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# SYSTEMATIC REVIEW OF THE MEGATHYMIDAE

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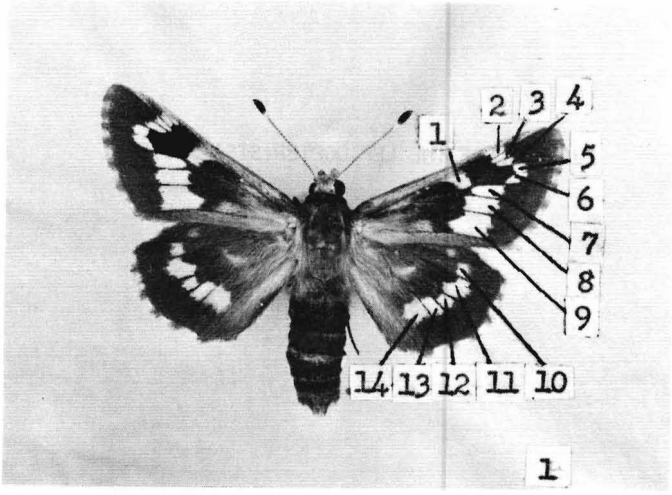


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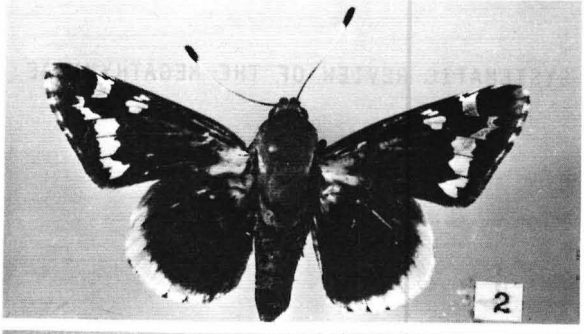

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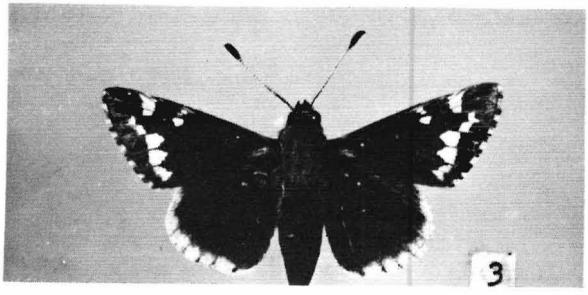

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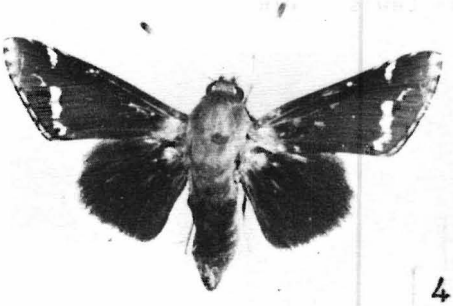

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# INTRODUCTION

In 1938, when this study began, the family Megathymidae was perhaps the most poorly known family of Rhopalocera. At that time there were 14 names regarded as species (one of which was later to be treated as a synonym and another as a subspecies) and four names regarded as subspecies, three of which are now recognized as full species. Today we recognize 49 species and 15 subspecies in this group of butterflies. The life histories of all species and subspecies have been worked out, with the exception of three which are known only in part. Chromosome counts have been made for many of the species by Dr. Charles Remington and his staff at Yale, and I have studied the chromosomes of additional species. Besides the work that I have done with this family, contributions to our knowledge of this interesting family have been made by Don B. Stallings, Viola Stallings, Dr. J. R. Turner, Ernest R. Tinkham, Charles F. Harbison, Dr. Charles Remington, and Dr. John A. Comstock.

In preparing keys for the identification of species and subspecies, reference is made to the spots of the wings and to the wing shape, and these characters are illustrated on plate 1. The spot numbers are given as 1 to 14, beginning with the cell spot (fig. 1). The wing shape is determined by a ratio of three measurements: 1) base-to-apex of forewing, or primary; 2) apex-to-outer angle (tornus) of primary; and 3) base-to-termination of $Cu_1$ of hindwing, or secondary. The wing shape is considered broad, if this ratio is 3:1.85:1.85, or greater (fig. 2); medium, if the ratio is about 3:1.6-1.8:1.6-1.8 (fig. 3); and narrow, if the ratio is less than 3:1.6:1.6 (fig. 4). As may be expected, infraspecific variation occurs in this ratio, but when based on average specimens, this character is useful as a means of identification.

A number of terms used in the keys are here defined: 1) sericin - a gelatinous protein that cements silken fibers found in the construction of the trap-door over the feeding tunnel in *Agathymus*; 2) apiculus - the erect, short point at the end of the club in some skippers; 3) pulvillus - a soft, padlike structure between the tarsal claws; 4) paronychium - a small, sleevelike structure over the base of the tarsal claw; 5) tent - a silken tube constructed by the larvae of certain Megathymidae over the feeding tunnel; 6) phantom spot - an indistinct spot, usually spot 14; 7) genitalia simple - valvae and vaginal

plate thin without any spines or processes; 8) genitalia fairly simple - valvae and vaginal plate thin with a few spines and other processes; 9) genitalia complex - valvae and vaginal plate thick with many spines and other processes; 10) flat black - in relation to the ground color, in which it is grayish-black with no purple gloss; 11) dull colored - not shiny; 12) deep black - very dark black with a slight purple gloss; 13) warm colored - refers to ground color, usually black with some intermixed brown or orange scales; 14) heavy - in relation to scaling, very dense; and 15) proharpe - a spiny process extending diagonally upward from near the terminal end of the sacculus or ventral part of the harpe or valva of the male genitalia.

## ACKNOWLEDGMENTS

I would like to express my appreciation to the National Science Foundation for Research Grants G-9900 and GB-398 which made this study possible. The photographs used in this article were made by Mr. Don B. Stallings, Caldwell, Kansas.

## Family MEGATHYMIDAE Comstock

Comstock, J. H. and A. B., 1895, Manual Study Insects: p. 365.

This family is made up of five genera containing 49 species and 15 subspecies. It is restricted to the Nearctic and northern Neotropical Regions. The adults are robust insects, usually measuring over 50 mm in wing expanse. They have a small head which is usually one half the width of the thorax. They have clubbed antennae, which show generic variation. The larvae feed in the caudex of *Yucca*, *Agave*, or *Manfreda* plants and the pupae have the ability to move up and down in the larval tunnel.

### Key to the subfamilies of Megathymidae

1a. Larvae construct a silken tent over feeding tunnel, pulp feeders; pupae with cremaster broadly rounded at terminal end, densely clothed with stiff, long bristles; vaginal plate of female simple and thin; adults usually fly in spring and summer, one species double brooded.....Megathyminae (p.3)

1b. Larvae construct a sericin-cemented trap door over feeding tunnel prior to pupation, primarily sap feeders; pupal cremaster may be bare or provided with hooks; vaginal plate of female complex and thick; adults fly in late summer and fall.....
.....Aegialinae (p.26)

## Subfamily MEGATHYMINAE Holland

Holland, W. J., 1899, Butterfly Book: 368.

### Key to the genera of Megathyminae

1a. Antennal club with an apiculus; antennae extending to inner edge of cell spot; paronychium bilobed, short and broad; genitalia simple; pupal cremaster barely spatulate, not depressed in center; tent constructed in last stages of larval feeding; *Manfreda* feeders.. .....*Stallingsia* Freeman

1b. Antennal club without apiculus; antennae not reaching cell spot; paronychium usually bilobed and fairly broad; genitalia fairly simple; pupal cremaster spatulate, with depressed center; tent constructed as larvae feed; *Yucca* feeders, except two species which feed on *Agave*.....*Megathymus* Scudder

## STALLINGSIA Freeman

*Stallingsia* Freeman, 1959, Lepid. News, 12: 87 ["1958"]

### Key to the species of *Stallingsia*

1a. Expanse usually more than 50 mm; spot 9 well defined. .....2

1b. Expanse usually less than 50 mm, (average of males 42 mm, females 45 mm); spots 7 and 8 elongated; spot 9 obsolete; southeastern Texas, northeastern Mexico.. .....*maculosus* (Freeman)

2a. Average expanse of males 64 mm, females 65 mm; ground color brown; secondaries with or without discal spots; spots 7 and 8 elongated; southwestern Mexico..... .....*smithi* (Druce)

2b. Average expanse of males 57 mm, females 59 mm; ground color chocolate brown in females, brownish-black in males; spots 7 and 8 round; extreme southern Mexico.. .....*jacki* S., T. & S.

### 1. Stallingsia smithi (Druce)

*Megathymus smithi* Druce, 1896, Biol. Centr. - Amer., Lepid. Heter.,2: 320, pl. 69, fig. 6.

*Stallingsia smithi;* Freeman, 1959, Lepid. News, 12: 87 ["1958"].

Type locality. - Amula, Guerrero, Mexico.

Distribution. - Mexico: Several specimens were taken near Guadalajara, Jalisco Mexico in apparently *Manfreda maculata* (Martius) Rose, which differ somewhat from specimens collected by Wilson near the type locality. This is still a very rare species in collections.

Chromosome number. - unknown.

## 2. Stallingsia maculosus (Freeman)

*Megathymus maculosus* Freeman, 1955, Amer. Mus. Novitates, 1711: 10.

*Stallingsia maculosus;* Freeman, 1959, Lepid. News, 12: 87 ["1958"]

Type locality. - Kingsville, Texas.

Distribution. - Southern Texas and northern Mexico. This species was first discovered at Parita Creek, Bexar Co., Texas. Later specimens were collected at Kingsville, Sinton, Falls City, Floresville, Sullivan City, and Mission. The only Mexican location where this species has been found was 35 miles southwest of China, Nuevo Leon.

Life history. - This is the only Megathymid that is known to be double brooded. I have collected pupae in April that emerged in May, while most of our specimens were collected as larvae and pupae during August and emerged during September and October. The larvae feed in the caudex of *Manfreda maculosa* Hooker. pH of soil, -7-7.3 in areas where larvae were collected.

Chromosome number. - 50.

## 3. Stallingsia jacki Stallings, Turner, & Stallings

*Stallingsia jacki* Stallings, Turner, and Stallings, 1963. Jour. Lepid. Soc., 17:117, pl. 2.

Type locality. - near Tuxtla Gutierrez, Chiapas, Mexico.

Distribution. - Known only from the type locality.

Life history. - This species is apparently single brooded. Larvae I collected during August, 1964, emerged during May and June of the following year. The food plant is a species of *Manfreda* which has unusually long, solid green, leaves and grows in tall grass, making the location of infested plants difficult. pH of soil, -7 - 7.2.

Chromosome number. - unknown.

## MEGATHYMUS Scudder

*Megathymus* Scudder, 1872, Rept. Peabody Acad. Sci., 1871:83(62).

### Key to the males of *Megathymus*

1a. Antennal club half white, half black; veins on lower surface of secondaries not contrasting with ground color.....2

1b. Antennal club all white; veins on lower surface of secondaries black, contrasting with ground color..8

2a. Wing shape narrow; no discal spots on lower surface of secondaries; no dense hair-like scales on wings. .....3

2b. Wing shape narrow; dark discal areas and distinct white spot near anal angle on lower surface of secondaries; no dense hair-like scales on wings.....4

2c. Wing shape broad; discal spots present on lower surface of secondaries; dense hair-like scales on upper surface of secondaries and lower surface of primaries.....5

3a. Ground color deep reddish-black; usually one subcostal spot on lower surface of secondaries; spots and marginal border of secondaries orange yellow; east of Mississippi River..... .....*yuccae* (Bdv. & LeC.)

3b. Ground color variable from brownish black to flat black; usually two subcostal spots on lower surface of secondaries; spots and marginal border of secondaries white to lemon yellow; west of the Mississippi River.....*coloradensis* Riley

4a. Ground color dull black; spots 7, 8, and 9 well developed, with a yellowish cast; spot 7 usually reaches to or slightly beneath spot 6; overscaling near base of wings brownish-yellow; Hidalgo, Mexico.. .....*beulahae* S. & T.

4b. Ground color purplish-black; spots 7, 8, and 9 small, white; spot 7 usually well separated from spot 6; overscaling near base of wings light yellowish-gray; vicinity of Coahuila, Mexico..... .....*gayleae* S.,T. & S.

5a. Ground color brownish-black; spots and marginal border orange-yellow; discal spots on lower surface of

secondaries indistinct, forming a straight line; Georgia and Florida.....6

5b. Ground color grayish-black to flat black; spots and marginal border light yellow; discal spots and other spots on lower surface of secondaries irregular in arrangement; South Dakota to Arizona.....7

6a. Ground color light brownish-black; marginal border of secondaries broad; discal band on lower surface of secondaries well developed; average expanse 55 mm; Florida.....*cofaqui* (Strecker)

6b. Ground color dark brownish-black; marginal border of secondaries medium to narrow; discal band on lower surface of secondaries poorly developed; average expanse 59 mm; north central Georgia.....*harrisi* Freeman

7a. Ground color warm grayish-black; spots and marginal border of secondaries dark yellow; a few creamy-yellow spots on lower surface of secondaries; ground color on lower surface of secondaries uniform grayish-brown; average expanse 72 mm; South Dakota to New Mexico.....*texanus* B. & McD.

7b. Ground color dull, flat black; spots and marginal border of secondaries yellowish-white; many white spots and dark blotches on lower surface of secondaries giving a mottled appearance; average expanse usually less than 72 mm; Arizona, New Mexico and Colorado.....*streckeri* (Skinner)

8a. Ground color dull, dark black; spots 7, 8, and 9 of approximately equal width, dark yellow; under surface of secondaries roughly overscaled with white; Arizona.....*ursus* Poling

8b. Ground color shiny black; spots 7, 8, and 9 progressively broader, orange; under surface of secondaries evenly overscaled with white; New Mexico, Texas and northern Mexico.....*violae* S. & T.

## Key to the females of *Megathymus*

1a. Antennal club one-half or less white, remaining portion black; veins not black on lower surface of secondaries; discal spots on upper surface of secondaries usually present.....2

1b. Antennal club all white; veins black on lower surface of secondaries, contrasting with ground color; no discal spots on upper surface of secondaries.....8

2a. Wing shape narrow; no discal band on lower surface of secondaries.....3

2b. Wing shape narrow; conspicious white, curved band on lower surface of secondaries.....4

2c. Wing shape broad; discal spots on lower surface of secondaries variable from one to many.....5

3a. Ground color deep umber black; usually one subcostal spot on lower surface of secondaries; spots and marginal border of secondaries orange-yellow; discal spots on upper surface of secondaries separate, rounded.....*yuccae* (Bdv. & LeC.)

3b. Ground color variable from brownish-black to shiny black; usually two subcostal spots on lower surface of secondaries; spots and marginal border variable from white to dark yellow; discal spots on upper surface of secondaries variable from fused to widely separate.....*coloradensis* Riley

4a. Ground color dark grayish-black; spot 7 situated beneath inner edge of spot 6; discal band well developed, spots adjacent but separate, especially close on secondaries; spots creamy-white; overscaling near base of wings grayish-brown.....
.....*beulahae* S. & T.

4b. Ground color dull black; spot 7 seldom extending beneath inner edge of spot 6; discal band greatly reduced on both primaries and secondaries; spots white; overscaling near base of wings grayish yellow.
.....*gayleae* S.,T. & S.

5a. Ground color brownish-black; spots orange-yellow; spot 7 usually extending to inner edge of spot 1; discal spots on lower surface of secondaries usually obsolete; discal spots on upper surface of secondaries forming a straight line.....6

5b. Ground color brownish black to black; spots orange yellow to white; spot 7 not extending to inner edge of spot 1; discal spots on lower surface of secondaries well defined; discal spots on upper surface of secondaries if present, slightly curved inward.....7

6a. Ground color warm brownish-black; marginal border of secondaries fairly broad; discal spots on upper and lower surfaces of secondaries well-defined; average expanse 55 mm.....*cofaqui* (Strecker)

6b. Ground color dark brownish-black; marginal border of secondaries obsolete; discal spots on upper surface of secondaries reduced, on lower surface of

secondaries obsolete; average expanse 59 mm.....
.....*harrisi* Freeman

7a. Ground color brownish-black; spots and marginal border dark yellow; ground color on lower surface of secondaries evenly brownish-gray, the discal spots creamy, reduced; discal spots on upper surface of secondaries well-defined.....
.....*texanus* B. & McD.

7b. Ground color dark grayish-black; spots and marginal border yellowish-white; under surface of secondaries mottled dark and light grayish-black; discal spots on lower surface of secondaries well-defined, clear white; discal spots on upper surface of secondaries absent or poorly defined.....
.....*streckeri* (Skinner)

8a. Ground color dark, shiny black; spots 7 and 8 usually wider than 9, dark yellow; under surface of secondaries roughly overscaled with white.....
.....*ursus* Poling

8b. Ground color warm black; spots 7, 8 and 9 of approximately equal width, orange; under surface of secondaries evenly overscaled with white.....
.....*violae* S. & T.

### 1. Megathymus yuccae (Boisduval & LeConte)

#### Key to the males of the subspecies of *Megathymus yuccae*

1a. Ground color dark brownish-black; spots of upper surface deep yellow; overscaling near base of wings medium to heavy; spot 9 in line with spots 7 and 8, not separate from them; marginal border of secondaries medium to broad, deep yellow; usually one subcostal spot on lower surface of the secondaries; average expanse 60 mm; North Carolina to Louisiana..
.....*yuccae* (Bdv. & LeC.)

1b. Ground color deep umber brown; spots of upper surface orange-yellow; overscaling near base of wings heavy; spot 9 separate from and slightly inward from spot 8; marginal border of secondaries broad, orange-yellow; usually one subcostal spot on lower surface of secondaries; average expanse 62 mm; Florida.....
.....*buchholzi* Freeman

## Key to the females of the subspecies of *Megathymus yuccae*

1a. Ground color dark brownish-black; spots of upper surface deep yellow; dense, deep yellow overscaling near base of wings; spots 7, 8 and 9 broad, about equal in size; fringes of primaries dark, faintly checkered with lighter scales; discal spots of secondaries well developed, 10 and 11 usually fused; marginal border of secondaries wide, deep yellow; under surface of secondaries uniform brownish-black, somewhat lighter around costa and margin; usually one subcostal spot on lower surface of secondaries; average expanse 70 mm...*yuccae* (Bdv. & LeC.)

1b. Ground color deep umber brown; spots of upper surface orange-yellow; heavy, orange-yellow, overscaling near base of wings; spot 9 is separate from and slightly inward from spot 8; fringes checkered light and dark on primaries; discal spots well-developed; marginal border of secondaries wide, orange-yellow; under surface of secondaries uniform brownish-black, lighter around costa and margin; usually one subcostal spot on lower surface of secondaries; average expanse 72 mm.....*buchholzi* Freeman

### 1a. Megathymus yuccae yuccae (Boisduval & LeConte)

*Eudamus yuccae* Boisduval & LeConte, 1833, Lepid. Amer., Sept.: pl. 70.

*Megathymus yuccae*; Scudder, 1872, Rep. Peab. Acad. Sci., 4:83.

*Megathymus yuccae alabamae* Freeman, 1943, Ent. News. 54: 211-217; Freeman, 1952, Field & Lab., 20:29 (synonymy).

Type locality. - Aiken County, South Carolina.

Distribution. - North Carolina, Southern Pines; South Carolina, Aiken County; Georgia, Stone Mountain, Atlanta, Dallas; Alabama, Anniston, Rockford; Florida, Pensacola; and Louisiana, West Feliciana.

Life history. - Adults emerge during March, April and May. Larvae feed in the caudex of *Yucca filamentosa* Linn., *Yucca smalliana* Fernald, and *Yucca flaccida* Haw.

Chromosome number. - unknown.

### 1b. Megathymus yuccae buchholzi Freeman

*Megathymus yuccae buchholzi* Freeman, 1952, Field & Lab., 20:31.

Type locality. - Jupiter, Palm Beach Co., Florida.

Distribution. - Florida: Jupiter, Gulfport, Port Sewell, Orlando, St. Petersburg, Sarasota, Melbourne Beach, and St. Augustine.

Life history. - Adults emerge during February, March, April and May. Larval food plant: *Yucca gloriosa* Linn., *Yucca smalliana* Fernald, and *Yucca aloifolia* Linn.

Chromosome number. - 26.

## 2. Megathymus coloradensis Riley

Key to the males of the subspecies complexes of *Megathymus coloradensis*

1a. Small (average expanse 50 mm); spot 7 entending to or well under spot 6; spots sordid white to light yellow; marginal border of secondaries medium to wide; midwestern and western United States.....2

1b. Medium to large (average expanse 58 mm); spot 7 extending to inner edge of spot 6; spots white to deep yellow; marginal border of secondaries narrow to wide; midwestern to southwestern United States....3

1c. Large (average expanse 60 mm); spot 7 may or may not reach inner edge of spot 6; spots light sordid white to dull yellow; wing shape narrow to medium; ground color flat black; medium to scant overscaling near base of wings; cell spot small; usually two subcostal spots on lower surface of secondaries; evenly brownish-gray on lower surface of secondaries; southcentral and southern Texas into northern Mexico..... .....*wilsonorum* complex

2a. Ground color brownish-black; wing shape broad; spots of upper surface light yellow; heavy pale yellow overscaling at base of wings; spot 7 extending halfway beneath spot 6; cell spot large; marginal border of secondaries wide, light yellow; one crescentic spot and a curved line beneath costa on lower surface of secondaries; under surface of secondaries mottled dark and light gray; Rocky Mountains eastward to Kansas and Texas Panhandle..... .....*coloradensis* complex

2b. Ground color grayish-black; wing shape medium; spots of upper surface light yellowish-white; indistinctly overscaled at base of wings; spot 7 extending to or slightly beneath spot 6; cell spot medium to small; marginal border of secondaries of medium width,

grayish-white; usually two spots beneath costa on lower surface of secondaries; under surface of secondaries rather evenly gray; Rocky Mountains and westward.....*navajo* Complex

3a. Ground color shiny black; wing shape medium to broad; spots lemon-to orange-yellow; faint to heavy overscaling near base of wings; spot 7 reaching inner edge of spot 6; cell spot large; marginal border of secondaries narrow to medium width, same color as spots; one to two subcostal spots on lower surface of secondaries; under surface of secondaries evenly grayish-black to brownish, somewhat lighter near margin; southern Kansas to northern Texas..... .....*stallingsi* Complex

3b. Ground color grayish-black; wing shape narrow to broad; spots white to light yellow; western and southwestern United States.....4

4a. Wing shape narrow to medium; spots sordid white; medium to heavy, light gray overscaling near base of wings; cell spot small; marginal border of secondaries of medium width, grayish-white; usually two subcostal spots on lower surface of secondaries; under surface of secondaries evenly gray; California and western Arizona.....*martini* Complex

4b. Wing shape medium to broad; spots sordid white to light yellow; heavy overscaling of paler hairs and scales near base of wings; cell spot medium to large; marginal border of secondaries very wide; usually two subcostal spots on lower surface of secondaries; under surface of secondaries usually mottled dark and light gray; southeastern Arizona to southwestern Texas.....*arizonae* Complex

Key to the females of the subspecies complexes of *Megathymus coloradensis*

1a. Small (average expanse 58 mm); spot 7 extending well under spot 6; spots sordid white to light yellow; marginal border of secondaries medium to wide; discal band of secondaries well-developed.....2

1b. Medium to large (average expanse 68 mm); spot 7 extending to or slightly beneath spot 6; spots white to deep yellow; discal band of secondaries medium to well-developed.....3

1c. Large (average expanse 71 mm); wing shape narrow to medium; ground color flat black; spots sordid white to light yellow; scant to medium overscaling near base of wings; spot 7 may or may not reach inner edge

of spot 6; cell spot small to medium; spots 7 and 8 narrow, about equal size, with spot 9 triangular and much wider than the other two, with the apex pointing inward; discal spots of secondaries poorly defined to medium, with 10 and 11 often absent; marginal border of secondaries medium and same general color as spots; under surface of secondaries grayish-black, becoming lighter near the border..*wilsonorum* Complex

2a. Ground color brownish-black; wing shape broad; spots of upper surface light yellow; heavy overscaling near base of wings; spot 7 extending halfway beneath spot 6; cell spot large; spots 7, 8 and 9 broad and squarish, about equal in width; discal spots of secondaries large and usually fused, usually with a phantom spot in space 14; marginal border of secondaries broad and yellowish; under surface of secondaries usually mottled light and dark.....
.....*coloradensis* Complex

2b. Ground color grayish-black; wing shape medium; spots of upper surface light yellow; indistinct overscaling near base of wings; spot 7 extending to or well beneath inner edge of spot 6; cell spot medium to small; spots 7 and 8 round on inner side, with indication of tooth, spot 9 somewhat wider; discal spots of secondaries small, separate, phantom spot in space 14 usually absent; marginal border of secondaries of narrow to medium width, grayish-yellow; under surface of secondaries usually uniform gray, sometimes lighter near margin.....*navajo* Complex

3a. Ground color shiny black; wing shape medium to fairly broad; spots of upper surface lemon- to orange-yellow
.....*stallingsi* Complex

3b. Ground color grayish-black; wing shape narrow to medium; spots white to light yellow.....4

4a. Wing shape narrow to medium; spots sordid white; light to medium overscaling near base of wings; cell spot large; spots 7, 8 and 9 medium to wide; discal spots of secondaries small to medium, separate; marginal border of secondaries medium; under surface of secondaries evenly gray.....
.....*martini* Complex

4b. Wing shape medium to wide; spots sordid white to light yellow; medium to heavy overscaling near base of wings; cell spot medium; spots 7, 8 and 9 wide; discal spots of secondaries large, often fused, a well-defined phantom spot in space 14; marginal border of secondaries very wide; under surface of secondaries variable from uniform gray to very mottled dark and light...*arizonae* Complex

Key to the males of the
*Megathymus c. coloradensis* complex

1a. Ground color light brownish-black; spot 7 extending half the distance under spot 6; heavy overscaling of light yellow near base of wings; small,(average expanse 50 mm); Oklahoma panhandle, Texas panhandle, southern Colorado, and northern New Mexico.....
.....*c. coloradensis* Riley

1b. Ground color dark brownish-black; spot 7 extending to or about half way under spot 6; light overscaling of yellow near base of wings; size larger (average expanse 54 mm); eastern New Mexico.....
.....*c. elidaensis* S. T. & S.

Key to the females of the
*Megathymus c. coloradensis* complex

1a. Ground color light brownish-black; spot 7 usually extending half the distance under spot 6; usually fairly heavy, pale overscaling near base of wings; discal spots on upper surface of secondaries usually large and fused, with a distinct phantom spot in space 14; small, (average expanse 58 mm).....
.....*c. coloradensis* Riley

1b. Ground color dark brownish-black; spot 7 extending usually about a third of the distance under spot 6; overscaling near base of wings medium; discal spots on upper surface of secondaries usually separate, and the phantom spot in space 14 is more or less obsolete; larger (average expanse 68 mm).....
.....*c. elidaensis* S. T. & S.

2a. Megathymus coloradensis coloradensis Riley, new combination

*Megathymus yuccae coloradensis* Riley, 1877, Trans. Acad. Sci. St. Louis, 3:568.

Type locality. - near Colorado Springs, Colorado.

Distribution. - Colorado: Colorado Springs, Springfield; Kansas: Wallace Co.; Oklahoma: Kenton; Texas: Palo Duro Canyon; New Mexico: Santa Fe.

Life history. - Adults emerge during April and May. Larval food plant, *Yucca glauca* Nuttall.

Chromosome number. - 27.

## 2b. Megathymus coloradensis elidaensis Stallings, Turner & Stallings, new combination

*Megathymus yuccae elidaensis* Stallings, Turner & Stallings, 1966, Lepid. Soc., 20:170.

Type locality. - near Elida, Roosevelt Co., New Mexico.

Distribution. - known only in the vicinity of the type locality.

Life history. - Adults emerge during March, April and May. Larval food plant, *Yucca glauca* Nuttall.

Chromosome number. - unknown.

Key to the males of the *Megathymus c. navajo* complex

1a. Spot 9 same width as spot 8; marginal border of secondaries grayish-white, indistinct; northern New Mexico, northern Arizona, southern Nevada..... .....*c. navajo* Skinner

1b. Spot 9 elongated inward, approximately two times the width of spot 8; marginal border of secondaries yellowish-white, distinct; Utah, southwestern Colorado.....*browni* S. & T.

Key to the females of the *Megathymus c. navajo* complex

1a. Spot 9 approximately same width as spot 8, bluntly pointed inward; marginal border of secondaries grayish-white, indistinct....*navajo* Skinner

1b. Spot 9 usually wider than spot 8, pointed inward toward base of wing; marginal border of secondaries yellowish-white, rather distinct..... .....*browni* S. & T.

## 2c. Megathymus coloradensis navajo Skinner, new combination

*Megathymus yuccae navajo* Skinner, 1911, Ent. News, 22:300.

Type locality. - Ft. Wingate, Zuni Mountains, McKinley Co., New Mexico.

Distribution.- New Mexico: Ft. Wingate; Jemez Springs; Bandalier; Colorado: Park Co.; Tarryall River Rd.; Arizona: Grand Canyon; Nevada: Charleston Mts., Clark

Co.; California: Little San Bernardino Mts., San Bernardino Co..

Life history. - Adults emerge during April, May, and June. Larval food plants, *Yucca baccata* Torr., *Yucca baileyi* Wooten & Standley, and *Yucca schidigera* Roezl.

Chromosome number. - 27.

### 2d. Megathymus coloradensis browni Stallings & Turner, new combination

*Megathymus yuccae browni* Stallings & Turner, 1960, Ent. News, 71:112.

Type locality. - Salina, Sevier Co., Utah.

Distribution. - Utah: Salina; Colorado: Black Canyon, Gunnison Co.

Life history. - Adults emerge during May and June. Larval food plant, *Yucca harrimaniae* Trelease.

Chromosome number. - unknown.

Key to the males of the *Megathymus c. stallingsi* complex

1a. Wing shape medium; spots lemon yellow; marginal border of secondaries narrow to medium, usually two subcostal spots on lower surface of secondaries; average expanse 55 mm; southcentral Kansas to northcentral Texas.....*stallingsi* Freeman

1b. Wing shape broad; spots deep yellow; marginal border of secondaries medium; usually one subcostal spot on lower surface of secondaries; average expanse 61 mm; east Texas.....*reinthali* Freeman

Key to the females of *Megathymus c. stallingsi* complex

1a. Wing shape medium; spots on upper surface lemon yellow; faint grayish-brown overscaling near base of wings; spot 7 reaching under inner edge of spot 6; cell spot of medium size; spots 7 and 8 fairly broad, spot 9 broadly triangular, its apex pointing inward; fringes of primaries black, faintly checkered with gray scales; discal spots of secondaries narrow, yellowish-gray; under surface of secondaries uniform brownish-black, with gray around margin; average expanse 65 mm.....*stallingsi* Freeman

1b. Wing shape broad; spots of upper surface dark yellow;

heavy, orange-yellow, overscaling at base of primaries; spot 7 reaching well under spot 6; cell spot large; spots 7, 8, and 9 broad, of about equal width; fringes of primaries yellow, faintly checkered with brown; discal spots of secondaries large and fused, usually a phantom spot in space 14; under surface of secondaries brownish-black over discal area, gray around costa and margin; average expanse 69 mm..... .....*reinthali* Freeman

### 2e. Megathymus coloradensis stallingsi Freeman, new combination

*Megathymus yuccae stallingsi* Freeman, 1943, Ent. News, 54:214.

*Megathymus yuccae stallingsi* female form *dee* Freeman, 1943, Ent. News, 54:216.

Type locality. - Caldwell, Sumner Co., Kansas.

Distribution. - Kansas: Caldwell; Oklahoma: Medford, Paul's Valley, Ryan, Terral, Cement; Texas: Wheeler, Wheeler Co., Dickens, Dickens Co., Palo Pinto, Palo Pinto Co., Dallas, Lancaster, Garland, Cedar Hill, Vickery, all in Dallas Co., Cleburne, Johnson Co., Waxahachie, and Midlothian, Ellis Co.

Life history. - Adults emerge during March, April, and May. Larval food plants, *Yucca arkansana* Trelease, and *Yucca pallida* McKelvey. pH of soil, 6.1 at type locality, all Texas localities 7.3-8.0.

Chromosome number. - 27.

### 2f. Megathymus coloradensis reinthali Freeman, new combination

*Megathymus yuccae reinthali* Freeman, 1963, J. Lepid. Soc., 17:91

Type locality. - two miles west of Ben Wheeler, Van Zandt Co., Texas.

Distribution. - Texas: type locality, 8.8 miles s. Canton, Van Zandt Co., 3.5 miles n. e. Crow, and 1 mile n. Crow, Wood Co., 2 miles n. w. Buffalo, and Oakwood, Leon Co., Tyler State Park, Smith Co., Luling, Caldwell Co., Redwater, Bowie Co., and Floresville, Wilson Co.

Life history. - Adults emerge during March, and April. Larval food plants, *Yucca louisianensis* Trelease, and *Yucca freemanii* Shinners. Soil pH, type locality 5.0; other locations tested, 4.9-5.1.

Chromosome number. - 27.

Key to the males of the *Megathymus c. martini* complex

1a. Ground color grayish-black; wing shape narrow; spots 7, 8 and 9 sharply pointed on their inner surface; average size 56 mm; western Mojave desert California. .....*martini* S. & T.

1b. Ground color dark grayish-black;wing shape medium; spots 7 and 8 rounded on their inner surface; average size 60 mm; Providence Mountains, in eastern Mojave Desert, California.....*maudae* S.,T. & S.

Key to the females of the *Megathymus c. martini* complex

1a. Ground color grayish-black; wing shape narrow; spot 7 reaches one half the distance to the cell spot; spots 10 and 11 displaced slightly inward from spot 12 on the upper surface of the secondaries; spots 12 and 13 small and sometimes indistinct; average size 61 mm.. .....*martini* S. & T.

1b. Ground color dark grayish-black; wing shape medium; spot 7 reaching two-thirds the distance to cell spot; spots 10 and 11 in line with spot 12 on the upper surface of the secondaries; spots 12 and 13 large and well defined; average size 70 mm..... .....*maudae* S.,T. & S.

## 2g. Megathymus coloradensis martini Stallings & Turner, new combination

*Megathymus yuccae martini* Stallings & Turner, 1956, Bull. So. Calif. Acad. Sci., 55:150, pl. 3.

Type locality. - Little Rock, Los Angeles Co., California.

Distribution. - Western Mojave Desert, California

Life history. - Adults emerge during January, February, March, and April. Larval food plants, *Yucca brevifolia* Engelm., and *Yucca schidigera* Roezl.

Chromosome number. - unknown.

## 2h. Megathymus coloradensis maudae Stallings, Turner & Stallings, new combination

*Megathymus yuccae maudae* Stallings, Turner & Stallings, 1966, J. Lepid. Soc., 20:169.

Type locality. - Providence Mountains, San Bernardino County, California.

Distribution. - Mountains of eastern Mojave Desert in California.

Life history. - Adults emerge during March and April. Larval food plant, *Yucca schidigera* Roezl.

Chromosome number. - unknown.

Key to the males of the *Megathymus c. arizonae* complex

1a. Wing shape broad; ground color brownish-black; spots light yellow; overscaling near base of wings medium in density; spot 7 extending just beneath spot 6; marginal border of secondaries broad, light yellow; usually two subcostal spots on lower surface of secondaries; under surface of secondaries evenly light gray; southeastern Arizona.....*arizonae* Tinkham

1b. Wing shape broad; ground color flat black; spots sordid white; overscaling near base of wings usually heavy; spot 7 extending about half way beneath spot 6; heavy white overscaling along outer margins; marginal border of secondaries very broad, grayish-white; usually two well-defined, subcostal spots on lower surface of secondaries; under surface of secondaries usually mottled light and dark gray; extreme western Texas (Hueco Mts.).....*reubeni* S.T. & S.

1c. Wing shape narrow to medium; ground color grayish-black; spots sordid white; overscaling near base of wings medium; spot 7 extending about one half the distance under spot 6; white overscaling on upper surface of primaries restricted to apical region; marginal border of secondaries broad, grayish-white; one well-defined subcostal spot and one linear spot on lower surface of secondaries; under surface of secondaries even light gray; western Texas (Wink).. .....*winkensis* Freeman

Key to the females of the *Megathymus c. arizonae* complex

1a. Wing shape medium; spots of upper surface light yellow; scant to medium overscaling near base of wings; spot 7 reaching just beneath spot 6; cell spot of medium

size; spots 7, 8 and 9 fairly broad, about equal in size; often a broadly V-shaped phantom spot in space 14; marginal border of secondaries broad, light yellow; under surface of secondaries rather evenly grayish-black; average expanse 70 mm.....
.....*arizonae* Tinkham

1b. Wing shape broad; spots of upper side whitish; medium to heavy overscaling near base of wings; spot 7 reaching well beneath spot 6; cell spot medium to large; spots 7, 8 and 9 broad, spot 7 often reaching inward nearly to cell spot; heavy overscaling of white near outer margins on the upper surface of the primaries; a well-developed V-shaped phantom spot in space 14; marginal border of secondaries very broad, grayish-white; under surface of secondaries mottled dark and light; average expanse 69 mm.....
.....*reubeni* S.,T. & S.

1c. Wing shape narrow to medium; spots of upper surface sordid whitish-yellow; medium overscaling near base of wings; spot 7 reaching to or just beneath spot 6; cell spot large; spot 7 never reaching to cell spot; white overscaling is restricted to the apical region; phantom spot in space 14 a broad blotch, not V-shaped; under surface of secondaries evenly gray with little contrast; average expanse 65 mm.....
.....*winkensis* Freeman

## 2i. Megathymus coloradensis arizonae Tinkham, new combination

*Megathymus yuccae arizonae* Tinkham, 1954, Bull. So. Calif. Acad. Sci., 53:81, pl. 2.

Type locality. - Mountain View, Pima Co., Arizona.

Distribution. - Arizona: south-central, Mountain View, Benson.

Life history. - Adults emerge during March. Larval food plants, *Yucca thornberyi* McKelvey, and *Yucca elata* Engelm. Soil pH, at type locality 7.1.

Chromosome number. - unknown.

## 2j. Megathymus coloradensis reubeni Stallings, Turner & Stallings, new combination

*Megathymus yuccae reubeni* Stallings, Turner & Stallings, 1963, Lepid. Soc., 17:87.

Type locality. - Hueco Mountains, El Paso Co., Texas.

Distribution. - Texas: Hueco Mountains, and near Shafter, Presidio Co.

Life history. - All specimens emerged during January to April except the one female from Shafter which emerged 8 Sept. 1957. Larval food plants, *Yucca baccata* Torrey, and *Yucca elata* Engelmann. Soil pH, at type locality 7.3, and the same at the location near Shafter.

Chromosome number. - 27.

### 2k. Megathymus coloradensis winkensis Freeman, new combination

*Megathymus yuccae winkensis* Freeman, 1965, J. Lepid. Soc., 19:87.

Type locality. - Wink, Winkler Co., Texas.

Distribution. - Texas: Wink, 3 miles s. Wink, Winkler Co., 6 miles n. Pyote, Ward Co.

Life history. - Adults emerge during February and March. Larval food plant, *Yucca campestris* McKelvey. Soil pH, at type locality 5.

Chromsome number. - unknown.

Key to the males of the *Megathymus c. wilsonorum* complex

1a. Wing shape very narrow; spots of upper side dull lemon yellow; dense, dull lemon yellow overscaling near base of wings; spot 7 not reaching inner edge of spot 6; marginal border of secondaries wide, dull lemon yellow; usually one subcostal spot on lower surface of secondaries; average expanse 61 mm; vicinity of Mission, Texas to Victoria, Tamaulipas, Mexico.. .....*wilsonorum* S. & T.

1b. Wing shape narrow; spots of upper side sordid yellowish-white; faint scant, gray overscaling at base of wings; spot 7 barely reaching inner edge of spot 6; marginal border of secondaries of medium width, sordid yellowish-white; two subcostal spots on lower surface of secondaries; average expanse 57 mm; San Angelo, Texas southward to Allende, Coahuila, Mexico, and westward to Langtry, Texas...*louiseae* Freeman

1c. Wing shape medium; spots and upper side dull lemon yellow; fairly heavy overscaling of lighter scales and hairs near base of wings; spot 7 barely reaching

inner edge of spot 6; marginal border of secondaries of medium width, dull lemon yellow; usually two white subcostal spots on lower surface of secondaries; average expanse 56 mm; northcentral Texas through San Antonio to Laredo, Texas.....*kendalli* Freeman

Key to the females of the *Megathymus c. wilsonorum* complex

1a. Wing shape very narrow; spots of upper surface yellowish-white; fairly heavy grayish-yellow overscaling near base of wings; spot 7 not reaching inner edge of spot 6; cell spot medium; spot 9 triangular with apex pointing inward; fringes of primaries distinctly checkered dark gray and sordid white; discal spots of secondaries greatly reduced, 10 and 11 usually absent; marginal border of secondaries broad, light yellow; under surface of secondaries grayish-black, darker over discal area and lighter around costa and margin; average expanse 74 mm.....*wilsonorum* S. & T.

1b. Wing shape narrow; spots of upper side yellowish-white; faint grayish-yellow overscaling near base of wings; spot 7 usually reaching to inner edge of spot 6; cell spot medium; spot 9 triangular, apex pointing inward; primaries with fringes of primaries distinctly checkered black and sordid white; discal spots of secondaries reduced, 10 and 11 mere dots, sometimes a phantom spot in space 14; marginal border of secondaries medium in width, sordid white blending into gray; under surface of secondaries uniform grayish-black, with some lighter gray around margin and near costa; average expanse 69 mm.....*louiseae* Freeman

1c. Wing shape medium to broad; spots of upper side light yellow; fairly heavy overscaling of yellowish-gray hairs and scales near base of wings; spot 7 may or may not reach inner edge of spot 6; cell spot medium to large; spot 9 shaped like a broad V with the point directed toward base of wing; fringes of primaries checkered light and dark; discal spots of secondaries well-defined, marginal border of secondaries narrow, yellow;under surface of secondaries uniform grayish-black; average expanse 70 mm.....*kendalli* Freeman

## 21. Megathymus coloradensis wilsonorum Stallings & Turner, new combination

*Megathymus yuccae wilsonorum* Stallings & Turner, 1958, Lepid. News, 11:129 ["1957"].

Type locality. - Victoria, Tamaulipas, Mexico.

Distribution. - Mexico: Victoria, China, General

Bravo, Tamaulipas; Texas: Mission and Sullivan City, Hidalgo Co., and Rio Grande City, Starr Co.

Life history. - The adults emerge during February, March and April. Larval food plants, *Yucca treculeana* Carr., and *Yucca (Samuela) carnerosana* Trel. Soil pH, 7.3 at type locality and Mission, Texas habitats.

Chromosome number. - 27.

### 2m. Megathymus coloradensis louiseae Freeman, new combination

*Megathymus yuccae louiseae* Freeman, 1963, J. Lepid. Soc., 17:95.

Type locality. - 16 miles north Del Rio, Val Verde Co., Texas.

Distribution. - Western Texas (vicinity of San Angelo to vicinity of Del Rio), and northern Mexico (12 miles south Allende, Coahuila).

Life history. - Adults emerge from February into May. Larval food plants, *Yucca thompsoniana* Trel., *Yucca torreyi* Shafer, and *Yucca reverchoni* Trel. Soil pH, type locality 7.1, varies in locations studied from 7.0 to 7.2.

Chromosome number. - 27.

### 2n. Megathymus coloradensis kendalli Freeman, new combination

*Megathymus yuccae kendalli* Freeman, 1965, Lepid. Soc., 19:83.

Type locality.-San Antonio, Bexar Co., Texas.

Distribution. - South central Texas (Erath County to Webb County).

Life history. - Adults emerge during February, March and April. Larval food plants, *Yucca constricta* Buckley, *Yucca rupicola* Scheele, *Yucca pallida* McKelvey, *Yucca necopina* Shinners, and *Yucca treculeana* Carr. Soil pH, 7.3 at all study habitats.

Chromosome number. - 27.

## 3. Megathymus cofaqui (Strecker)

*Aegiale cofaqui* Strecker, 1876, Proc. Acad. Nat. Sci. Phila., 28:148.

*Megathymus cofaqui;* Skinner, 1891, in: Smith, List Lep. Bor. Amer.:17.

Type locality. - Boca Grande, Lee Co., Florida.

Distribution. - Florida: Sarasota, Boca Grande, Longboat Key, Casey Key, and Lutz.

Life history. - Adults emerge during February, March and April. Larval food plant, *Yucca aloifolia* L.

Chromosome number. - unknown.

### 4. Megathymus harrisi Freeman

*Megathymus harrisi* Freeman, 1955, Amer. Mus. Novitates, no. 1711:2.

Type locality. - Stone Mountain, Dekalb Co., Georgia.

Distribution. - Georgia: Stone Mountain, Atlanta, and Cleveland.

Life history. - Adults emerge during July, and August. Larval food plant, *Yucca filamentosa* L.

Chromosome number. - unknown.

### 5. Megathymus streckeri (Skinner)

*Aegiale streckeri* Skinner, 1895, Canad. Ent., 27:179.

*Megathymus streckeri* 1898, Syn. Cat. N. A. Rhop.,:99.

Type locality. - Petrified Forest, Apache Co., Arizona.

Distribution. - Arizona: Petrified Forest; New Mexico: Albuquerque, Santa Fe; Colorado: La Veta, Alamosa Co., Alamosa Canyon, 14 miles from Capulin, Conejos Co., Durango, La Plata Co., Del Norte, Monte Vista, Shaw Creek, South Fork, Willow Creek, Wolf Creek 5 miles east of South Fork, Rio Grande Co.

Life history. - unknown.

Chromosome number. - unknown.

## 6. Megathymus texanus Barnes & McDunnough

*Megathymus streckeri texana* Barnes & McDunnough, 1912, Contrib. Nat. Hist. Lepid. N. A., I (3):39, pl. 2, f. 9.

### 6a. Megathymus texanus texanus Barnes & McDunnough

*Megathymus streckeri texana* Barnes & McDunnough, 1912, Contrib. Nat. Hist. Lepid. N.A., 1:39, pl. 2, f. 9.

*Megathymus texana;* Freeman, 1944, Ent. News, 55:105.

*Megathymus albocincta* Holland, 1930, Ann. Carnegie Mus., 19:159; Freeman, 1944, Ent. News, 55:105 (Synonymy).

Type locality. - Kerrville, Kerr Co., Texas.

Distribution. - Texas: Kerrville, Pampa, Gray Co., Skellytown, Carson Co., Palo Duro Canyon, Armstrong Co., Wheeler Co.; New Mexico: Folsom; Southeastern Colorado.

Life history. - Adults emerge during April, May and June. Larval food plant, *Yucca glauca* Nuttall.

Chromosome number. - unknown.

### 6b. Megathymus texanus leussleri Holland

*Megathymus leussleri* Holland, 1931, Ann. Carnegie Mus., 20:262; Freeman, 1944, Ent. News, 55:104 (as synonym of *texana*).

Type locality. - Sand Hills near Valentine, Cherry Co., Nebraska.

Distribution. - Nebraska: Valentine, Hire; South Dakota: Black Hills.

Life History. - Adults emerge during June, and July. Larval food plants, *Yucca glauca* Nuttall.

Chromosome number. - Unknown.

This subspecies differs from typical *texanus* in that the spots are more orange-yellow on the upper surface of the primaries, especially in the females, and the males often have a small yellow spot on the disc of the secondaries where vein $M_2$ branches from the cell, which is lacking in typical *texanus*.

## 7. Megathymus ursus Poling

*Megathymus ursus* Poling, 1902, Ent. News, 13:97, pl. 4.

Type locality. - Santa Catalina Mountains, west of Redington, Pima Co., Arizona.

Distribution. - Arizona: west of Redington, Madera Canyon, Mt. Lemmon, Carr Canyon, Paradise.

Life history. - Adults emerge during June, July and August. Larval food plant, *Yucca schottii* Engelm. Soil pH, at type locality, 6.1.

Chromosome number. - unknown.

### 8. Megathymus violae Stallings & Turner

*Megathymus violae* Stallings & Turner, 1956, Lepid. News, 10:4.

Type locality. - Carlsbad Caverns National Park, Eddy Co., New Mexico.

Distribution. - New Mexico: Carlsbad Caverns National Park; Texas: Big Bend National Park; several locations in northcentral Mexico.

Life history. - Adults emerge during May, June and July. The larval food plant is *Yucca torreyi* Shafer.

Chromosome number. - 27.

### 9. Megathymus beulahae Stallings & Turner

*Megathymus beulahae* Stallings & Turner, 1958, Lepid. News, 11:121 ["1957"]

Type locality. - near Ixmiquilpan, Hidalgo, highway 85, Klm. 176, Mexico.

Distribution. - Mexico: type locality and 10 miles south Ixmiquilpan.

Life history. - Adults emerge during July and August. The larval food plant is *Agave striata* Tucc. Soil pH, type locality, 6.

Chromosome number. - unknown.

### 10. Megathymus gayleae Stallings, Turner & Stallings

*Megathymus gayleae* Stallings, Turner & Stallings, 1963, J. Lepid. Soc., 17:81.

Type locality. - 23 Km. north Saltillo, Coahuila, Mexico, marker 903.

Distribution. - Northern Mexico: type locality, 25 to 50 miles west of Saltillo, on highway 40, 10 to 20 miles east of Saltillo, on highway 40, 73 miles north of Saltillo, in the pass and on the north slope of the Sierra de la Gavia, on highway 57.

Life history. - Adults emerge during September and October. The larval food plant is *Agave falcata* Engelm. Soil pH, at type locality, 7.4.

Chromosome number. - unknown.

## Subfamily AEGIALINAE Stallings & Turner

Aegialinae Stallings & Turner, 1958, Lepid. News, 11:134 ["1957"]

The antennae extend to the outer edge of the cell spot. The pulvillus is well developed. The paronychium is bilobed, with both lobes narrow. The tongue is well developed. The genitalia form is usually complex. The larvae construct from one to two trap doors on the lower surface of the *Agave* leaf. They do not powder the larval tunnel, and the young larvae tunnel directly to the base of the leaf to form the larval chamber. The pupal cremaster is narrowly spoonbilled, and has many hooks. There is one brood each year, with the adults emerging in late summer and fall.

### Key to the tribes of AEGIALINAE

1a. Cremaster of pupa with a small knobbed termination, usually with hooks; larval tunnel not powdered; proharpe of the male genitalia shorter than cucullus or apparently absent; antennae reaching cell or beyond.....Aegialini

1b. Cremaster of pupae nude, or at most with minute bristles; larval tunnel powdered; the proharpe longer than cucullus; antennae barely reaching inner edge of cell.....Agathymini

## Tribe AEGIALINI Stallings & Turner

Aegialini Stallings & Turner, 1958, Lepid. News, 11:134 ["1957"]

## Key to the genera of AEGIALINI

1a. Spot in interspace 1 in line with two above; paronychium bilobed, both lobes narrow; genitalia complex; pupal cremaster narrowly spoonbilled, with many hooks; larvae tunnel directly to base of leaf ..... .....*Aegiale* Felder

1b. Spot in interspace 1 out of line with two above, directed inward basally; paronychium bilobed, broad; genitalia simple in males, complex in females; pupal cremaster broadly spoonbilled, with few hooks; larvae tunnel in irregular pattern to base of leaf.. .....*Turnerina* Freeman

## AEGIALE Felder

*Aegiale* Felder, 1860, Wiener Ent. Monats., 4:110.

There is at present one recognized species in this genus, *Aegiale hesperiaris* (Walker), which is confined to Mexico.

### 1. Aegiale hesperiaris (Walker)

*Castnia hesperiaris* Walker, 1856, List Lep. Het. Brit. Mus., 7:1583.

*Acentrocneme hesperiaris*; Druce, 1896, Biol. Centr. Amer., Lep. Het., 2:319.

*Aegiale hesperiaris;* Draudt, 1924, in: Seitz, Macrolep. World, 5, Amer. Rhop.,:998.

*Aegiale kollari* Felder, 1860, Wiener Ent. Monats., 4:111.

*Acentrocneme kollari;* Scudder, 1875, Proc. Amer. Acad. Arts Sci., 10:100; Druce, 1896, Biol. Centr. Amer., Lep. Het., 2:319 (synonymy).

*Terias agavis* Blasquez, 1870, La Naturaleza, 1:282; Druce, 1896, Biol. Centr. Amer., Lep. Het., 2:319 (synonymy).

Type locality. - vic. Mexico, D. F., Mexico.

Distribution. - Northern and central Mexico, D. F.; 37 Klm. east Mexico, D. F.; Klm. 227 n. Tehuacan, Puebla; 40 miles south San Luis Potosi, S. L. P.; San Cayetano de las Vacas; Nuevo Leon; San Jose de Raices, Nuevo Leon; 25 mi. east Saltillo; Pass Sierra de la Gavia, Coahuila; Monclova, Coahuila; 10 miles north Jimenez, Tamps.;

Galeana, Nuevo Leon; Ojocaliente, Zacatecas; La Zarca, Durango.

Life history. - Larvae located in bottom leaves of *Agave americana* L. or related species of *Agave*. The adults emerge during August, September, October and November.

Chromosome number. - 24.

## TURNERINA Freeman

*Turnerina* Freeman, 1959, Lepid. News, 12:84 ["1958"].

### Key to the species of the *Turnerina*

1a. Average expanse 50 mm; spots of unequal size forming discal band on secondaries, one at anal angle and outer one elongated toward outer margin of wing; two yellow spots above outer discal spot; ground color on under surface of secondaries mottled..... .....*mejicanus* (Bell)

1b. Average expanse 42 mm; spots of about equal size forming discal band on secondaries; no spots above outer discal spot; ground color on under surface of secondaries more uniform.....*hazelae* (S. & T.)

### 1. Turnerina mejicanus (Bell)

*Megathymus mejicanus* Bell, 1938, Amer. Mus. Novitates, no. 1013: 8, figs. 5, 6.

*Turnerina mejicanus;* Freeman, 1959, Lepid. News, 12:84 ["1958"].

Type locality. - Guanacevi, Durango, Mexico.

Distribution. - Known only from the type series. Four males from Guanacevi, one female from Rio Campo, Mexico.

Life history. - Not known. The adults were collected in October, 1903.

Chromosome number. - unknown.

### 2. Turnerina hazelae (Stallings & Turner)

*Megathymus hazelae* Stallings & Turner, 1958, Lepid. News, 11: 127 ["1957"].

*Turnerina hazelae;* Freeman, 1959, Lepid. News, 12:84 ["1958"].

Type locality. - Mexico: near Chilpancingo, Guerrero, highway 95, Km. 235.

Distribution. - Known only from the type locality.

Life history. - The adults emerge during September, October and November. The larvae are found in a succulent *Agave*, which makes it rather difficult to collect them, as the larvae and pupae die very quickly when the humidity in their larval chamber drops below a certain point. The plants grow on rocky cliffs.

Chromosome number. - unknown.

## Tribe AGATHYMINI Stallings & Turner

Agathymini Stallings and Turner, 1959, Lepid. News, 12:93 ["1958"].

At present there is but one genus in this tribe.

## AGATHYMUS Freeman

*Agathymus* Freeman, 1959, Lepid. News, 12:82 ["1958"].

Members of this genus have the following characteristics: Antennal club without an apiculus; antennae not reaching cell spot; thorax clothed with scales and hair-like scales; pulvillus poorly developed; paronychium narrow and ribbon-like, not bilobed;tongue well developed; primaries with outer edge of discal band of spots in line, reaching Vein A well before termen; genitalia complex; pupal cremaster usually pointed and without hooks; larvae trap door builders; food plant of larvae, *Agave;* larval burrow powdered; adults usually emerge in late summer and fall.

### Key to the males of species complexes in AGATHYMUS

1a. Well developed spots on upper surface of both wings.....2

1b. Well developed spots sometimes present on primaries, none on secondaries.....10

2a. Spots 7, 8, and 9 on primaries, discal spots of secondaries fused; medium to heavy overscaling of orange-fulvous at base of wings.....3

2b. Spots 7, 8, and 9 on primaries, discal spots of secondaries not fused; sparse or no overscaling at base of wings.....7

3a. Spots bright orange-yellow; spot 7 usually overlapping spot 6; costa of primaries usually orange-fulvous.. .....4

3b. Spots dull yellow; spot 7 not overlapping inner edge of spot 6; costa of primaries dull yellow to same as ground color.....6

4a. Cell spot large, usually elongated on costal side toward base of wings; discal spot on secondaries above vein 4 usually elongated toward base of wings producing a sharp point; orange-fulvous overscaling at base of primaries usually reaching cell.....5

4b. Cell spot usually small and not elongated toward base of wings; discal spot on secondaries above vein 4 rounded, not elongated into a point; orange-fulvous overscaling usually restricted to interspaces 1 and 2.....*chisosensis* complex

5a. Small, average expanse 45 mm; discal band, subcostal spots and cell area usually sordid white on under surface of secondaries; spot 8 wider than spot 7 or 9; fringed checkered white and black..... .....*polingi* complex

5b. Large, average expanse 56 mm; discal band, subcostal spots, and cell area seldom lighter than ground color; spots 7, 8, and 9 of approximately equal size; fringes yellow to sordid white, checkered with black. .....*neumoegeni* complex

6a. Wing shape broad; spot 8 usually wider than either 7 or 9; spot 7 may or may not reach inner edge of spot 6.....*evansi* complex

6b. Wing shape narrower; spots 7, 8, and 9 usually about equal in size; spot 7 not reaching inner edge of spot 6; fringes white.....*aryxna* complex

6c. Wing shape medium; spots 7, 8, and 9 usually about equal in size; spot 7 usually well basal of spot 6; fringes usually yellow.....*baueri* complex

7a. Ground color usually black; maculation usually well developed on lower surface of secondaries; spot 7 not overlapping spot 6 on upper surface of primaries; lower discal spot on secondaries approximately equal in size to the others.....8

7ba. Ground color usually brownish-black; maculation usually poorly developed or absent on lower surface of secondaries; spot 7 may or may not overlap spot 6 on primaries; lower discal spot on secondaries usually largest one in row.....9

8a. Spots 7, 8, and 9 usually small and slightly rounded; spot or spots present above last discal spot on secondaries; white area on lower surface of secondaries extending into cell, not a distinct white spot; usually 5 spots in discal row on secondaries.....
.....*stephensi* complex

8b. Spots 7 and 9 usually somewhat elongated with their points directed basad; spots usually absent above last discal spot on secondaries; usually a small distinct white cell spot on lower surface of secondaries; usually 4 spots in discal row on secondaries.
.....*remingtoni* complex

9a. Average expanse 45 mm; spot 9 usually wider than spots 7 or 8; macular band on lower surface of secondaries distinct to absent.....*mariae* complex

9b. Average expanse 64 mm; spots 7 and 8 elongated inward toward base of wing, usually wider than spot 9; macular band on lower surface of secondaries heavily overscaled with sordid yellowish scales.....
.....*alliae* complex

10a. Usual spots present on the primaries; long pencil of erectile hairs above cell on upper surface of secondaries; erectile hairs on the cell on the lower surface of the primaries.....*indecisa* complex

10b. No distinct spots on the upper surface of the wings; no erectile hairs on secondaries.....
.....*rethon* complex

Key to the females of species complexes in AGATHYMUS

1a. Well developed spots on upper surface of both wings..
.....2

1b. Well developed spots sometimes present on primaries, none on secondaries.....10

2a. Spots on primaries more or less fused; veins between spots 7, 8, and 9 of approximately same color as spots; discal spots on upper surface of secondaries fused.....3

2b. Spots on primaries more or less fused; veins between spots darker than spots; discal spots on upper surface of secondaries more or less separate.....7

2c. Spots on primaries separate; discal spots on upper surface of secondaries separated by darker veins or ground color.....8

3a. Spots large, bright orange-yellow; spot 7 fused into cell spot; base of both wings heavily overscaled with orange-fulvous.....4

3b. Spots medium in width, deep yellow; spot 7 usually reaching under cell spot, not distinctly fused into it ; medium to sparse, yellow overscaling at base of wings.....6

4a. Cell on primaries completely surrounded by bright orange.....*neumoegeni* complex

4b. Cell on primaries not completely surrounded by bright orange.....5

5a. Average expanse 45 mm; spots deep orange; discal spot above vein 4 projecting basad on upper surface of secondaries; maculation lower surface of secondaries, distinct, strongly contrasting.....
.....*polingi* complex

5b. Average expanse 59 mm; spots deep reddish-orange; discal spot above vein 4 on upper surface of secondaries not projecting sharply basad; maculation indistinct on lower surface of secondaries.....
.....*chisosensis* complex

6a. Spot 7 may or may not overlap edge of spot 6; maculation on lower surface of secondaries usually distinct, some species with a clear, white discal band and other spots; wing shape medium to narrow.....
.....*baueri* complex

6b. Spot 7 usually reaching under spot 6; maculation on lower surface of secondaries light to medium, not strongly contrasting; wing shape broad.....
.....*evansi* complex

7a. Average expanse 60 mm; spots deep yellow; under surface of secondaries uniform grayish with indistinct lighter spots; spots 7 and 8 usually wider than spot 9.....*aryxna* complex

7b. Average expanse 50 mm; spots light yellow; maculation on lower surface of secondaries well developed to none; spot 9 usually wider than spots 7 and 8.....
.....*mariae* complex

8a. Average expanse 68 mm; spot 7 extends from beneath inner edge of spot 6 to well beneath spot 1.....
.....*alliae* complex

8b. Average expanse 55 mm; spot 7 not extending to spot 1.....9

9a. Spots 7 and 8 wider than spot 9, 9 columnar in shape; spots light yellow to nearly white; 7 well developed spots on upper surface of secondaries; maculation well developed on lower surface of secondaries..... .....*stephensi* complex

9b. Spot 9 wider than spots 7 or 8, usually pointed on its inner side; spots deep yellow; usually 6 spots on upper surface of secondaries; maculation indistinct to well developed on lower surface of secondaries... .....*remingtoni* complex

10a. Ground color brownish-black; primaries with well developed maculation on upper surface..... .....*incisa* complex

10b. Ground color black; no well developed spots on upperside, fringes clear white extending onto wings on secondaries.....*rethon* complex

Key to males of the *Agathymus neumoegeni* complex

1a. Orange-fulvous overscaling at base of primaries extending to cell area, of secondaries, extending to discal spots; ground color on lower surface of secondaries light gray.....2

1b. Orange-fulvous overscaling at base of primaries barely reaching lower edge of cell, of secondaries, becoming sparse before reaching discal spots; ground color on lower surface of secondaries dark gray...3

2a. Discal band on lower surface of secondaries macular, usually lighter than ground color; spot 7 usually wider than spots 8 and 9; discal band of secondaries narrow.....*judithae* (S. & T.)

2b. Discal band on lower surface of secondaries indistinct, hardly lighter than ground color; spot 8 usually wider than 7 or 9; discal band on secondaries wide..... .....*macalpinei* (Freeman)

3a. Lower surface of secondaries uniform dark gray to brownish-gray.....4

3b. Lower surface of secondaries with discal band distinct to slightly indicated.....5

4a. Primaries: spots 7, 8 and 9 of about equal size; dark black beneath most of cell; costa slightly overscaled with orange. Secondaries: discal band narrow; lower surface uniform dark gray..... .....*neumoegeni* (Edwards)

4b. Primaries: spot 8 usually wider than either spot 7 or 9; usually an irregular orange spot beneath cell; costa usually heavily overscaled with orange. Secondaries: discal band fairly wide; lower surface uniform brownish-gray.....*florenceae* (S. & T.)

5a. Spot 8 slightly wider than spots 7 or 9; slight indication of discal band on lower surface of secondaries; wing shape narrow.....*carlsbadensis* (S.& T.)

5b. Spots 7, 8 and 9 about equal size; discal band distinct, dull orange, on the lower surface of secondaries; wing shape slightly broader.....
.....*diabloensis* Freeman

Key to females of the *Agathymus neumoegeni* complex

1a. Discal band on lower surface of secondaries usually well defined, white.....2

1b. Discal band on lower surface of secondaries not well defined.....3

2a. Distinct black spot at inner edge of spot 8, usually round; spots bright orange; distinct black streak in cell.....*diabloensis* Freeman

2b. Indistinct dot at inner edge of spot 8; spots yellowish-orange; indistinct black streak in cell.....
.....*judithae* (S. & T.)

3a. Ground color on lower surface of secondaries dark grayish-black.....4

3b. Ground color on lower surface of secondaries light gray, sometimes with some brownish scales.....5

4a. Spot 9 with a sharp point directed toward base of wing, usually extending half way through the black area.....*neumoegeni* (Edwards)

4b. Spot 9 with or without sharp point directed toward base, if present, usually short, not extending half way across the black area.....*florenceae* (S.& T.)

5a. Large black area inside cell; usually large black area basad of spot 8 and 9; discal spots on upper surface of secondaries narrow; orange fulvous overscaling does not extend from base to discal row of spots.....*carlsbadensis* (S.& T.)

5b. No black spot in cell; small circular black areas

basad of spots 8 and 9; discal spots on upper surface of secondaries wide; orange fulvous overscaling extending to discal row.....*macalpinei* (Freeman)

1. Agathymus neumoegeni (Edwards)

*Megathymus neumoegeni* Edwards, 1882 Papilio, 2:27.

*Agathymus neumoegeni;* Freeman, 1959, Lepid. News, 12:83 ["1958"].

Type locality. - Approximately 9 miles south of Prescott, Yavapai Co., Arizona.

Distribution. - Central Arizona: 9 to 10 miles south of Prescott; Mingus Mountain near Jerome; Oak Creek Canyon.

Life history. - The larvae are found in juvenile *Agave parryi* Engelm. plants. The adults emerge usually during October.

Chromosome number. - unknown.

2. Agathymus carlsbadensis (Stallings & Turner)

*Megathymus carlsbadensis* Stallings & Turner, 1957, Ent. News, 68:8.

*Agathymus carlsbadensis;* Freeman, 1959. Lepid. News, 12:83 ["1958"].

Type locality. - On the mesa at the head of Yucca Canyon, New Mexico, Guadeloupe Mountains, Carlsbad Caverns National Park, Eddy Co., New Mexico.

Distribution. - Type locality, and Parker Ranch, Nickle, Texas (south of the type locality).

Life history. - Adults emerge during September, and October. Larvae are found in a *parryi*-like *Agave*, usually in mature plants. Soil pH, at type locality, 7.9.

Chromosome number. - unknown.

3. Agathymus florenceae (Stallings & Turner)

*Megathymus florenceae* Stallings & Turner, 1957, Ent. News, 68:12.

*Agathymus florenceae;* Freeman, 1959, Lepid. News, 12:83 ["1958"].

Type locality. - Davis Mountains, Scenic Drive, Jeff Davis Co., Texas.

Distribution. - Western Texas: type locality, and 18 miles northeast of Ft. Davis, Texas.

Life history. - The adults emerge during September, and October. The larvae are found in juvenile plants of a *parryi*-like *Agave*, often in grass taller than the *Agave* plant. Soil pH, type locality, 5.9, and at the location 18 miles northeast of Ft. Davis, 6.0.

Chromosome number. - 10.

### 4. Agathymus judithae (Stallings & Turner)

*Megathymus judithae* Stallings & Turner, 1957, Ent. News, 68:5.

*Agathymus judithae;* Freeman, 1959, Lepid. News, 12:83 ["1958"].

Type locality. - Approximately 8 miles east of Hueco, in the Hueco Mountains, El Paso Co., Texas.

Distribution. - Extreme western Texas.

Life history. - The adults emerge during September and October. The larvae are usually located in medium to large plants of *Agave parryi* Engelm., or a closely related species. Soil pH, type locality, 7.3.

Chromosome number. - unknown.

### 5. Agathymus diabloensis Freeman

*Agathymus diabloensis* Freeman, 1962, Amer. Mus. Novitates, No.2097:1.

Type locality. - Approximately 5 miles west of Victoria Canyon, Diablo Mountains, Hudspeth Co., Texas.

Distribution. - Vicinity of the type locality in extreme western Texas.

Life history. - Adults emerge during September. The larvae are found in a *parryi*-like *Agave*, usually in medium to large plants. Soil pH, type locality, 7.3.

Chromosome number. - unknown.

### 6. Agathymus macalpinei (Freeman)

*Megathymus mcalpinei* Freeman, 1955, Amer. Mus. Novitates, No. 1711:6.

*Agathymus mcalpinei* Freeman, 1959, Lepid. News, 12:83 ["1958"].

*Agathymus macalpinei (emendatio);* dosPassos,1964, Lepid. Soc. Mem., 1:1.

Type locality. - 5.1 miles north of Marathon, flats near foothills of Glass Mountains, Brewster Co., Texas.

Distribution. - Western Texas: Glass Mountains; 5 miles north and 4.3 miles east of Marathon; and 12 miles northeast of Marathon.

Life history. - The adults emerge during September and October. The larvae feed in a species of *Agave* related to *scabra* L.-D., usually in medium to large plants. Soil pH, type locality, 7.4.

Chromosome number. - 10.

Key to the males of the *Agathymus chisosensis* complex

1a. Small, expanse 45 mm; spots 8 and 9 on primaries of about equal size; discal band on secondaries macular, seldom fused; spots deep yellowish-orange..... .....*hoffmanni* (Freeman)

1b. Large, expanse 53 mm; spots 7 and 8 wider than 9; discal band on secondaries usually fused; spots deep orange.....*chisosensis* (Freeman)

Key to females of the *Agathymus chisosensis* complex

1a. Small, expanse 46 mm; overscaling at base of wings rather sparse, brownish-orange; spot 7 reaches cell but seldom fused into spot 1; discal band of secondaries narrow; spot 9 not connecting with orange basal overscaling.....*hoffmanni* (Freeman)

1b. Large, expanse 58 mm; dense overscaling at base of wings, same color as discal spots; spot 7 fused into spot 1 in cell; discal band of secondaries wide; spot 9 usually connecting to orange basal overscaling; spots and overscaling deep orange..... .....*chisosensis* (Freeman)

## 7. Agathymus chisosensis (Freeman)

*Megathymus chisosensis* Freeman, 1952, Amer. Mus. Novitates, No. 1593:1.

*Agathymus chisosensis;* Freeman, 1959, Lepid. News, 12:83 ["1958"].

Type locality. - Chisos Mountains, el. 5400 ft., Brewster Co., Texas.

Distribution. - Vicinity of the type locality.

Life history. - Adults emerge during September and October. The larvae are found in medium to large plants of *Agave scabra* L.-D. Soil pH, type locality, 5.2.

Chromosome number. - 18

### 8. Agathymus hoffmanni (Freeman)

*Megathymus hoffmanni* Freeman, 1952, Amer. Mus. Novitates, No. 1593:4.

*Agathymus hoffmanni*; Freeman, 1959, Lepid. News, 12:83 ["1958"].

Type locality. Valle de Mexico, D. F., Mexico.

Distribution. - Central Mexico: Valle de Mexico; Km. 37 east of Mexico, D. F., el. 8000 ft.; Acambaro, Guanajuato; El Tepeyac, S. L. P.

Life history. - adults emerge during September and October. The larvae feed in small plants of a *parryi*-like *Agave* in the Valle de Mexico. In other locations they were found in large and medium plants of *Agave americana* L. Soil pH, Valle de Mexico, 5.5.

Chromosome number. - unknown.

## Agathymus aryxna complex

### 9. Agathymus aryxna (Dyar)

*Megathymus aryxna* Dyar, 1905, J.N.Y. Ent. Soc., 13:141; Freeman, 1950, Field & Lab., 18:144 (synonymy).

*Agathymus aryxna*; Freeman, 1959. Lepid. News, 12:83 ["1958"].

*Megathymus drucei* Skinner, 1911, Trans. Amer. Ent. Soc., 37:207, Stallings and Turner, 1958, Lepid. News, 11:116 (synonymy)["1957"]

Type locality. - Western slopes of the Patagonia Mountains, southeast of Nogales, Sonora, Mexico.

Distribution. - Northern Sonora, Mexico and southern Arizona: Globe; Portal, and Paradise, in the Chiricahua Mountains; west of Redington, Santa Catalina Mountains; Santa Rita Mountains, near Madera Canyon; Texas Canyon; Baboquivari Mountains; Huachuca Mountains, Ramsey Canyon, Carr Canyon, and Miller Canyon.

Life history. - Adults emerge during September and October. The larvae are found in *Agave palmeri* Engelm., usually in medium to large plants. Soil pH, in most areas tested varied from 5.3-6.1.

Chromosome number. - 5.

This species appears to be the only member of its immediate complex described at the present time. Its chromosome count of 5 makes it unique.

Key to the males in the *Agathymus baueri* complex

1a. Spots on primaries large, cell spot well developed, somewhat oval; spot 7 reaching near inner edge of spot 6; maculation on lower surface of secondaries well developed; discal spots on secondaries usually fused.....2

1b. Spots on primaries small, well separated; cell spot small, linear; spot 7 located towards base from spot 6; maculation on lower surface of secondaries indistinct; discal spots on secondaries small, separated.....*baueri* (S. & T.)

2a. Spots deep orange-yellow; discal band on secondaries wide; heavy orange suffusion at base of both wings; discal band and large central spots on lower surface of secondaries yellowish, distinct.....
.....*freemani* S.,T. & S.

2b. Spots light yellow; discal band on secondaries narrow; light suffusion of yellowish hairs near base of wings; discal band and small central spot white or sordid white on lower surface of secondaries.....
.....*juliae* (S. & T.)

Key to females of the *Agathymus baueri* complex

1a. Spot 7 reaching from cell spot to inner edge of spot 6; maculation on lower surface of secondaries distinct; discal spots on secondaries fused.....2

1b. Spot 7 not reaching inner edge of spot 6; maculation on lower surface of secondaries indistinct; discal spots on secondaries not fused...*baueri* (S. & T.)

2a. Spots deep orange-yellow; maculation on lower surface of secondaries well-defined, yellowish.....
.....*freemani* S.,T. & S.

2b. Spots light yellowish-orange; maculation on lower surface of secondaries well-defined, clear white.. .....*juliae* (S. & T.)

### 10. Agathymus baueri (Stallings & Turner)

*Megathymus baueri* Stallings & Turner, 1954, Lepid. News, 8:80.

*Agathymus baueri*; Freeman, 1959, Lepid. News, 12:83 ["1958"].

Type locality. - Verde Hot Springs, Yavapai Co., Arizona.

Distribution. - West Central Arizona: type locality; Sycamore Creek; Cactus Mountains, and Mayer, all in Yavapai County.

Life history. - The adults emerge during October. The larvae feed in *Agave parryi* Engelm.

Chromosome number. - 15.

### 11. Agathymus freemani Stallings, Turner & Stallings

*Agathymus freemani* Stallings, Turner & Stallings, 1960, Ent. News, 71: 109.

Type locality. - Bagdad, Yavapai Co., Arizona.

Distribution. - West Central Arizona: type locality; Hillside; Kirkland; and Date Creek, all in Yavapai County.

Life history. - The adults emerge during September and October. The larvae feed in *Agave deserti* Engelm.

Chromosome number. - 15.

### 12. Agathymus juliae (Stallings & Turner)

*Megathymus juliae* Stallings & Turner, 1958, Lepid. News, 11:125 ["1957"].
*Agathymus juliae;* Freeman, 1959, Lepid. News, 12:83 ["1958"].

Type locality. - North of Zarca, Durango, on highway 45 at Klm. 1317, Mexico.

Distribution. - Vicinity of the type locality.

Life history. - The adults emerge during September. The larvae feed in a *Parryi*-like *Agave*, usually in rather small plants.

Chromosome number. - unknown.

Key to males of the *Agathymus evansi* complex

1a. Spot 7 reaching inner edge of spot 6; spot 8 wider than spot 7 or 9; large expanse 54-58 mm; spots orange-yellow.....2

1b. Spot 7 well towards base from spot 6; spots 7, 8, and 9 of about equal size, narrow; smaller, expanse 46 mm; spots deep yellow.....*ricei* S.,T. & S.

2a. Discal spots on lower surface of secondaries indistinct; cell spot small, narrow; narrow orange streak in space 1 near base; four well developed discal spots on secondaries and a small spot near apex..... .....*belli* (Freeman)

2b. Discal spots on lower surface of secondaries distinct; cell spot large, rounded; oval orange spot in space 1 near base; five well-defined discal spots on secondaries.....*evansi* (Freeman)

Key to females of the *Agathymus evansi* complex

1a. Spot 7 reaching spot 1 in cell; spot 7 reaching inner edge of spot 6; spots deep orange-yellow; expanse 55-60 mm; discal spots on secondaries large, close together.....2

1b. Spot 7 not reaching cell spot; spot 7 placed well towards base from spot 6; spots deep yellow; expanse 52 mm; discal spots on secondaries small, well separated; maculation indistinct on lower surface of secondaries.....*ricei* S.,T. & S.

2a. Discal band on lower surface of secondaries indistinct; narrow bar of orange in space 1 near base; usually discal spots of secondaries five large and one small. .....*belli* (Freeman)

2b. Discal band on lower surface of secondaries usually well developed; oval orange patch in space 1 near base; usually six large discal spots on secondaries .....*evansi* (Freeman)

## 13. Agathymus evansi (Freeman)

*Megathymus evansi* Freeman, 1950, Field & Lab., 18:144-146.

*Agathymus evansi;* Freeman, 1959, Lepid. News, 12:83 ["1958"].

Type locality. - Ramsey Canyon, Cochise Co., Arizona.

Distribution. - Southern Arizona: Ramsey Canyon; Carr Canyon; Miller Canyon; Chiricahua Mountains; and Palmerlee.

Life history. - Adults emerge during September and October. The larvae are found in *Agave parryi* Engelm. and *A. palmeri* Engelm.

Chromosome number. - unknown.

### 14. Agathymus belli (Freeman)

*Megathymus belli* Freeman, 1955, Amer. Mus. Novitates, No. 1711:5.

*Agathymus belli;* Freeman, 1959, Lepid. News, 12:83 ["1958"].

Type locality. - La Bequilla, Durango, Mexico.

Distribution. - Northern Mexico: type locality; north of Chihuahua, Chihuahua, at Km. 1775.

Life history. - The adults emerge during July, September, and October. The larvae feed in a *parryi*-like species of *Agave*.

Chromosome number. - unknown.

### 15. Agathymus ricei Stallings, Turner & Stallings

*Agathymus ricei* Stallings, Turner & Stallings, 1966, J. Lepid. Soc., 20:163.

Type locality. - Km. 165 east of Puebla, Puebla, Mexico.

Distribution. - Southern Mexico: type locality; Tecamachalco, and km. 227 north of Tehuacan, all in Puebla.

Life history. - The adults emerge during September, October and November. The larvae feed in a *parryi*-like *Agave*, and make a black trap door which is characteristic of the *evansi* complex.

Chromosome number. - unknown.

Key to the males of the *Agathymus mariae* complex

1a. Under surface of secondaries evenly overscaled, with

discal spots indistinct or absent; spots 5 and 6 on under surface of primaries indistinct or absent....2

1b. Under surface of secondaries somewhat mottled, cell and discal spots prominent; spot 5 and 6 on under surface of primaries usually distinct.....4

2a. Discal spots on upper surface of secondaries forming a straight line.....3

2b. Discal spots on upper surface of secondaries evenly curved.....*rindgei* Freeman

3a. Spots orange-yellow; spot 9 usually twice as wide as spots 7 and 8, cell spot on primaries small, round; spots 5 and 6 usually prominent on upper surface of primaries; discal spots well developed on secondaries; fringes light tan and dark gray.....
.....*micheneri* S.,T. & S.

3b. Spots tan; spots 7, 8, and 9 of approximately equal size; cell spot on primaries very small and linear; spots 5 and 6 usually absent on upper surface of primaries; discal spots small, sometimes poorly defined on secondaries; fringes sordid white to light tan, checkered with dark gray....*gilberti* Freeman

4a. Ground color brownish-black; overscaling heavy near base of wings; discal spots on secondaries large, close together.....5

4b. Ground color dull black, with sparse overscaling; discal spots on secondaries small, separated.....
.....*lajitaensis* Freeman

5a. Spot 9 wider than 8, 8 wider than 7; cell spot on upper surface of secondaries usually indistinct; discal spots on secondaries well defined, close together; fringes tan and dark brownish-black.....
.....*mariae* (B. & B.)

5b. Spots 7, 8, and 9, large, of approximately equal size; cell spot on upper surface of secondaries usually well defined; discal spots on secondaries large, close together; fringes light tan and brownish-black.....
.....*chinatiensis* Freeman

Key to females of the *Agathymus mariae* complex

1a. Overscaling on lower surface of secondaries light to dark gray; discal spots on lower surface of secondaries indistinct, if present usually sordid white.....2

1b. Overscaling on lower surface of secondaries tan to brownish-gray; discal spots on lower surface of secondaries distinct, yellowish to clear white....4

2a. Spots tan; spot 7 may or may not reach outer edge of cell spot; fringes sordid white and dark gray.....3

2b. Spots orange-yellow; spot 7 reaching well under cell spot; fringes yellowish-tan and dark gray..... .....*micheneri* S.,T. & S.

3a. Spots 5 and 6 usually separate; discal spots on upper surface of secondaries usually separate, forming a straight line; cell spot on upper surface of secondaries indistinct or absent.....*gilberti* Freeman

3b. Spots 5 and 6 usually fused; discal spots on upper surface of secondaries usually large, fused together, evenly curved; cell spot on upper surface of secondaries usually present.....*rindgei* Freeman

4a. Overscaling on lower surface of secondaries tan; discal spots on upper surface of secondaries usually fused and large.....5

4b. Overscaling on lower surface of secondaries brownish-gray; discal spots on upper surface of secondaries usually separate.....*lajitaensis* Freeman

5a. Ground color light brownish-black; under surface of secondaries heavily overscaled with yellowish-tan; discal spots on lower surface of secondaries contrasting slightly with ground color; cell spot on upper surface of secondaries heavily overscaled with yellowish scales; discal spots on upper surface of secondaries fused.....*mariae* (B. & B.)

5b. Ground color dark brownish-black; under surface of secondaries sparsely overscaled with yellowish-gray; discal spots on lower surface of secondaries contrasting distinctly with ground color; cell spot on upper surface of secondaries distinct; discal spots on upper surface of secondaries large, separated by dark veins.....*chinatiensis* Freeman

## 16. Agathymus mariae (Barnes & Benjamin)

*Megathymus mariae* Barnes & Benjamin, 1924, Contrib. Nat. Hist. Lepid. N.A., 5(3):100.

*Agathymus mariae;* Freeman, 1959, Lepid. News, 12:["1958"].

Type locality. - Franklin Mountains, El Paso, El Paso Co., Texas.

Distribution. - Western Texas: Franklin Mountains, El Paso; Hueco Mountains; Nickle and Kent, Culberson Co.; Diablo Mountains, Eagle Mountains, Sierra Blanca, Van Horn, Hudspeth Co.; Alpine, Marathon, Chisos Mountains, Brewster Co.; Ft. Stockton, Pecos Co.; McCamey, Upton Co.; Sanderson, Terrell Co.; and Langtry, Val Verde Co. New Mexico: Vicinity of Carlsbad Caverns National Park. Mexico: Ciudad Juarez.

Life history. - The adults emerge during September, October, and November. The larvae feed in *Agave lecheguilla* Torre. Soil pH, type locality, 8.4.

Chromosome number. - 22.

### 17. Agathymus chinatiensis Freeman

*Agathymus chinatiensis* Freeman, 1964, J. Lepid. Soc., 18:172.

Type locality. - 2.7 miles south Shafter, Presidio Co., Texas.

Distribution. - Southwestern Texas: type locality; Chinati Mountains; 19 miles south Marfa, all in Presidio Co.

Life history. - The adults emerge during September and October. The larvae feed in *Agave lecheguilla* Torr. Soil pH, type locality, 7.1.

Chromosome number. - 22.

### 18. Agathymus lajitaensis Freeman

*Agathymus lajitaensis* Freeman, 1964, J. Lepid. Soc., 18:174.

Type locality. - 10 miles west of Lajita, Presidio Co., Texas.

Distribution. - Known only from the type locality, in the Big Bend area of Texas.

Life history. - The adults emerge during September and October. The larvae feed in *Agave lecheguilla* Torr. Soil pH, type locality, 7.3.

Chromosome number. - 22.

### 19. Agathymus rindgei Freeman

*Agathymus rindgei* Freeman, 1964, J. Lepid. Soc., 18:180.

Type locality. - 14 miles north Bracketville, Kinney Co., Texas.

Distribution. - Southwestern Texas: type locality; 28 miles north of Del Rio, Vale Verde Co.; 11-12 miles south of Juno, el. 1450 ft.

Life history. - The adults emerge during September, October, and November. The larvae feed in atypical *Agave lecheguilla*. Soil pH, type locality, 7.1.

Chromosome number. - 22.

### 20. Agathymus gilberti Freeman

*Agathymus gilberti* Freeman, 1964, J. Lepid. Soc., 18:176.

Type locality. - 14 miles north of Bracketville, el. 1500 ft., Kinney Co., Texas.

Distribution. - Southwestern Texas: type locality; 28 miles north of Del Rio, Val Verde Co., el. 1450 ft.; 11-12 miles south of Juno; Pecos River Canyon, el. 1250 ft.; 10 miles east of Langtry, el. 1150 ft.; Langtry; 8 miles west of Dryden; near Boquillas Canyon, Brewster Co., el. 1900 ft.

Life history. - The adults emerge during September, October and November. The larvae feed in atypical *Agave lecheguilla* in the vicinity of the type locality and in typical *A. lecheguilla* westward. Soil pH, type locality, 7.1.

Chromosome number. - 21.

### 21. Agathymus micheneri Stallings, Turner & Stallings

*Agathymus mariae micheneri* Stallings, Turner & Stallings, 1961, J. Lepid. Soc., 15:19.

*Agathymus micheneri;* Freeman, 1963, J. Res. Lepid., 2:140

Type locality. - 15-20 miles south of Allende, on highway 57, Km. 89, el. 1300 ft., Coahuila, Mexico.

Distribution. - known only from the type locality, in north central Mexico.

Life history. - The adults emerge during September and October. The larvae feed in *Agave lecheguilla* Torr. Soil pH, type locality, 7.0.

Chromosome number. - 20.

Key to the males of the *Agathymus remingtoni* complex[1]

1a. Overscaling on lower surface of secondaries grayish-brown to brownish-black; 5-6 discal spots on upper surface of secondaries.....2

1b. Overscaling on lower surface of secondaries light gray to grayish-black; 4-6 discal spots on upper surface of secondaries.....3

2a. Overscaling on lower surface of secondaries dark, brownish-black; discal spots on lower surface of secondaries rarely visible; spots 7 and 8 usually twice as wide as 9; yellowish-brown overscaling near base of wings; usually 6 discal spots on upper surface of secondaries.....*fieldi* Freeman

2b. Overscaling on lower surface of secondaries uniform grayish-brown, with some green scales; discal spots on lower surface of secondaries usually present; spots 7, 8, and 9 of approximately equal width; brownish overscaling near base of wings; usually 5 discal spots on upper surface of secondaries.....*estelleae* (S. & T.)

3a. Ground color dark brownish-black; cell spot small, rarely with linear spots on costa above; overscaling on lower surface of secondaries light gray, with some black areas; 4 small, linear, discal spots on lower one-third of secondaries; discal spots on lower surface of secondaries white; fringes checkered sordid white and black.....*valverdiensis* Freeman

3b. Ground color brownish-black; cell spot of average size to large, usually one or two linear spots above it; overscaling on lower surface of secondaries grayish-black, mottled; 5 more or less round discal spots on lower one-fourth of secondaries; discal spots on lower surface of secondaries conspicious, sordid white; fringes checkered yellowish-white and black.....*remingtoni* (S. & T.)

[1] *Agathymus escalantei* S.,T. & S. is known only from the female.

Key to females of the *Agathymus remingtoni* complex

1a. Overscaling on lower surface of secondaries brownish-gray to brownish-black; spot 7 may or may not reach spot 6.....2

1b. Overscaling on lower surface of secondaries gray to grayish-black; spot 7 usually reaching under spot 6.. .....3

2a. Overscaling on lower surface of secondaries uniform dark, brownish-black; discal spots on lower surface of secondaries seldom visible; no cell spot on lower surface of secondaries; spot 8 on primaries usually twice as wide as spot 9; spot 7 not reaching spot 6; discal band on upper surface of secondaries, usually of 4 small spots; some yellowish-brown overscaling near base of wings.....*fieldi* Freeman

2b. Overscaling on lower surface of secondaries dull brownish black; discal spots on lower surface of secondaries minute, white; spot 1 on primaries unusually large, larger than spot 7; spot 8 on primaries elongated inward almost reaching inner edge of spot 1; discal band on upper surface of secondaries of 4 spots in a straight line, upper two distinct, lower two poorly defined.....*escalantei* S.,T. & S.

2c. Overscaling on lower surface of secondaries grayish-brown, paler near outer margin; discal spots distinct on lower surface of secondaries; cell spot on lower surface of secondaries usually present; spot 8 on primaries never as wide as spots 7 and 9; spot 7 may or may not reach inner edge of spot 6; usually 5-6 discal spots on upper surface of secondaries; slight brownish overscaling near base of wings..... .....*estelleae* (S.& T.)

3a. Cell spot on lower surface of secondaries seldom present; 4 small, linear, discal spots on upper surface of secondaries; ground color dark brownish-black; under surface of secondaries mottled grayish-black, discal spots white and separate; spots 7, 8 and 9 of approximately equal width; overscaling near base of wings approximately same color as ground color.....*valverdiensis* Freeman

3b. Cell spot on lower surface of secondaries usually prominent; 5 large, well-developed, discal spots on upper surface of secondaries; ground color warm, brownish-black; under surface of secondaries fairly uniform to mottled grayish-black, with discal spots sordid white, close together; spot 9 usually nearly twice as wide as spots 7 and 8; overscaling near

base of wings lighter than ground color.....
.....*remingtoni* (S. & T.)

### 22. Agathymus remingtoni (Stallings & Turner)

*Megathymus remingtoni* Stallings & Turner, 1958, Lepid. News, 11:117 ["1957"].

*Agathymus remingtoni;* Freeman, 1959, Lepid. News, 12:83 ["1958"].

Type locality. - Mountains south of Jacala, on highway 85, Km. 250, el. 6000 ft., Hidalgo, Mexico.

Distribution. - Northeastern Mexico: type locality; Maiz, S. L. P.; Antiguo Morelos, Tamaulipas, el. 1500 ft.

Life history. - The adults emerge during August, September, and October. The larvae feed in a member of the *lecheguilla* complex which looks somewhat like *Agave utahensis* Engelm. In most areas the plants grow on rocky cliffs. Soil pH, type locality, 5.

Chromosome number. - 9.

### 23. Agathymus estelleae (Stallings & Turner)

*Megathymus estelleae* Stallings & Turner, 1958, Lepid. News., 11: 119 ["1957"].

*Agathymus estelleae;* Freeman, 1959, Lepid. News., 12:83 ["1958"].

Type locality. - Near General Bravo, el. 400 ft., Nuevo Leon, Mexico.

Distribution. - Northern Mexico: type locality; 25 miles east of Saltillo, in Neuvo Leon, el. 3700 ft.; approximately 5 miles east of Saltillo, Coahuila, el. 5000 ft.

Life history. - The adults emerge during August and September. The larvae feed in an atypical *Agave lecheguilla*. Soil, pH, type locality, 7.3, in other locations from 7.0 to 7.3.

Chromosome number. - 9.

### 24. Agathymus valverdiensis Freeman

*Agathymus valverdiensis* Freeman, 1966, J. Lepid. Soc., 20:182.

Type locality. - 28 miles north of Del Rio, el. 1450 ft., Val Verde Co., Texas.

Distribution. - Del Rio area of western Texas: type locality; 14 miles north of Bracketville, 1500 ft. el.; 11-12 miles south of Juno, 1450 ft., Val Verde Co.

Life history. - The adults usually emerge during August, September, and November. Roy Kendall found two pupae from which adults emerged during April. Soil pH, type locality, 7.1, varies other locations from 7.0 to 7.2. Larvae feed in atypical *Agave lecheguilla* Torrey.

Chromosome number. - 9.

### 25. Agathymus fieldi Freeman

*Agathymus fieldi* Freeman, 1960, J. Lepid. Soc., 14:59.

Type locality. - Guadalajara, highway 15, km. 724, el. 4400 ft., Jalisco, Mexico.

Distribution. - known only from the vicinity of the type locality.

Life history. - The adults emerge during September and October. The larvae feed in *Agave tequilana* Weber.

Chromosome number. - unknown.

### 26. Agathymus escalantei Stallings, Turner & Stallings

*Agathymus escalantei* Stallings, Turner & Stallings, 1966, J. Lepid. Soc., 20:167.

Type locality. Nochistlan, 20 km. southwest of Acahuizotla, Guerrero, Mexico.

Distribution. - Known only from the type locality, in southern Mexico.

Life history. - Unknown.

Chromosome number. - Unknown.

This is an unique species and may be found to represent an entirely different complex from what we now believe when we are able to obtain specimens in addition to the female holotype.

Key to males in the *Agathymus stephensi* complex

1a. Average expanse 42 mm; maculation on lower surface of secondaries yellowish-white; discal band on secondaries of average width to narrow.....2

1b. Average expanse 50 mm; maculation on lower surface of secondaries clear to sordid white; discal band on secondaries of average width to wide.....
.....*stephensi* (Skinner)

2a. Spots 7 and 8 of approximately equal size; spot 7 approaching spot 6; discal spots on lower surface of secondaries not fused into a continuous band.....
.....*comstocki* (Harbison)

2b. Spot 8 absent or one-half the size of spot 7; spot 7 well separated from spot 6; discal spots on lower surface of secondaries usually fused into a continuous band.....*dawsoni* Harbison

Key to females in the *Agathymus stephensi* complex

1a. Average expanse 49 mm; overscaling of paler scales at base of wings sparse; spot 7 not reaching inner edge of spot 6; maculation on lower surface of secondaries yellowish-white.....2

1b. Average expanse 52 mm; overscaling of paler scales at base of wings dense; spot 7 reaching inner edge of spot 6; maculation on lower surface of secondaries sordid white.....*stephensi* (Skinner)

2a. Spot 9 broadly V-shaped, with the point directed toward base of wings; spots on lower surface of secondaries usually separated.....
.....*comstocki* (Harbison)

2b. Spot 9 usually columnar and narrow; spots on lower surface of secondaries close together, often fused..
.....*dawsoni* Harbison

## 27. Agathymus stephensi (Skinner)

*Megathymus neumoegeni stephensi* Skinner, 1912, Ent. News, 23:126.

*Agathymus stephensi;* Freeman, 1959, Lepid. News 12:83 ["1958"].

Type locality. - Mason Valley (La Puerta), San Diego Co., California.

Distribution. - Western Colorado Desert of California: type locality; Banner Grade; Sentenec Canyon, 9-10 miles east of Julian; Palms to Pines Highway; San Felipe Valley; Vallecitos; near Jacumba. Northern Baja California, Mexico.

Life history. - The adults emerge during September and October. The larvae feed in *Agave deserti* Engelm.

Chromosome number. - unknown.

### 28. Agathymus comstocki (Harbison)

*Megathymus comstocki* Harbison, 1957, Trans. San Diego Soc. Nat. Hist., 12:241.

*Agathymus comstocki;* Freeman, 1959, Lepid. News 12:83 ["1958"].

Type locality. - 2 miles northeast of San Simon, Baja California Norte, Mexico.

Distribution. - The vicinity of the type locality, on the west coast of Baja California Norte.

Life history. - The adults emerge during August and September. The larvae feed in *Agave shawii* Engelm.

Chromosome number. - unknown.

### 29. Agathymus dawsoni (Harbison)

*Agathymus dawsoni* Harbison, 1963, Trans. San Diego Soc. Nat. Hist., 13:64.

Type locality. - 17.7 miles north of Punta Prieta, Baja California Norte, Mexico.

Distribution. - Central Baja California: type locality; 20 miles north Punta Prieta.

Life history. - The adults emerge during September and October. The larvae feed in *Agave goldmaniana* Trel.

Chromosome number. - unknown.

The remaining four species are not closely related to the previously discussed species or to one another, and each can be considered to represent a separate complex according to our present knowledge.

## *Agathymus polingi* Complex

### 30. Agathymus polingi (Skinner)

*Megathymus polingi* Skinner, 1905, Ent. News, 16: 232.

*Agathymus polingi;* Freeman, 1959, Lepid. News, 12:83 ["1958"].

Type locality. - Baboquivari Mountains, Pima Co., Arizona.

Distribution. - Southern Arizona (all locations in Pima Co.): type locality; Mt. Lemmon Road, el. 4250 ft., 5500 ft., Santa Catalina Mountains; Redington Road near Pass, el. 4400 ft., Santa Catalina Mountains.

Life history. - The adults emerge during September, October and November. The larvae feed in the caudex of *Agave schottii* Engelm. Soil pH, various localities ranged from 5.8 - 6.1.

Chromosome number. - 10.

## *Agathymus alliae* Complex

### 31. Agathymus alliae (Stallings & Turner)

*Megathymus alliae* Stallings & Turner, 1957, Ent. News, 68:1.

*Agathymus alliae;* Freeman, 1959, Lepid. News, 12:83 ["1958"].

Type locality. - 15 miles west of Cameron, Coconino Co., along canyon of Little Colorado River, el. 5000 ft., Arizona.

Distribution. - Recorded only from the type locality.

Life history. - The adults emerge during August, September, and October. The larvae feed in *Agave utahensis* Engelm.

Chromosome number. - 38.

## *Agathymus rethon* Complex

### 32. Agathymus rethon (Dyar)

*Megathymus rethon* Dyar, 1913, Proc. U.S. Nat. Mus., 44:282.

*Agathymus rethon;* Freeman, 1959, Lepid. News, 12:83 ["1958"].

Type locality. - Sierra de Guerrero, Mexico.

Distribution. - Southern Mexico: type locality; near Cuautla, Morelos; Oaxaca near the Chiapas border.

Life history. - The adults emerge during August and September. The larvae feed in *Agave sisalana* Perrine.

Chromosome number. - unknown.

## *Agathymus indecisa* Complex

### 33. Agathymus indecisa (Butler & Druce)

*Aegiale indecisa* Butler & Druce, 1872, Cistula Ent. 1:116.

*Megathymus indecisa;* Druce, 1896, Biol. Centr. Amer., Lep. Het., 2:319.

*Agathymus indecisa;* Freeman, 1959, Lepid. News, 12:83 ["1958"].

Type locality. - Costa Rica.

Distribution. - Southern Mexico to Panama: type locality; Comitan, Chiapas, Mexico; Guatemala; and Panama.

Life history. - The adults emerge during September and October. The larvae are reported to feed in a *hennigan*-type *Agave*.

Chromosome number. - unknown.

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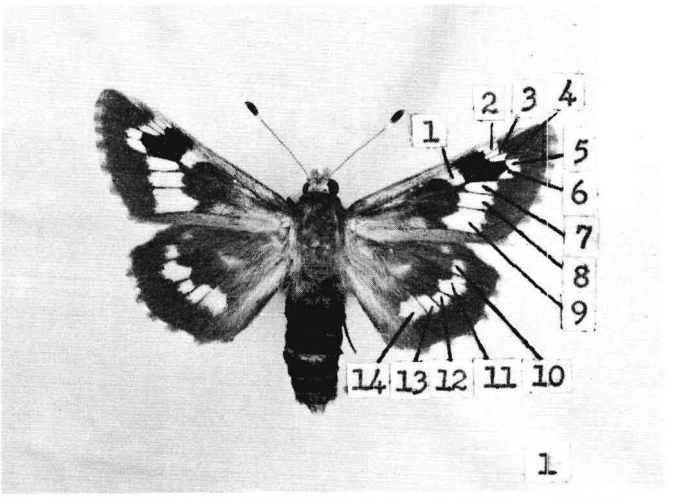
Explanation of Plate 1

Fig. 1, *Agathymus rindgei* Freeman, ♀, showing how the spots are numbered.

Fig. 2, *Megathymus yuccae buchholzi* Freeman, ♂, representing broad wing shape.

Fig. 3, *Megathymus coloradensis navajo* Skinner, ♂, representing medium wing shape.

Fig. 4, *Megathymus coloradensis wilsonorum* Stallings & Turner, ♂, representing narrow wing shape.

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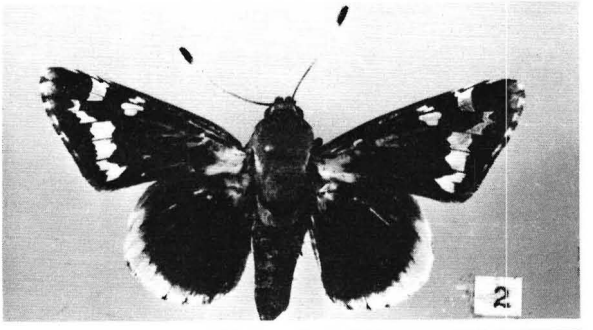

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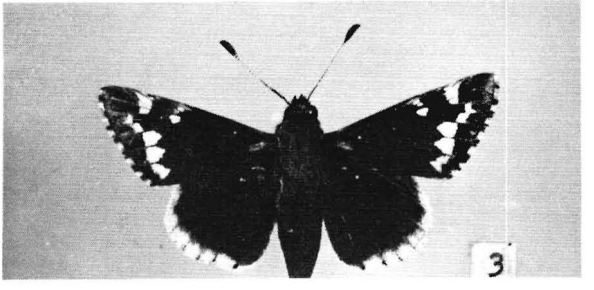

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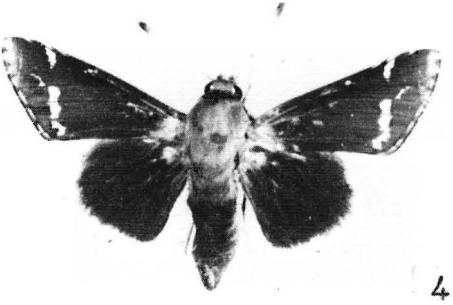

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