more attracted to light than females. Rearing by the junior author lends support to this: 15 adults (6 males and 9 females) were reared with a ratio of 40% males to 60% females; in the field 77 specimens were taken (75 males and 2 females) with a ratio of 97.4% males to 2.6% females. If there was an equal attraction for light between the sexes, a more equatable ratio should be found. The most extensive flights have been observed on warm, overcast nights during the latter part of May.

Eggs are deposited in a tight cluster glued to the host, probably near the crown. They have raised surface reticulations forming square and rectangular depressed cells. Eggs are 2.0 mm in height and 1.0 mm in diameter.

Larvae attain a length of 30 mm. When alive they have rose-lavender highlights which fade rapidly when specimens are placed in alcohol. The head is partly covered by the first thoracic segment. Thoracic legs are short, with a strong claw; abdominal legs are represented by crotchets arranged in a uniordinal series on segments A_3 through A_6.

Setae are sparse and short. The most striking feature of the larvae is the heavily sclerotized horn on the dorsal surface of the anal flap (Fig. 2 & 4). This horn is dark brown and does not extend above the level of the back. The purpose of the horn is open to speculation; it may be pushed against the wood to help the larvae travel inside the host.

Pupae (Fig. 3) are about 15 mm long, dark brown and heavily spined. The spines suggest that the pupa is active and able to travel. Considerable digging in the vicinity of infested plants has produced no pupa in the field, but they have been obtained by rearing. Reared adults leave their pupal cases protruding conspicuously above ground after emergence. This indicates the larvae, upon leaving the host, probably constructs a subterranean cell prior to pupation. Prior to emergence of the imago, the pupa makes its way to the ground surface. Rivers (1897) in a description of the life history of *H. bertholdi* Grt., points out that the pupa also extends above ground prior to adult emergence.

LITERATURE CITED

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BOOK NOTICE

ENVIRONMENT AND MAN. Richard H. Wagner. W. W. Norton and Co., Inc. 491 p., 196 figs., 9 tables. 1971. $7.50.

This book, produced on recycled paper, is intended as a general introduction to man-environment problems requiring little background in the sciences. The stress is on understanding basic problems. Additional readings are listed at the end of each of the 23 chapters and an Appendix to professional and lay journals containing articles of interest is provided for those who wish to keep up with this rapidly expanding area of information.

The book is divided into phases of reciprocal influence between man and environment: the environment in shaping man; man shaping the environment; the man-made city environment shaping man; and finally the ultimate problem of balancing resources and population to allow coexistence of all organisms. It presents an easy to read, well balanced overview of man-environment problems.—ROBBIN W. THORP, *University of California, Davis, 95616.*