TWO NEW SUBSPECIES OF *MEGATHYMUS YUCCAE* (Bdv. & LeC.) FROM TEXAS

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There has been some confusion for a number of years concerning the status of specimens of *Megathymus yuccae* from Stephensville southward through San Antonio to Laredo. Don Stallings and I have referred to this large region as a "flux" area where specimens seemed to indicate characteristics of several subspecies. Recent studies have presented proof that actually we are dealing with a distinct subspecies showing relationships more closely to *wilsonorum* Stallings & Turner than to *stallingsi* Freeman, with which we had previously primarily associated it. With the naming of this subspecies the status and distribution of the various subspecies of *yuccae* in Texas is clarified.

Megathymus yuccae kendalli Freeman, new subspecies

FEMALE. Upper surface of primaries: flat black, with fairly heavy overscaling of yellowish gray hairs and scales near base; a few light gray scales near apex. Spot 1 (cell spot), squarish, light yellow; subapical spots (2, 3, 4) white, broad, 2–3 mm in width, submarginal spots 5 and 6 narrow, yellowish white; spot 7 square, 4 mm wide and may or may not reach under inner edge of spot 6; spot 8 very much like 7; spot 9 shaped like a broad V with the point directed toward base of wing; all three spots (7, 8, 9) light yellow. Fringes sordid gray, checkered with black at ends of veins.

Under surface of primaries: dull black, with entire outer margin overscaled with gray. All spots reappear, somewhat lighter than above.

Upper surface of secondaries: flat black, with a few light hairs near base; marginal border narrow, sordid grayish yellow. Discal spots are well defined, fairly small, 10 and 11 usually fused together. Only rarely a phantom spot in space 14. Fringes concolorous with marginal border.

Under surface of secondaries: gray around marginal area becoming dull black over discal and basal regions. Two white subcostal spots usually present, the larger one nearer base, broadly linear, the smaller one much narrower.

Abdomen dull black above, beneath only a little lighter. Thorax dark grayish black above, somewhat lighter beneath. Palpi white. Antennal club black with some white beneath, the remaining portion black, ringed with white above, nearly all white beneath.

Length of forewing 30 to 36 mm, average 33 mm. Wing measurements of holotype: forewing, apex to base 33 mm, apex to outer angle 20.5 mm, outer angle to base 25 mm; hindwing, base to end of Vein Cu_1 25.5 mm.

MALE: Upper surface of primaries: flat black, with fairly heavy overscaling of yellowish gray hairs and scales near base; a narrow overscaling of light gray near apex. Spot 1 (cell spot) small and oval. Spots 2 through 6 white. Spot 7 just barely reaches inner edge of spot 6. Spots 7 and 8 rounded on inner edge, 2.5 mm wide. Spot 9 somewhat pointed on inner surface, 3 mm wide. Spots 7, 8, and 9 light to medium dull yellow. Fringes gray, checkered with black at ends of veins.

[1] I wish to express my deepest thanks to the National Science Foundation for GB-398 which is making this research on the Megathymidae possible.

Under surface of primaries: dull black, some grayish scales near apex. All spots reappear, lighter than above, especially 7, 8, and 9.

Upper surface of secondaries: flat black, some yellowish hairs near base; marginal border narrow to medium width, dull yellow. Fringes concolorous with marginal border.

Under surface of secondaries: very similar to female.

Abdomen, thorax, palpi, and antennae as in female.

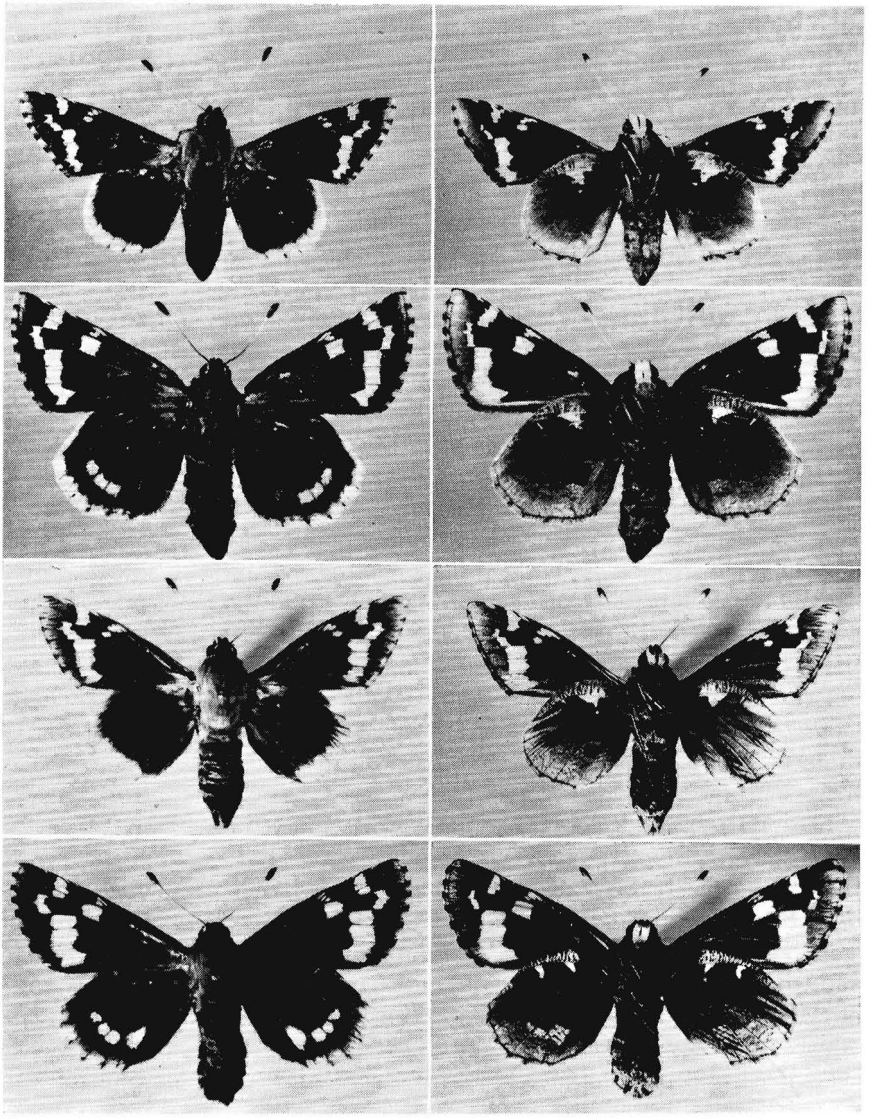
Length of forewing 24 to 30 mm. Wing measurements of the allotype: forewing, apex to base 26.5 mm, apex to outer angle 17 mm, outer angle to base 19 mm, hindwing, base to end of vein Cu_1 18 mm.

Holotype, female, San Antonio, Bexar County, Texas, 12 March 1957, reared in *Yucca constricta* Buckley, pH 7.3; allotype, male, same location and foodplant, 24 April 1958; both were collected by Roy O. and Connie Kendall and will be placed in the American Museum of Natural History. Described from 135 specimens (72 males and 63 females) all reared from larvae; 101 specimens were collected by Roy O. and Connie Kendall at San Antonio, Bexar County, Texas. February, March, and April, 1957–61, in *Yucca constricta* Buckley; 32 specimens were collected by Stallings & Turner at San Antonio in the same foodplant, March–May, 1948–56. One male and one female collected by the author at the same general area March, 1950, pH 7.3, same foodplant. There are five male and 11 female paratypes in the Kendall's collection; 18 male and 14 female paratypes in the Stallings & Turner collection. Paratypes will be placed in the Yale University collection and U. S. National Museum. The rest of the paratypes are in the author's collection.

Associated with this subspecies but not made a part of the type series are specimens collected at the following locations: Inks Lake State Park, Burnet County; U. S. Highway 81, Medina County; Hondo, in cemetery; 12 miles southeast of Laredo, on Highway 83; Eckert, Llano County; Burnet, Burnet County (*Yucca rupicola* Scheele); Stephensville, Erath County (*Yucca pallida* McKelvey); Bluff Dale, Erath County (*Yucca pallida* McKelvey and *Yucca necopina* Shinners); and Cleburne State Park, Johnson County, all in Texas.

I take pleasure in naming this new subspecies for my good friends Roy O. and Connie Kendall who collected most of the type series.

This subspecies is found 50 miles southwest of Cedar Hill, Dallas County, Texas (which is the southernmost record for *M. yuccae stallingsi* Freeman) southward to the Mexican border at Laredo (Map 1). On the west it is replaced by *M. y. louiseae* Freeman, which occurs at Bracketville northward to San Angelo. It does not extend over to eastern Texas where *M. y. reinthali* Freeman occurs, except just east of San Antonio in the Floresville area, where *Yucca louisianensis* Trelease occurs in sandy soil in wooded areas, where the pH is acid. *M. y. kendalli* has not been taken in the lower Rio Grande Valley where *M. y. wilsonorum* S. & T. is



EXPLANATION OF PLATE

Adults of *Megathymus yuccae*; left, upperside; right, underside. Top row: *M. yuccae kendalli* paratype ♂, San Antonio, Texas, 22 April 1948. 2nd row: *M. yuccae kendalli* paratype ♀, San Antonio, Texas, 4 April 1948. 3rd row: *M. yuccae winkensis* paratype ♂, Wink, Texas, 24 March 1963. Lower row: *M. yuccae winkensis* paratype ♀, Wink, Texas, 11 March 1963.

found. The former is associated with open country where the pH is on the alkaline side usually around pH 7.3–7.5. In most places the soil is rather rocky and scrub cedars (*Juniperus*) and mesquite are the dominant plant associates. The center of distribution of *kendalli* appears to be the San Antonio area, where most specimens have been taken from *Yucca constricta* Buckley.

In comparing this subspecies with the others found in this general part of Texas, it differs from *stallingsi* in the following ways: *stallingsi* has the spots bright lemon yellow, whereas in *kendalli* they are dull, light yellow; the ground color in *stallingsi* is dark, shiny black, in *kendalli* it is flat black; in *stallingsi* spot 7 reaches under spot 6 usually, while in *kendalli* it just barely reaches the inner edge of spot 6 and often may be separate from it; in *stallingsi* the females have spots 7 and 8 usually wider than spot 9, but in *kendalli* they are usually somewhat narrower than spot 9. *M. y. kendalli* differs from *reinthali* in the following ways: the spots are much darker yellow in *reinthali*; the ground color of *reinthali* is dark, shiny black, while in *kendalli* it is flat black; the spot shape differs in the females, *reinthali* has all of the spots on both wings larger and better defined than in *kendalli*; in *reinthali* spot 7 reaches well under spot 6 usually, while in *kendalli* it may or may not reach the inner edge of spot 6. *M. y. kendalli* differs from *louiseae* in the following ways: in *louiseae* the spots are yellowish white, while in *kendalli* the spots, although light, are still darker yellow than in *louiseae*; the spots are better defined in *kendalli* in both sexes than they are in *louiseae*; the marginal border of the secondaries is somewhat more narrow in *kendalli* than in *louiseae*; the wing shape is different in both sexes, while *kendalli* has broader wings. *M. y. kendalli* differs from *wilsonorum* in the following ways: the wing shape differs, *kendalli* has broader wings; the marginal border of the secondaries of both sexes in *wilsonorum* is much wider than in *kendalli*; as a general rule individuals of *wilsonorum* are larger than those of *kendalli*; spot 7 is well separated from spot 6 in *wilsonorum*, while in *kendalli* most specimens have spot 7 just barely reaching to the inner edge of spot 6. The genitalia place *kendalli* closer to *wilsonorum* than to any other subspecies of *yuccae*.

Several years ago Stallings & Turner found some old tents of *Megathymus yuccae* in *Yucca campestris* McKelvey at Wink, Texas. Using the information provided by them, I made two collecting trips to this area, one in November, 1962 and the other in November, 1963, to obtain specimens for study. As this area is very sandy and presents a habitat somewhat different from any other in Texas, I was certain that we had something different even before any specimens were seen. The pH is acid being pH 5 for the study habitats. After the first specimen emerged

it was obvious that we had a new subspecies, the description of which follows.

Megathymus yuccae winkensis Freeman, new subspecies

FEMALE. Upper surface of primaries: dark grayish black, with fairly heavy overscaling of grayish yellow hairs and scales near base; a narrow, grayish line of overscaling from apex to about middle of wing just inside fringe. Spot 1 (cell spot) broadly rectangular, yellowish white; three narrow white spots between cell spot and costa; spots 2, 3, and 4 white, broad, 3 mm; spots 5 and 6 prominent, white, 1–2 mm wide; spot 7 reaches to inner edge of spot 6, in some cases one-half the way under it; spot 7 broadly rectangular, 4.5 mm wide; spot 8 broadly rectangular, 5.5 mm wide; spot 9 bent inward at bottom, sharply pointed toward base of wing, not as wide as spot 8, 4 mm wide; all three spots (7, 8, 9), yellowish white, on some specimens almost completely sordid white. Fringes sordid white, checkered with black at ends of veins.

Under surface of primaries: dull grayish black, with the outer margin overscaled with light gray scales. All spots reappear, of the same general coloration as above.

Upper surface of secondaries: dark grayish black, with some slight, lighter overscaling near base; a broad, yellowish white, marginal border 3–4 mm in width; usually a white spot near costa. Markings light yellowish white; spots 10 and 11 usually fused, rather small, 1.5 mm wide; spot 12 rounded, 2.5 mm wide, spot 13 somewhat rectangular, 2–3 mm wide; usually a prominent spot in space 14 varying from phantom-like to a well-defined triangular spot. Fringes concolorous with marginal border.

Under surface of secondaries: dull grayish black, the spots reappearing as lighter areas. Two well-defined, linear, subcostal white spots. A brown, circular dot just above spot 10.

Abdomen dark grayish black above, slightly lighter beneath. Thorax grayish black above, somewhat lighter beneath. Palpi clear white. Antennae with club black, the remaining portion white with minute black rings between segments.

Length of forewing 31–34 mm, average 33 mm. Wing measurements of holotype: forewing, apex to base 33 mm, apex to outer angle 19 mm, outer angle to base 23 mm; hindwing, base to end of vein Cu_1 23.5 mm.

MALE. Upper surface of primaries: dull grayish black, with heavy overscaling of yellowish gray hairs and scales at base; some light grayish overscaling near apex. Cell spot (spot 1) small, oval, white; three linear, white streaks above cell spot near costa; spots 2, 3, and 4 form a curved line, prominent, white, 2–3 mm wide; spots 5 and 6 prominent, white; spot 7 usually extending one-half the distance beneath spot 6; spots 7 and 8 roughly square, 2–3.5 mm wide; spot 9 directed inward along vein, a light streak on vein on outer surface, 3.5 mm wide; spots 7, 8, 9 white in some cases with a very slight yellowish cast. Fringes light gray, checkered with black on veins.

Under surface of primaries: dull grayish black, apical area overscaled with grayish scales. The spots reappear, of the same general coloration as above.

Upper surface of secondaries: dark grayish black, some yellowish gray overscaling near base; a broad, sordid white, marginal border, 3–4 mm in width. Most veins are black, extending through this area. One specimen with two small but distinct discal spots. Fringes same color as marginal border.

Under surface of secondaries: similar to female except grayish overscaling is a little more uniform in appearance.

Abdomen, thorax, palpi and antennae same as in female.

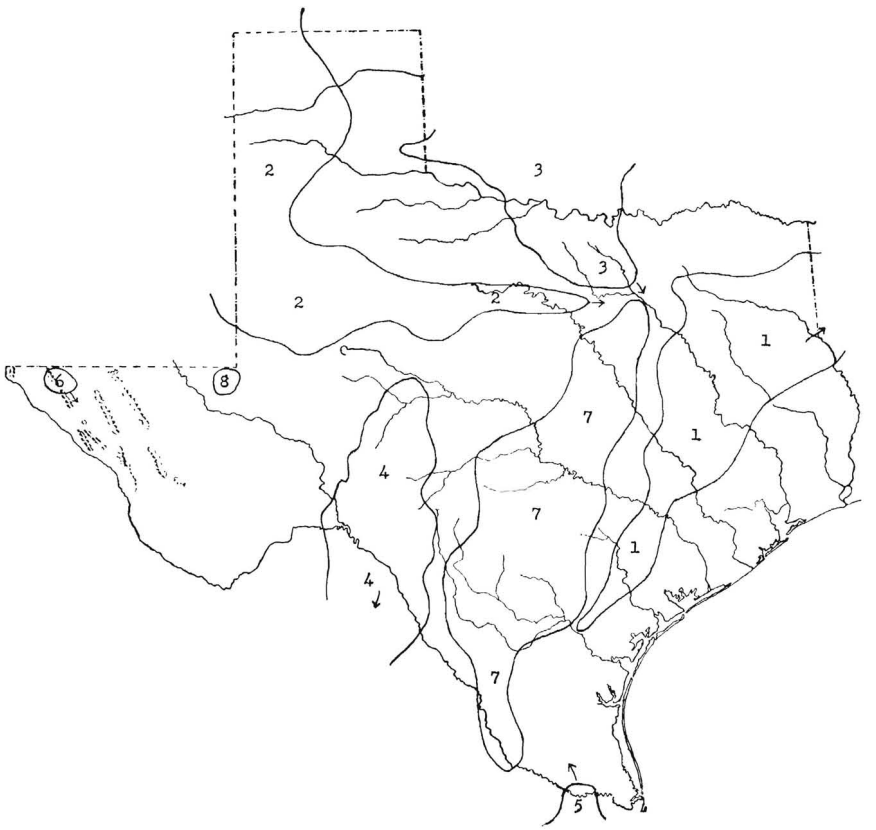
Length of the forewing 23 to 30 mm, average 29 mm. Wing measurements of allotype: forewing, apex to base 29.5 mm, apex to outer angle 18 mm, outer angle to base 21 mm; hindwing, base to end of vein Cu_1 19.5 mm.

Holotype female, Wink, Winkler County, Texas, 16 March 1964, reared in *Yucca campestris* McKelvey; allotype male, same location and foodplant, 9 March 1964, both were collected by the author and will be deposited in The American Museum of Natural History.

Described from 36 specimens (22 males and 14 females) all reared from larvae. Three males and one female were taken six miles north of Pyote, Ward County, Texas, November, 1962 and emerged during February and March, 1963; four males and five females were collected three miles south of Wink, Winkler County, Texas, November, 1962 and emerged during March and April, 1963; 15 males and eight females were collected at the northern edge of Wink, November, 1963 and emerged during March, 1964. All specimens were collected by H. A. Freeman. The type locality is the northern edge of Wink where the soil is red sand having a pH of 5. The elevation is 2,700 feet and the most predominant type of vegetation other than the foodplant, *Yucca campestris* McKelvey, was mesquite, tumbleweed, cacti, sand burs, and *Mahonia*. Apparently this subspecies is restricted to the above-mentioned areas, where the soil is acid. This is the only acid Yucca location that I have so far found in western Texas.

The two subspecies of *Megathymus yuccae* that show closest relationship to *winkensis* are *arizonae* Tinkham and *reubeni* Stallings, Turner, & Stallings. In comparing the males of *winkensis* with *arizonae* the following differences are noted: the wing shape is somewhat broader in *arizonae* than it is in *winkensis*; the ground color in *winkensis* is grayish black, while in *arizonae* it is brownish black; the coloration of spots 7, 8, and 9, as well as the marginal border of the secondaries in *winkensis* is light whitish yellow, while in *arizonae* the same areas are a darker dull yellow. In comparing the males of *winkensis* with *reubeni* the following differences are noted: the wing shape is somewhat broader in *reubeni* than in *winkensis*; *reubeni* has heavier white overscaling along the outer margins and all spots seem to fuse together more than they do in *winkensis*; the ground color of *reubeni* is flat black, while in *winkensis* it is more grayish black; and on the lower surface of the secondaries the subcostal spots are better defined in *reubeni* than they are in *winkensis*. In comparing the females of *winkensis* with *arizonae* the following are noted: the ground color in *winkensis* is grayish black, while in *arizonae* it is more brownish black; the spots are lighter in color in *winkensis* than in *arizonae*; the wing shape is somewhat broader in *arizonae* than it is in *winkensis*; in *arizonae* the discal band of spots on the upper surface of the secondaries are better defined than in *winkensis*, and the phantom spot in space 14 is broadly V-shaped with the point directed toward the base of the wing, while in *winkensis* this spot is more of a distinct, tri-

angular blotch; there are usually two white, oval spots below the outer subcostal spot on the lower surface of the secondaries in *arizonae*, while in *winkensis* these spots are obsolete. In comparing the females of *winkensis* with *reubeni* the following differences are noted: the wing shape is slightly broader in *reubeni* than in *winkensis*; spot 7 usually reaches to the cell spot in *reubeni*, while this rarely occurs in *winkensis*; all spots are larger and more fused together in *reubeni* than they are in *winkensis*; there is more white overscaling in the outer margins of *reubeni* than in *winkensis*; the phantom spot in space 14 on the upper surface of



EXPLANATION OF MAP

Distribution of the subspecies of *Megathymus yuccae* (Boisduval & LeConte) in Texas. 1, *M. yuccae reinthali* Freeman; 2, *M. y. coloradensis* Riley; 3, *M. y. stallingsi* Freeman; 4, *M. y. louiseae* Freeman; 5, *M. y. wilsonorum* Stallings & Turner; 6, *M. y. reubeni* Stallings, Turner, & Stallings; 7, *M. y. kendalli* Freeman; 8, *M. y. winkensis* Freeman.

the secondaries in *reubeni* is more like that in *arizonae* than it is to *winkensis*; there is greater contrast on the lower surface of the secondaries in *reubeni* than in *winkensis*; and in *reubeni* the discal band on the upper surface of the secondaries is more yellow than spots 7, 8, and 9, while in *winkensis* they are all of the same light whitish yellow coloration.

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BOOK NOTICE

ENTOMOLOGIE V. [Entomology, vol. V.]. By Jan Obenberger. 1964. 775 pp., 846 figs., and 12 pls. (of which 6 in color). Published by the Czechoslovak Academy of Sciences. Vodičkova Street, Praha, Czechoslovakia. Price 71,- Kčs.

The fifth volume of the monumental Obenberger's work "Entomologie" (in Czech) contains the orders Trichoptera, Lepidoptera, and Diptera.

The part on Lepidoptera (pp. 69–410, figs. 66–477, 12 pls.) contains a short review on the world system of families with a number of illustrations. In the introductory chapters the morphology and anatomy of all stages of Lepidoptera are discussed in detail.

The part on Lepidoptera in this entomological work is the most comprehensive study about the general problems of this order in the Czech language.

[The author, Professor of Entomology of Charles University, Prague, died at 29 May 1964].—JOSEF MOUCHA, Národní museum v Praze, Praha 1, Czechoslovakia