

A REVIEW OF *POANES HOBOMOK* (HESPERIIDAE: HESPERIINAE)
WITH THE DESCRIPTION OF A NEW SUBSPECIES
FROM THE SOUTHERN APPALACHIANS

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ABSTRACT. *Poanes hobomok monofacies* is described from the southern limits of the Appalachian Mountains in western North Carolina, northern Georgia and eastern Tennessee. The type locality is Chestnut Mountain, 3,400', Macon County, North Carolina. This new subspecies is characterized by the similarity of males and females and overall much darker and subdued marking when compared to both *P. h. hobomok* (eastern to mid, northern US & eastern to mid, southern Canada) and *P. h. wetona* (Colorado & New Mexico). The northern and western range of this new taxon and the area of its intergradation with nominate *hobomok* remains to be established, however, specimens from as far south in the Appalachians as West Virginia are nominate *hobomok*. All subspecific descriptions are presented. Syntypes are recognized for *P. hobomok* in the MCZ, Harvard. The type of *wetona* is illustrated for the first time. It is concluded that nominate *hobomok* and *wetona* differ significantly only in females, that *ridingsii* is a doubtful subspecies, and *monofacies* has the most distinct males.

Additional key words: form *alfaratta*, melanism.

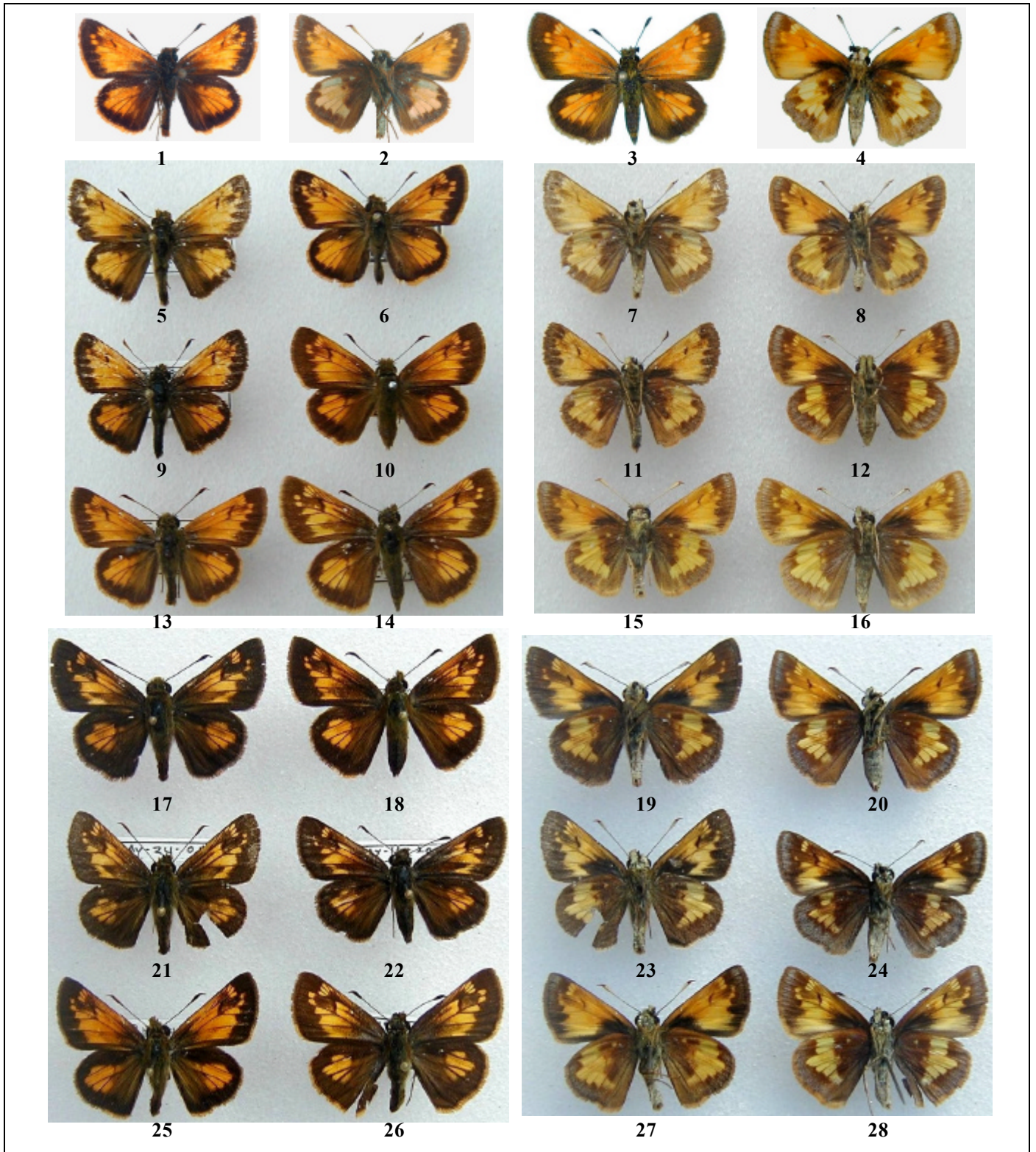
Discovery and Overview of a New Subspecies

Since the late 1980s I have made numerous trips to the southern Appalachian Mountains of western North Carolina and northeast Georgia to research the butterflies and skippers of that region. *Poanes hobomok* (Harris) 1862, is local, but not uncommon, in that area. In 1994, I noticed I had incorrectly determined two males as females in the small sample I had collected in this region. This manifested that the sexes were very similar and that both sexes were decidedly darker than individuals I had from the Midwest. I thus began a concerted effort to collect *hobomok* at various locations in that region. By 2002 I had acquired a sufficient sample from a variety of sites which confirmed that this was a unique and hitherto undescribed subspecies of *Poanes hobomok*.

This new subspecies, described herein, has much less fulvous on the dorsal surface of males than the males of the nominate subspecies (typical in New England region). Females of the new subspecies are much less variable than nominotypical females. For example, while the dark female form *pocahontas* (Scudder), 1864 is frequent to common in the New England region, it is apparently infrequent in western North Carolina and northern Georgia. Further, New England and southeastern Canadian *hobomok* females frequently have extensive dorsal fulvous (Fig. 10); this never occurs in females of the new subspecies. Both males and females of the new subspecies have the ventral hind wing yellow patch reduced and within

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Figs. 1-28: *Poanes hobomok* subspecies. **Figs. 1/2** (D/V), ♂ *P. h. wetona* holotype (data pg. 5). **Figs. 3/4** (D/V), ♀ *P. h. wetona*, Colfax Co., NM., leg. Spomer. **Figs. 5/7** (D/V), ♂ *P. hobomok*, Melrose, MA, 2 June 2002, leg. Grkovich. **Figs. 6/8** (D/V), ♂ *P. hobomok*, Lake Co., MN, 29 July 1967. **Figs. 9/11** (D/V), ♂ *P. hobomok*, Gardner, MA, 8 June 2002, leg. Grkovich. **Figs. 10/12** (D/V), ♀ *P. hobomok*, Edmundston, NB, CAN, 25 June 1961. **Figs. 13/15** (D/V), ♂ *P. hobomok*, Hardin Co., IA, 2 July 1967. **Figs. 14/16** (D/V), ♀ *P. hobomok* (same data as 13). **Figs. 17/19** (D/V), ♂ *P. h. monofacies* holotype (data pg. 6). **Figs. 18/20** (D/V), ♀ *P. h. monofacies* allotype (data pg. 6). **Figs. 21/23** (D/V), ♂ *P. h. monofacies* paratype, Clay Co., NC, 24 May 2002. **Figs. 22/24** (D/V), ♀ *P. h. monofacies* paratype, Macon Co., NC, Jones Knob, 16 May 2002. **Figs. 25/27** (D/V), lightest ♂ *P. h. monofacies* paratype (data as 22). **Figs. 26/28** (D/V), lightest ♀ *P. h. monofacies* paratype, (data as 22 except, 4 June 1993). 13-28 leg. Gatrell. All X 1.20 natural size. Dorsal/Ventral. 17,18,21,22 form *alfaratta*.

a darker brown ground color than in nominate *hobomok*. The phenotype of the new subspecies is not indicated to be an ecotype produced by altitude or short photoperiod. So far it has been found to occur as low as 900 feet and as high as 4400 feet and likely has a much wider altitudinal range.

The western subspecies *Poanes hobomok wetona* Scott, 1981 was described from Colorado at 7200 ft. and displays the opposite phenotypic extreme as individuals are heavily fulvous in both males and females (Figs. 1-4). Further, the lightest males and females in the east are found more commonly the further north the species occurs into Canada. The many specimens I have examined in this study indicate that the increase in dorsal fulvous correlates with increased elevation or shorter photoperiods. If this assessment is correct, then the melanistic phenotype of the new subspecies is significant as it occurs in the opposite phenotypic direction, but within the same short day niche, which indicates that this phenotype is a product of genetics and not ecology – not an ecotype. It should be noted that melanistic facies are a common occurrence among many species of Lepidoptera in the southern Appalachian region.

My primary purpose in this paper is to bring the existence of this subspecies to the attention of the scientific and conservation communities. Thus, there are a few questions that remain to be addressed by subsequent research. Foremost of which is the determination of the limits, or extent, of this taxon's range. I have examined a large number of specimens in the course of this study from throughout the range of species *hobomok*. At present, the new subspecies is confirmed only from western North Carolina, Georgia, and eastern Tennessee. It likely extends into northwestern South Carolina, northern Alabama and possibly much further west (Arkansas?).

The few specimens of *P. hobomok* I have seen from West Virginia indicate that it does not occur there but may inhabit the southernmost areas of that state. The blend zone may occupy much of Virginia and north central North Carolina. Although this should not be assumed. For example, no mention of darker males is made in either the Butterflies of West Virginia (Allen, 1997) or Butterflies of Virginia (Clark and Clark, 1951) and both books figure typical *Poanes hobomok hobomok* males. Males with very reduced dorsal fulvous (f. *alfaratta* Holland, 1930) are only known in the new subspecies described herein.

Examination of Described Taxa

Poanes hobomok hobomok

Poanes hobomok was described by Thaddeus W. Harris in 1862 as *Hesperia hobomok*. This was a posthumous publication 6 years after his death (Harris:1795-1856). This was in A TREATISE ON SOME OF THE INSECTS INJURIOUS TO VEGETATION, third edition. (The cover reads: HARRIS'S INSECTS INJURIOUS TO VEGETATION - FLINT.) This was actually the fourth in a series that began with the REPORT ON SOME OF THE INSECTS INJURIOUS TO VEGETATION published by the *Commissioners on the Zoological and Botanical Survey of Massachusetts* in 1841. The next three versions were in 1842, 1852 and 1862. *Hobomok* was not described until this 4th edition – which is as follows.

Hesperia hobomok. Hobomok Skipper. (Fig. 137)

Dark brown above; on each of the wings a large tawny-yellow spot occupying the greater part of the middle, four or five minute spots of the same color near the tips of the fore wings, on which is also a short brownish line at the outer extremity of the central mesh; under side of the fore wings similar to the upper, but paler; hind wings brown beneath, with a yellow spot near the shoulder, and a very broad deep yellow band, which does not attain the inner margin and has a tooth-like projection extending towards the hinder edge. The male has not the usual distinguishing oblique dash on the fore wings, which differ from those of the female only in the greater size of the tawny portion, which extends to the front margin.

Expands from 1 7/20 to 1 4/10 inch.

This skipper comes very near to the Otho of Smith and Abbot (Which is not the same as the Otho of Boisduval), and also approaches closely to a species that is figured in Dr. Boisduval's work under the name Zabulon; but does not sufficiently agree with either of them, and, in the belief that it has not been described before, I have given it the name of one of our celebrated Indian chiefs. It is found in June and July.

No type locality is established in the text. Because earlier editions state that either New England or Massachusetts is the area being surveyed, Massachusetts has historically been considered the type locality. I am not comfortable with this technically as in the 4th volume in which the name *hobomok* is introduced no state or region is mentioned anywhere. I thus here restrict the type locality to Massachusetts.

No type specimens are designated nor are any references given to any. There is a black and white woodcut on the margin, but this was commissioned and added by the editor (Flint) and can not thus be considered the type.

The Harris collection is located at the Museum of Comparative Zoology (MCZ), Harvard University. There are four old specimens in the Harris collection which I believe are actual syntypes used by Harris. Collectively they constitute the type (ICZN Article 73.2). These specimens have very few labels but what labels they do have are quite significant. Three have only a hand written label that says 171. This is a reference to Harris's notebook where he listed his species by number. The only other data is a date on the fourth specimen of – June 15 1839. I have sought to designate one of these as a lectotype but have been unable to secure photographs from the MCZ. There is nothing in the OD text or in Harris's notebook to indicate that these are syntypes. But the one bearing a label of June 15 1839 is compelling evidence of an actual type. If this specimen is in good condition, and especially if typical of Massachusetts' specimens, I recommend it be designated as the lectotype.

The MCZ web site provides information and photos of its types. The site refers to these 4 specimens as Type. The data is given but no photos. I have contacted the Museum to obtain more information and photos of these specimens. I was told that photos were not available. Because another *hobomok* subspecies is being described in the eastern United States, I think it important to have the nominate taxon clearly defined by proper typification and type locality. This should be done as soon as possible. There is always the possibility that one or more of these alleged types may yet prove to just be old specimens that someone else wrote 171 on.

Brown (1975) conducted an in-depth study into the literary history and Code relativity of the posthumous publication of this Harris name. While the information he uncovered is impressive, I disagree with part of his conclusions. I have been assisted greatly in this by David Wright who concurs. The problem is two fold. One issue is that of authorship of the name *hobomok*, the other date of publication. There were three works that appeared about the same time and each had Harris's descriptions in them. I will just mention them here under Brown's paper rather than cite them individually. They are the works of Scudder, Morris and Flint. Brown seemed to think that the name *hobomok* might be attributable to one of these men which is why he saw the date of publication of such importance.

Brown's concern was unwarranted as in all cases the text of the description was clearly attributed to Harris and put forth as his work alone. Since the Morris paper was dated as published in February of 1862 and all that is stated in the Flint volume re date of publication is simply 1862, Brown determined that it was necessary to find the actual month of the Flint edition to assure proper authorship. One can read this all in the Brown paper, so I will just address what I consider Brown's error.

Brown concluded that there were several issuances of the 3rd edition. I do not accept this for two reasons. First, if this were so I think they would have been referred to as different editions. Second, the item Brown assessed the *publication* date by was the date of the Editor's Preface in these books. These are simply the dates each preface was written not the volume published. To me, this is proven by this statement. "The copy in the British Museum (N.H.) library has the Editor's Preface dated 'Boston, December, 1861'. The publication date for this printing is '1862' ". Brown missed the obvious by seeing the publication date as 1861 even though 1862 is explicitly stated. The Code requires that when a date of publication is present that that is the date of publication. I don't think we can tell the exact month the 3rd edition was published. But this is a moot point, in my view, as the author is Harris regardless of the month or in which of the three publications his description appeared in 1862 because the text is always attributed to Harris.

Poanes hobomok ridingsii

The number of subspecies recognized depends on how taxonomists assess (or synonymise) these entities. Of the four possible subspecies, *Poanes hobomok ridingsii* F.H. & R.L. Chermock, 1940 is the most controversial. The original description of *ridingsii* is quite odd. By the title and first portions of the text, *ridingsii* is clearly presented as an infrasubspecific form which does not have availability by the rules of the *International Code of Zoological Nomenclature*. However, the authors lastly apply this epithet as a subspecies in the Riding Mountains and types are designated.

Thus, *ridingsii* is introduced as a form but made an available name within the same article! Its range is limited to the Riding Mountains of Manitoba, Canada. The few specimens (6) from Manitoba I have seen do not convince me that this should be considered a subspecies. Someone should examine this in detail. In the mean time, the name *ridingsii* can be utilized as at least a form name in Canada if anyone wishes to do so. Here is the original description

Poanes hobomok ridingsii new form

This form has the same relationship to *hobomok* that *suffusa* has to *massasoit*. The upper surface is slightly darker in color than that of *hobomok*. The discal patch on the secondaries below is very heavily overcast by brownish scales. We have a very extensive series of this form from the Riding Mountains where it appears to be constant. From Montreal, we have a fair series collected by our generous friend Mr. Sheppard. At Montreal this form occurs with the typical form. The classification "form" is based on this latter material; however, in the Riding Mountains, *ridingsii* occurs as a race. With sufficient material from the regions between the two locations, interesting theories could be formulated.

Holotype - ♂, June 23, 1938, Riding Mountains, Manitoba

Allotype - ♀, June 7, 1934, Riding Mountains, Manitoba

Paratypes – Riding Mountains, Sand Ridge, Man., and Montreal, P.Q.

Poanes hobomok wetona

Poanes hobomok wetona was minimally described verbally and no illustration was provided. To my knowledge, the photos provided herein are the first published depictions of the holotype (Figs. 1-2). I have examined topotypical Massachusetts males of *hobomok* (Figs. 5/7) that are identical to typical males of *wetona*. It is the females of *wetona* that distinguish it as being distinct from nominate *hobomok*. Although some *hobomok* females also have considerable dorsal fulvous, the dark form *pocahontas* occurs frequently within northeastern US *hobomok* while this form is unknown from subspecies *wetona*. The southern Appalachian taxon described herein differs more from nominate *hobomok* and western *wetona* than those two differ from each other. Here is the OD of *wetona*.

Poanes hobomok wetona Scott, new subspecies. *Wetona* is somewhat paler than *P. hobomok hobomok* (Harris). The brown DFW and DHW borders are slightly narrower, the dorsal wing bases have less brown, and the brown dorsal spot beyond the FW cell is smaller (less brown). Few females are as dark as ssp. *hobomok*, and many females are as light as males; the black female form *pocahontas* common in eastern U.S. in ssp. *hobomok* is absent in *wetona*. I first discovered *wetona* in 1967. It has since been found common throughout the foothills of the Wet Mts. in southern Colorado, and also on Raton Mesa in New Mexico. It possibly occurs between these areas, west of La Veta for instance. These are its only Rocky Mtn. localities (although ssp. *hobomok* occurs in the Black Hills). It occurs in *Quercus gambellii* – *Pinus ponderosa* habitat. Types: Sand Gulch S. Greenwood, 7200', Custer Co. Colo. 30 May 1971 [leg.] Glenn Scott, holotype male, 4 m paratypes; North Creek 4 mi. NW Beulah, Custer Co. Colo. 29 June 1970 G. Scott 2m 1f, 30 June 1971 J. Scott, 11; Beulah, Pueblo Co. Colo. 12 June 1970 2m J. Scott; 2 mi. up Greenhorn trail, Pueblo Co. Colo. 22 June 1967 1f J. Scott; Soda Gulch S. Wetmore, Custer Co. Colo, 7400' 29 June 1971 40 J. Scott; Smith Creek Campground, Custer Co. Colo. 25 May to 6 July, 1970-1793, 48, J. Scott & G. Scott; N. Hardscrabble Creek 2 mi. S. Greenwood, Custer Co. Colo. 24 June 1968, 1f G. Scott; Slope between N. & middle Hardscrabble Creek, Custer Co. Colo. 30 June 1968 1f G. Scott; N. Hardscrabble Crk. E. of Harms Gulch, Custer Co. Colo. 30 June 1968 2m 3f G. Scott; middle Hardscrabble Crk. Custer Co. Colo. 1 July 1968 1f G. Scott; 2 mi. SW Oak Creek Cgd., Fremont Co. Colo. 7 July 1970 1f J. Scott; 5 mil SE Beulah, Pueblo Co. Colo. 18 June 1970 5m G. Scott; South Hardscrabble Crk. 7400', Custer Co. Colo. 30 June 1971 8 J. Scott; N. of Goodpasture, Pueblo Co. Colo. 5 May 1972 1m J. A. Scott; Raton Mesa, Colfax Co. New Mex. 4 July 1973 Allotype female, 13 m 3f paratypes J. Scott. 3m paratypes to New Mex. State Univ., others to many colls. [RG. The holotype was deposited in the LACM.]

Poanes hobomok monofacies: New Subspecies

Diagnosis. Males. Both *P. h. hobomok* and *P. h. wetona* are broadly fulvous on the dorsal forewings. Some males of nominate *hobomok* have dark dusting at the base of the forewings, but never as extensive as in typical males of *P. h. monofacies*. Males of *P. h. monofacies* differ from all other *hobomok* populations in that many individuals have extensive dark brownish black scaling at the base of the forewings – this is especially noticeable in cell CU₂ where the dark basal color extends well into the cell in some individuals reducing the fulvous area to a small spot. This is form *alfaratta* (Figs. 17 & 21) which was previously considered to only occur in females. *Monofacies* is thus the only subspecies where some males are darker than typical females. In *monofacies* the dark forewing margin is 3 to 5 mm wide, to 1/3 width of wing; in *hobomok* 1.5 to 3.5 mm wide, less than 1/4 width of wing. The fulvous area on the dorsal hindwing of *monofacies* is also reduced. This is most noticeable in cell CU₁. On the ventral surface of both wings the outer ground color tends to be a uniform dark brown in *monofacies*; the hind wing central yellow patch is noticeably narrower (smaller) than in either *wetona* or *hobomok*, often occupying only about the middle one third of the wing surface. In typical *hobomok* from New England west through subspecies *wetona* the ventral outer ground color varies from medium brown to light yellowish brown with bluish-gray dusting; the central hind wing yellow patch often occupies over half the surface of the wing. The fringe on *monofacies* is usually brown while in the other subspecies it is usually orange. **Females.** In subspecies *monofacies*, the dorsal forewings are never extensively fulvous, while in subspecies *wetona* they almost always are, and frequently are in *hobomok* females. The *pocahontas* form is rare in subspecies *monofacies* but common in New England nominate *hobomok*. The ventral surface of *monofacies* females is similar to that of its males except that they are at times dusted with bluish-gray scales on the dark brown outer margins of the wings and the central yellow patch is even more restricted and at times absent. The dorsally yellow females of *hobomok* and *wetona* are usually well marked and more colorful ventrally (Figs. 4, 12 & 16).

Description. Male (Figs. 17/19, 21/23, 25/27): *Head, thorax, abdomen and legs*: In all anatomical features darker but of the same colors as in nominate *hobomok* except for the palpi which are as in nominate *hobomok* – grayish white at base blending to rusty tawny at terminal segment; palpi thus in more contrast with head and thorax in *monofacies*. *Forewings*: dorsally, outer margin dark brown 3 to 5 mm wide; base of wing usually with extensive brown, up to 8 mm into wing in cell CU₂; fulvous area accordingly compressed so that many male *monofacies* are form *alfaratta*; ventrally, as above but fulvous and dark areas more sharply defined, base of wing black. *Hindwings*: dorsally, dark brown with restricted orange fulvous central patch, spot in cell CU₁ small and never extending to base of vein (this spot usually extends to base of vein in *hobomok*), never a fulvous spot in cell CU₂; ventrally, central area yellow patch occupying half or less of wing surface and strongly contrasting with dark outer brown ground, ground seldom with any yellowish dusting, fringe usually dark and concolorous with marginal area of wing with an inner thin black line. **Female** (Figs. 18/20, 22/24, 26/28): *Head, thorax, abdomen and legs*: as in male but slightly lighter. *Forewings*: dorsally, as in male but tending to less fulvous with most females being form *alfaratta*, individuals with only small spots (*pocahontas*) are uncommon; ventrally, as in male but outer marginal lighter and often with blue-gray dusting in apical area. *Hindwings*: dorsally, as in male, individuals with no fulvous uncommon; ventrally, as in male but central yellow patch more restricted and usually with blue-gray dusting on margins.

Types. Holotype ♂ (Figs. 17/19): NORTH CAROLINA: Macon County, near summit of Chestnut Mountain, 3,500', FS Rd. 4563, 22 May 2000, R. Gatrell collector. **Allotype** ♀ (Figs. 18/20): NORTH CAROLINA: Macon County, near summit of Chestnut Mountain, 3,500', FS Rd. 4563, 22 May 2000, R. Gatrell collector. **Paratypes**: 31 ♂♂, 12 ♀♀: NORTH CAROLINA: Clay County: Buck Creek, 1♂, 18 May 2001, 1♂, 7 May 2002, 3♂♂, 24 May 2002, 1♂, 25 May 2002, Chunky Gal Mtn. at Hwy. 64, 1♂, 24 May 2002; Jackson County: Brushy Mtn., 1♂, 29 May 2000, Whiteside Cove Rd., 3100', 1♀, 30 May 2000 (form *pocahontas*); Macon County: visc. Jones Knob, 1♂, 27 June 1992, 4♂♂, 5♀♀, 4 June 1993, 1♀, 10 June 1994, 4♂♂, 1♀, 30 June 1994, 1♂, 22 May 2000, 4500', 4♂♂, 2♀♀, 16 May 2002, Chestnut Mtn., 1♂, 22 May 2000, Scaly Mtn. trail, off Turtle Pond Rd., 4100', 1♂, 1♀, 10 June 1993. GEORGIA: Walker County: Pigeon Mtn. Rec. Area, 1000', 19 km WSW of LaFayette, 4♂, 1♀, 2 May 1992, 3♂♂, 16 May 1998. The holotype and allotype are deposited in the LACM, Los Angeles, California; NC paratypes in the TILS collection Goose Creek, South Carolina; Georgia paratypes in collection of James Adams, Dalton, GA. All NC paratypes leg. R. Gatrell; all GA paratypes leg. James Adams.

Etymology. The name means one face because the sexes look very much alike.

Additional material examined. In this study I examined specimens from the following locations. All specimens are nominate *hobomok* unless otherwise noted. Number of specimens by sex in [♂/♀]. CANADA: MANITOBA: Duck Mtns [1/2] (*ridingsii*), Riding Mtns. [1/], Turtle Mtns. [1/1]; ONTARIO: Kitchner [2/], Shequidah [2/]; NEW BRUNSWICK: Edmundston [1/]; NOVA SCOTIA: Armdale [8/2]. UNITED STATES: MASSACHUSETTS: Mt Holly [4/3], Melrose [3/2], Gardner [1/]; CONNECTICUT: Middletown [1/], Kent [1/]; NEW HAMPSHIRE: Coos Co. [4/]; VERMONT: Orange Co. [7/3]; MAINE: Lewiston [1/], Brunswick [1/]; NEW YORK: Staten Island [1/], Lk. Tiorrti [2/], Catskills [4/1], Hartsdale [2/]; NEW JERSEY: Nutley [1/]; PENNSYLVANIA: Bucks Co. [1/2], Green Lane Co. [1/1], Bedford [4/7], Flowertown [10/16], Montgomery Co. [8/8], Centre Co. [1/], Lehigh Co. [3/3]; MARYLAND: Allegany Co. [3/2]; WEST VIRGINIA: Pocahontas Co. [1/]; ILLINOIS: Lake Co. [8/1], Mc Hennery [3/]; OHIO: Geauga [1/1]; MICHIGAN: Lansing [1/], Cass Co. [1/];

WISCONSIN: Marathon Co. [1/], Polk Co. [1/]; **MINNESOTA:** Lake Co. [1/]; **IOWA:** Lyon Co. [1/], Hardin Co. [12/8]; **NEBRASKA:** Cass Co. [2/1], Sioux Co. [1/1], Saunders Co. [/1], Richardson Co. [4/4]; **MISSOURI:** Wayne Co. [3/2], Boone Co. [/1], Holt Co. [/4], Grundy Co. [6/4], Columbia [/1]; **OKLAHOMA:** Craig Co. [3/]; **ARKANSAS:** Carroll Co. [4/3] (nr. *monofacies*), Washington Co. [/1], Saline Co., Quachita Mtns. [1/] (nr. *monofacies*); **GEORGIA:** (all *monofacies*) Bibb Co. [/1], Cobb Co. [1/], Allatoona Dam [1/], Pickens Co. [1 atypically light/1], Rabun Co. [2/]; **TENNESSEE:** (*monofacies*) Great Smoky Mtns. Park [/1]; **COLORADO:** Custer Co. [3/] (*wetona*) (one a paratype: 7800', N. Creek, 30 June 1971); **NEW MEXICO:** (*wetona*) Colfax Co. [2/3].

[Note: data off museum labels was sometimes difficult to read or very incomplete. New Mexico, Nebraska and Manitoba specimens provided by Steve Spomer. Various specimens from northeastern states provided by Alex Grkovich. Colorado specimens in TILS collection. Remaining specimens in Florida State Collection of Arthropods.]

Size. *Monofacies* is the largest of the *Poanes hobomok* subspecies: male: average left FW: 16.5 mm from base to apex. (in MA *hobomok*: 13.5); female: average left FW: 17.5 (in MA *hobomok*: 14.5). In mounted specimens the average wing expanse (FW outer margin to margin) was: MA *hobomok*: males: 29 mm, females: 33 mm; NM *wetona*: males: 28 mm, females: 31 mm; NC *monofacies*: males: 33 mm, females: 36 mm. (n= per specimens listed above.)

Comments. The subspecies *hobomok*, *wetona* and *monofacies* can be summarized as follows. 1) *Hobomok* has the most variable females ranging from unmarked dark brown to very fulvous dorsally. Male *hobomok* are almost always (90%) quite fulvous dorsally. 2) *Wetona* has all males and nearly all females exhibiting extensive dorsal fulvous – form *pocahontas* does not occur in *wetona*. However, occasional females and many males of *wetona* are indistinguishable from nominate *hobomok*. 3) All *monofacies* females and many males are quite dark dorsally and ventrally, and look alike dorsally in range of variation. Largely fulvous females have never been observed in *monofacies* and only one form *pocahontas* female has been found. 90% of *monofacies* females are form *alfaratta*. Occasional male *monofacies* (<10%) are fulvous enough on the dorsal fore wing to be very similar to males of nominate *hobomok* (Fig. 25). These similar to *hobomok* males can usually be separated by the reduced fulvous on the dorsal hind wing in cell CU1. 20% - 40% of males are form *alfaratta* in local populations.

While many of the samples were quite small, they nonetheless provided an accurate sample and pattern of how the Hobomok Skipper varies throughout its range. The specimens from Arkansas indicate that *monofacies* may extend into that state. Missouri material is largely typical *hobomok*. The Iowa series was very typical in phenotype but a bit larger than northeastern specimens. Maryland specimens were also larger but slightly darker than typical New England *hobomok*. Nebraska specimens were also larger and darker than populations in Iowa and Colorado, but still considered nominate *hobomok*. Austin notes one male with *monofacies* phenotype ex Iowa in his collection. This pattern indicates to me that *monofacies* was at one time an inhabitant of the southeastern mainland when Florida was an Island. This would have been across Georgia, Alabama and Mississippi.

The more I investigate the subspecific patterns in eastern US butterflies and skippers, the more I am convinced that most of the taxa in the northeastern US came from ancestors from the west and not often the southeast. The southeastern influence does not seem to go northward beyond New Jersey. North of New Jersey (esp. Remington's suture zone 1) many species are represented by different subspecies than occur south of that region (Remington, 1968; Gatrell, 1999, 2000). My expectation is that DNA would show that *wetona* and *hobomok* are close relatives and *monofacies* more distant. *Wetona* and *monofacies* would then be the most direct descendants from two refugia. The darker populations in Oklahoma and Nebraska would be from gene flow moving from Arkansas northward. A fascinating aspect of evolution is how multiple taxa will act both as species and subspecies in different regions. For example, it would not surprise me if *wetona* and *monofacies* act as species but both act as subspecies with nominate *hobomok*.

(In review, Austin mentioned possible circular speciation and provided several references including:

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Wake, D.B., K.P. Yanev, and M.M. Frelow. 1989. Sympatry & hybridization in a "ring species": the plethodontid salamander *Ensatina eschscholtzii*. Pp.134-157 in Speciation and its Consequences (D. Otte and J.A. Endler, eds.). Sinauer, Sunderland, MA. 679 pp.)

My hypothesis on the origin of form *pocahontas* into *hobomok* is as follows. *Wetona* (which lacks the dark morphs) would have moved north and eastward as the Wisconsin ice sheet retreated while *monofacies* moved west and north (both following grasses). When *monofacies* genes interacted with *wetona* genes this gave rise to *hobomok* and its form *pocahontas* as it continued east (driven by the prevailing winds). Spomer reports no dark form females from Nebraska and I have not seen them in Iowa. They are found in Missouri. Thus, this hypothesized convergence would appear to have occurred in the lower Midwest and moved north and east from there (Mississippi and Ohio drainage). The presence of form *alfaratta* in *monofacies* males and scarceness of *pocahontas* in *monofacies* females is interesting. I have never seen a fully fulvous female of *monofacies*. Figure 26 is the most fulvous female *monofacies* I have found. A lot of interesting evolutionary and genetic things for someone to research in *wetona*, *hobomok*, and *monofacies*.

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