



STUDIES IN ALAUDES  
(COLEOPTERA; TENEBRIONIDAE)

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In 1890, the writer took a specimen of a species of *Alaudes* at San Diego, California. It was found with ants under a cobblestone, near the mouth of what was then known as Switzer's Canyon. This canyon is to the southeast of the city. The specimen has remained an unique ever since.

In 1907, Mr. F. W. Nunenmacher collected a series of a species near Goldfield, Nevada. Dr. E. C. VanDyke has also taken a small series in Alameda County, California. Very recently Mr. J. O. Martin most kindly permitted me to study a series of sixteen specimens which he collected at Pasadena, southern California. The Goldfield and Pasadena series are accompanied by specimens of the ants with which they were found. These ants are of two distinct species. Careful examination of the specimens shows conclusively that four species of *Alaudes* are involved, and that three new species make a remarkable addition to our list of blind Tenebrionids.

Dr. Geo. Horn in the "Revision of the Tenebrionidae"<sup>1</sup> defined the genus *Alaudes* and described a single species, namely, *A. singularis*. The striking generic characters are the absence of eyes, and the abrupt and very deep depression at middle of the pronotal base, with a corresponding scutellar depression of the elytral base. Horn states that in *singularis* the scutellum is "transverse, bisinuate and tridentate at apex." The elytra have nine series of punctures each, and the vestiture consists of widely spaced and interstitial series of scales or setae.

The species may be defined as follows:

***Alaudes singularis* Horn**

*Form* oblong=oval and subdepressed. *Color* brownish=castaneous.

*Head* and pronotum clothed with yellowish appressed scales, interspersed with others that are larger and scarcely suberect. Elytral vestiture consists of very sparsely arranged, more or less gradually clavate, erect scales.

<sup>1</sup> Annals Amer. Philos. Soc., xiv, p. 361.

*Head* rather large, about a third of its width wider than long; sides sinuate at the usual position of the eyes, the sinuation limited by an anterior and a posterior angulation, the latter or basal angle slightly more prominent laterally than the former; apex very moderately sinuate at middle, lateral lobes arcuate and continuous with the moderately oblique sides of the front, margin more or less subdiaphanous and slightly reflexed; base broadly arcuate and scarcely sinuate laterally.

*Pronotum* slightly more than twice as wide as long; sides moderately prominent and rounded in anterior half, thence sinuately converging to become parallel before the basal angles; base transverse in middle two-fourths, sinuate in lateral fourths and adapted to the humeral region of the elytra; basal angles blunt, somewhat prominent laterally, including the investing scales; apex broadly, rather strongly and arcuately sinuate; disk rather more than moderately convex; basal depression occupies rather more than basal two-fourths, its floor flat, quite semicircularly rounded anteriorly, sides moderately precipitous, forming an angle with the floor.

*Elytra* about three times as long as the pronotum, about a third longer than wide; sides rather less than moderately arcuate, more rapidly so in apical third to the subgival apex; base broadly and feebly emarginate, humeri feebly dentiform; disk moderately and quite evenly convex, punctures large and round, arranged in rows, obsolescent on the scutellar declivity, but attaining the base laterally, interspaces bearing a single series of widely spaced erect scales, marginal series clavate, i.e. increasing gradually in width from base to apex, inner series becoming more or less subclavate or linear on the disk, but more hair-like at base. Scutellum transverse with a few long slender hairs.

Head and prothorax beneath, and legs clothed with scales. Prosternum rather densely punctate, with a few scattered scales.

*Measurements*.—Length, 1.7 mm.; width, 0.7 mm.

*Habitat*.—Pasadena, Los Angeles County, southern California. Horn gives only "California".

Sixteen specimens studied. *Type* in the Horn Collection.

Mr. Martin's specimens were identified as *singularis* by Prof. Fall. Horn's figure in the "Revision" is quite misleading as to the general form of the insect. It is drawn too robust and too oval, sides of the pronotum too straight, basal angles too obtuse and blunt, basal projections too strong, and the sides of the head are more sinuate than represented.

As a matter of fact the basal angles of the pronotum are clothed with a dense tuft of scales which render the angles more prominent than they really are. The true angles can often be seen as a blackish line dorsally at base of the squamous tuft. Horn's specimen may have had the angles denuded.

The basal prominences of the pronotum are relatively large, and when the prothorax is fully extended slightly overlap the sides of the scutellar depression.

The sutural striæ may be slightly impressed and the first interval feebly convex as it descends on the basal declivity.

It may again be stated that the marginal row of scales on the elytra are distinctly narrowed from apex to base, the former rounded, while the next and inner series are less so, becoming fusiform or linear on the central part of the disk, and hair-like around the scutellar declivity. The scutellum has a few long, flying hairs. The elytral punctures are strong and moderately deep. The elytral base is equal in width to that of the pronotum. In the humeral fourths the base is notched and apparently interlock with the angles of the pronotum.

Sexual differences are not evident. Four out of the sixteen specimens of Mr. Martin's series have all of the elytral scales quite linear, but not hair-like nor setiform. In some of the specimens the antennæ are gradually and slightly incrassate, in others a three-jointed club is slightly evident. There are probably sexual differences, they are positively not specific.

#### ***Alaudes squamosa* new species**

*Form* oblong-oval, subdepressed and quite parallel. *Color* testaceo-castaneous. Head and pronotum densely clothed with appressed scales. Elytral vestiture consisting of sparsely placed capitate scales in interstitial series, those of the central area becoming more slender and in the basal region rather linear.

*Head* about a third of its width wider than long, not strongly sinuate at the sides, and the basal angles somewhat more prominent laterally than the anterior angulation; apical margin rather deeply sinuate in middle third, sinuation evenly rounded, lobes evenly rounded into the oblique sides, margin rather narrow and subdiaphanous; surface broadly and feebly impressed in the latero-basal area.

*Pronotum* slightly more than twice as wide as long; sides somewhat prominent and moderately arcuate in anterior third, thence convergent and broadly sinuate to become parallel in about basal fourth; apex broadly and moderately deeply sinuate and adapted to the arcuate base of the head; apical angles sub-obtuse and not broadly rounded; base truncate at middle, sinuate laterally and adapted to the humeral region of the elytra; basal angles not prominent laterally, obtuse with the investing scales; disk moderately convex anteriorly, sides of the basal depression rather obliquely precipitous, passing rather arcuately into the horizontal floor; depression equal to about a third of the width or length.

*Elytra* slightly more than three times as long as the pronotum, base equal to the pronotal base; sides moderately arcuate and parallel, arcuately convergent in apical third, apex obtusely ogival; disk evenly and moderately convex, punctures coarse and round, distinctly serial in arrangement and separated by a distance equal to their diameter or a little less, sutural series slightly impressed, sutural interval feebly convex and passing more or less on to the scutellar declivity, surface punctate to base, punctures somewhat obsolescent behind the scutellum, the latter narrow and transverse; marginal scales almost widest at apex, triangulo-clavate in form, those of the central area clavate and more rounded at apex, becoming more linear about the scutellar region, scutellar hairs few, long and slender.

*Measurements*.—Length, 1.6 mm.; width, 0.6 mm.

*Habitat*.—Goldfield, Esmeralda County, Nevada. Collected October 18, 1907. Found in ant's nests by Mr. F. W. Nunenmacher.

*Type* in the author's collection. Paratypes in Mr. Nunenmacher's collection.

*Squamosa* is more parallel than *singularis*. The elytral base is equal to the pronotal base in both species. In *squamosa* the basal angles of the pronotum are not prominent laterally, and are obtuse, including the investing scales; sides moderately rounded anteriorly and frequently subangulate at point where convergence begins. Pronotal margin with short, stout truncate scales which are semi-erect.

The elytral scales are stouter apically, somewhat rounded or nearly truncate at apex, narrowing more rapidly at base; the marginal series may be described as triangulo-clavate, while those of the central area are more or less clavate to fusiform. The punctures are less perforate than in *singularis*.

#### **Alaudes setigera** new species

*Form* slightly robust, oblong-oval and less depressed. *Color* brownish castaneous. Vestiture consisting of densely placed and appressed scales on the head and pronotum, and of slender, erect hair-like setae on the elytra.

*Head* transverse, about a half wider than long; front moderately and evenly convex, broadly and feebly impressed laterally near the basal angles, the latter subacute and distinctly more prominent laterally than the anterior angulation, situation rather sharply subtriangular; apical margin broadly sinuate at middle, lobes evenly rounded, edge moderately narrowly subdiaphanous; base broadly arcuate and feebly sinuate laterally, adapted to the pronotal apex.

*Pronotum* about twice as wide as long; sides prominent and rather strongly rounded in apical half, thence converging and broadly sinuate, becoming parallel in about basal fifth; apical angles quite broadly rounded and continuing

into the broadly sinuate apex; base, as a whole, moderately arcuate, squarely truncate in middle two-fourths, sinuate laterally and adapted to the elytral base at the humeri; basal depression large and broadly arcuate anteriorly, projections rather strong, distinctly touching the side of the scutellar depression; basal angles almost rectangular, narrowly rounded including the investing scales; disk strongly arcuate anteriorly and laterally.

*Elytra* about three times as long as the pronotum and about a third of their width longer than wide; disk moderately convex, punctures coarse, round and rather shallow, quite obsolete at base and on the scutellar declivity; sides moderately arcuate, converging from about the middle in an arcuate manner to the parabolically rounded apex; vestiture long, slender and hair-like, widely spaced in interstitial series. Scutellum apparently oblong-triangular and transverse, the sparsely placed hairs somewhat coarse.

*Measurements*.—Length, 1.5 mm.; width, 0.6 mm.

*Habitat*.—San Diego, California. Taken in company with ants. One specimen in the author's collection.

*Setigera* is quite distinct from either *singularis* or *squamosa*, the head is transverse, the pronotum longer and less transverse, elytral vestiture hair-like, form more robust, the basal angles of the head are more prominent and sharper and the lateral situation is more sharply reëntrant.

#### ***Alaudes testacea* new species**

*Form* oblong-oval, somewhat depressed. *Color* testaceous. Head and pronotum clothed with yellow appressed scales, some of which are apparently larger than the majority. Elytral vestiture consists of sparsely arranged erect scales in interstitial series; the marginal scales are strongly capitate, becoming less capitate centrally.

*Head* moderate in size, about a third wider than long, anterior angulation less prominent than the subobtuse basal angle, situation rather shallow, sides oblique anteriorly; apex moderately deeply sinuate in middle third, situation evenly rounded, lobes evenly arcuate, margin narrowly subdiaphanous; base rather strongly and broadly arcuate in middle three-fifths, somewhat oblique and apparently very feebly sinuate laterally; surface feebly convex centrally, broadly and vaguely impressed laterally and apically.

*Pronotum* distinctly transverse and about a third of its length shorter than the head, more than twice as wide as long, base about equal to apex; sides moderately arcuate anteriorly, thence oblique and somewhat feebly sinuate and subparallel before the basal angles, the latter obtuse ( $\sigma$ ) to somewhat prominent ( $\varphi$ ) posteriorly; apex broadly sinuate, angles subobtuse; base somewhat arcuate as a whole, sinuate laterally and adapted to the humeri; depression about equal to a third of the width, sides rather precipitous, passing quite arcuately into the floor, the latter flat with posterior border transverse or feebly arcuate; disk moderately convex, basal prominences rather strong.

*Elytra* about three and a half times longer than the pronotum and about a third of their length longer than wide; sides feebly arcuate and parallel in basal two-thirds, thence gradually arcuate to the less than broadly rounded apex; disk moderately convex from side to side, arcuately declivous apically; punctures large, round, quite strong, moderately deep and distinctly serial; marginal scales short, broad and rounded at apex, quite suddenly narrowed toward base, those on the central part of the disk more gradually clavate, the few flying hairs about the scutellum rather coarse. Scutellum distinctly triangular.

Body beneath clothed with scales.

*Measurements*.—Length, 1.5–1.08 mm.; width, 0.6–0.8 mm.

*Habitat*.—Alameda County, California.

*Type* (♂) in the author's collection. Collected by Dr. E. C. Van Dyke, who possesses paratypes.

The salient and differential characters are the shorter pronotum, shorter, stouter and more strongly capitate marginal scales of the elytra, and, besides the punctures attaining the base laterally, becoming obsolete on the scutellar declivity, the sutural striæ are impressed toward base and extend on to the declivity as well. The triangular scutellum is distinctive and unique. In the female the sides of the scutellar depression is rather prominent, and the sculpturing is coarser. The basal prominences are noticeably tufted with horizontal elongate scales.

The posterior margin of the floor of the basal pronotal depression is distinctly arcuate.

The following table will aid in the separation of species:

Elytral vestiture distinctly scale-like. Scutellum distinctly triangular; marginal scales of elytra strongly capitate and rather short.....	<b>testacea</b>
Scutellum apparently transverse and more or less bisinuate at apex.	
Marginal scales rather narrow, increasing gradually in width from the base.....	<b>singularis</b>
Marginal scales broad at apex, increasing rapidly in width from the base; rounded or subtruncate at apex.....	<b>squamosa</b>
Elytral vestiture distinctly hair-like. Scutellum apparently transverse and more or less bisinuate at apex.....	<b>setigera</b>

It is extremely doubtful that the scutellum is transversely oblong, tridentate and bisinuate at apex. The doubt arises from a careful examination of the small series at hand. These insects are delicate and troublesome to handle, there are so few in collections that it is not desirable to dissect any. These remarks apply only to *singularis*, *squamosa* and *setigera*.

In *testacea* there can be no doubt regarding the scutellum, for it is larger than in the other species and almost an equilateral triangle.

In the other three species the bottom of the scutellar depression is transversely flattened. The scutellum when cleaned and viewed with moderately high power appears to consist of three parts, a middle or triangular part (true scutellum) and a lateral portion or callus on each side, which is a modification of the elytral margin bounding the scutellum, and fitted to the oblique sides of the central triangular part so as to give the appearance of a continuous transversely oblong scutellum, which appears distinctly bisinuate and tridentate at apex from lateral angles of the side pieces, and the middle angle or apex of the true scutellum. This appears to be the true explanation, and does not affect the status of the species. In *testacea* the parascutellar pieces are not present.

In all the species the elytral base is impressed or notched between the humeri and the more or less prominent sides of the scutellar depression, corresponding to similar notches at base of the pronotum, between the basal prominences and basal angles.