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THE PIERIDAE OF ARKANSAS

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The members of the family Pieridae are medium to small sized butterflies usually having white, yellow, or orange background color, with dark gray or black marginal wing markings. The radius may be three or four branches, rarely five, and some branches are always stalked in the front wing. The cubitus appears three branched (Fig. 1). There are always two anal veins present in the hind wing. The front legs are well developed in both males and females, and the tarsal claws are bifid.

The chrysalids are elongate and are attached to supporting surfaces by the cremaster and a silken girdle around the middle of the body. They may be recognized by the presence of a sharp point or projection in front (Fig. 2). The larvae are usually long and green with short fine hairs. Some of the larvae in this family are highly destructive, especially to clovers and some of the better known crucifers. For clarity a phylogenetic list follows.

SUBFAMILY PIERINAE

(Whites)

- Appias drusilla* (Cramer). Florida White*
Pieris protodice Boisduval and LeConte. Southern cabbage worm
Pieris rapae (Linnaeus). Imported cabbageworm
Ascia (*Ascia*) *monuste* (Linnaeus). Great Southern White*

SUBFAMILY COLIADINAE

(Sulphurs)

- Colias* (*Colias*) *eurytheme* Boisduval. Alfalfa caterpillar
Colias (*Colias*) *philodice* Godart. Clouded sulphur
Colias (*Zerene*) *cesonia* (Stoll). Dog face
Anteos maerula (Fabricius). The Maerula*
Phoebis (*Phoebis*) *sennae* (Linnaeus). Cloudless sulphur
Phoebis (*Phoebis*) *philea* (Johansson). Orange barred sulphur
Phoebis (*Phoebis*) *agarithe* (Boisduval). Orange sulphur
Phoebis (*Aphrissa*) *statira* (Cramer). The Statira*
Kricogonia lyside (Godart). The lyside*
Eurema (*Eurema*) *daira* (Godart). Fairy yellow*
Eurema (*Eurema*) *mexicana* (Boisduval). Mexican sulphur
Eurema (*Pyrisitia*) *lisa* Boisduval and LeContet. Little sulphur
Eurema (*Pyrisitia*) *nise* (Cramer). Nise sulphur*
Eurema (*Abaeis*) *nicippe* (Cramer). Sleepy orange
Nathalis iole Boisduval. Dainty sulphur

*Not likely to be taken by the general collector.

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SUBFAMILY EUCHLOEINAE

(Orange Tips)

Anthocaris (Falcapica) midea Hubner, Falcate orange tip
Euchloe olympia (Edwards). The Olympia

KEY TO SUBFAMILIES

- 1a. Wings white above with black markings. In some species the front wing may have a falcate (hooked) orange tip above 2
- b. Yellow to orange above with black markings. Some species have white forms, but the dark markings on the lighter forms are the same as the yellow forms (Sulphurs) .. *Coliadinae*
- 2a. The underside of the hind wing has a greenish network, or marbled green mottling which usually shows through when viewed from above (orange tips) *Euchloeinae*
- b. The marking on the hind wing may vary from white to black and white checkered spots, but are never mottled or marbled (Whites) *Pierinae*

KEY TO THE GENERA AND SPECIES OF THE
 SUBFAMILY PIERINAE

- 1a. At least one or more large medial dark spots in the fore wing above 2
- b. No large medial dark spot above. If dark spot is present it is a discoidal mark usually small and obscure 3
- 2a. Front wings creamy white above with the apex grey and with at least one and often two circular medial dark spots above. Hind wing may be clear or with only one medial dark spot above. Female not noticeably more heavily marked. Fig. 3 *Pieris rapae* (L.)
- b. Wings white with subrectangular dark spots above giving them a checkered appearance. Females are much more heavily marked Fig. 4 & 5 *Pieris protodice* Bois. & LeC.
- 3a. White, with a pearly iridescence at the base of front wing above, and wing margin slightly concave. Orange at the base of the hind wing beneath in the males. Hind wing color variable in the female from creamy white to a very pale orange. Fig. 6 *Appias drusilla* (Cramer) ?
- b. White above usually with a dark margin. The under side of hind wing and the apex of the front wing may be yellowish tinged, but never orange at the base beneath. Fig. 7 *Ascia monuste* (L.)*

KEY TO THE GENERA AND SPECIES OF THE
SUBFAMILY COLIADINAE

- 1a. Dark brown or black margins on front wing above that never cover more than one eighth of the wing. Color variable, can be pale yellow, orange, or yellow fading into white distally 2
- b. Dark margins on the front wing cover more than one eighth of the wing on an orange to grayish-white background above 7
- 2a. Front wing angulate, slightly falcate distally, a clear yellow, with a medial dark discocellular spot above. A yellowish to white patch present in the hind wing at the base of the costa. Fig 8 *Anteos maerula* (Fab.)*
- b. Front wing rounded apically, no trace of falcation present 3
- 3a. Wide orange barred caudal edge on a yellowish background, hind wing above in both sexes. Males also barred medially on front wing above. Fig 9 *Phoebis philea* (Johan)*
- b. Orange bars on a yellow background absent above. If any bi-coloring of orange and yellow is present, it is basic, never barred caudally 4
- 4a. Wings above with a clear orange background margined with gray or black. Females with a dark discocellular spot, absent in males. Large 2 1/2"-2 3/4" wing spread. Fig. 10 & 11 *Phoebis agarithe* (Bois.)
- b. Entirely yellow or yellow fading into white distally. Dark color markings variable above. Never with a clear orange background 5
- 5a. Entirely yellow above in the males to yellow margined with black with a dark discocellular spot in females. Fig. 10 & 11 *Phoebis sennae* (L.)
- b. Background color not evenly distributed over entire wing, fades into different shades 6
- 6a. Wings yellow basally, white medially, merging into yellow distally above. Often with a short dark bar on the costa of the hind wing. Fig. 12 *Kricogonia lyside* (Godart)*
6. Wings yellowish-pink basally, fading into white distally above. Wing margin clear to bordered with black. Discocellular spot variable Fig. 23 *Phoebis statira* (Cram.)
- 7a. "Dog face" pattern in front wing above. Figs. 13 & 14 8
- b. Without a "dog face" pattern in front wing 9

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- 8a. "Dog face" pattern with dark round spot giving the "dog face" an "eye" above. Fig. 13 *Colias cesonia* (Stoll.)
- b. "Dog face" pattern without an "eye" above; angular hind wing. Fig. 14 *Eurema mexicana* (Bois.)
- 9a. Dark bar lengthwise above on leading edge of hind wing near costa. Small, 1 inch wing spread; front wing above with dark apex and a dark bar posteriorly on a yellow background. Fig. 15 *Nathalis iole* Bois.
- b. No such dark bar above on leading edge of hind wing near costa 10
- 10a. Medium in size; 1 1/4" wing spread; dark bar missing on hind wing above with dark marginal splotching. Front wing barred baso-laterally in summer, not barred in winter; front wing apex dark above. Fig. 16 ... *Eurema daira* (Godart)*
- b. Not baso-laterally barred in either front or hind wing. Wings variable, usually evenly colored predominately orange or yellow with black margins 11
- 11a. Discocellular spot above in the front wing, small, dark and comma shaped, or missing 12
- b. Discocellular spot noticeably more rounded, and a conspicuous orange spot medially in the hind wing 14
- 12a. Wing background color above orange, bordered in black with a dark, comma shaped discocellular spot. Fig. 17 *Eurema nicippe* (Cram.)
- b. Wings above whitish to yellow, never a bright orange background 13
- 13a. Wings whitish to yellow with a dark discocellular comma shaped spot. Fig. 18 *Eurema lisa* Bois. and LeC.
- b. Wings whitish to yellow, with no discocellular spot *Eurema nise* (Cram.)*
- 14a. Wings above yellow margined with dark marking. No trace of an orange color except for orange in the medial spot in the hind wing. Fig. 19 & 20 *Colias philodice* Godart
- b. Wings above whitish to orange with dark markings. Never a clear yellow background. Fig. 19 & 20 *Colias corytheme* Bois.

KEY TO THE GENERA AND SPECIES OF THE
SUBFAMILY EUCHLOEINAE

- 1a. Front wing falcate, apex orange above in males; grey in females. Wings mottled with greenish grey. Fig. 22 *Anthocaris midea* Hubner
- b. Front wing not falcate. White, or white with dark markings. Front wing above sparsely mottled with grey; hind wing

marbled beneath with green, which shows through above.

Fig. 21 *Euchloe olympia* (Edw.)

Adults of the family Pieridae fall readily into three sub-families based mostly on color. These are Pierinae (whites), Eulichloinae (orange tips) and Coliadinae (sulphurs). Of the twenty-one species listed that might be found in Arkansas ten species are common, four are collected occasionally in late summer or fall, and seven may be taken as strays.

Specimens of the subfamily Pierinae are characterized by a white background colored with gray or black markings. Some very light yellowing may be present giving the insect a creamy color. A yellow form rarely occurs. Only two species are commonly found in Arkansas.

The other species of Pierinae included in this writing are rarely taken by the average collector but are included because of their migratory habits.

Pieris protodice Boisduval and LeConte, the southern cabbage-worm is readily separated from *Pieris rapae* by its checkered appearance. The markings are rectangular and sexual dimorphism is present. The female is always noticeably more heavily marked. It has three or more broods yearly. Wing spread is about one and three fourths inches. The larvae feed on members of the family Cruciferae (Mustard family).

Pieris rapae (L.), the imported cabbageworm, has rounded markings and very little sexual dimorphism. The wing tip is a solid gray. This species was introduced into North America about 1860 and has since spread over most of the continent. The larvae are very destructive to cabbage and related plants (Family Cruciferae). Adults appear in March and may be seen late in the fall. Three or more broods usually occur annually. Wing spread is about one and three fourths inches.

Appias drusilla (Cramer), the Florida white, is not a native of Arkansas, but it becomes migratory at times and has been taken as far North as Nebraska. It is larger than *P. rapae* and *P. protodice*, having a wing span of about two and one half inches. It is mostly a silky white to grayish with dark borders. Sexual dimorphism is present with the females darker. The insect is separated from *Ascia monuste* (L.) by the characteristic orange marking basally beneath on the front wing.

Ascia monuste (L.), the great southern white, like *A. drusilla* migrates into the state. At times it is quite common in the south of Arkansas along the Gulf coast. It has light and dark forms. The darker form has been shown to be the migratory phase. The com-

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mon form is white with dark borders. The brownish gray form has similar but more diffuse dark margins. It has a wing spread of about two and one half inches.

The subfamily Coliadinae is the group of butterflies commonly known as the sulphurs. This group is easily recognized by the yellow or orange coloring. Although whitish forms may occur they need not be confused with other subfamilies as the wing pattern is identical in both the orange and yellow form, and the background color is much more gray.

Colias eurytheme Boisduval is the alfalfa caterpillar. Although it varies greatly in shading it is recognized by its orange coloring above. It has dark submarginal spots on both wings beneath, along with a silvery centered round, mostly double, orange or red discocellular spot in the hind wing below. Sexual dimorphism is present with the females more heavily marked with dark markings, though often on a grayish-white background with the characteristic dark markings. Whitish males are rare. Hosts are in the family Fabaceae, the clovers and vetches. Alfalfa is its preferred food.

Adults may be taken readily from blooming plants in open fields and along roadsides. These butterflies appear from April to late fall and there are three or four broods annually. Wing spread is about one and one half to two inches.

Colias philodice Godart, the clouded sulphur, is readily separated from *C. eurytheme* by its yellow background color. The other wing markings and size are similar. The females can be separated by the yellow color and a narrower black border on the upper side of the front wings. The preferred host of *C. philodice* is white clover, but otherwise its habits are similar to *C. eurytheme*.

Colias cesonia Stoll, the dog face, is easily identified by its large size about two and one half inch wingspread; its sharply pointed front wing; and the typical "dog face" yellowish pattern above on the front wing facing outward. The discocellular dark spot gives the appearance of an "eye" in the yellow pattern.

It feeds upon false indigo (*Amorpha fruticosa*) and clover (*Trifolium spp.*), and there are three to four broods annually. Adults are usually collected in open fields, and on blooming flowers along roadsides.

Anteos maerula (Fab.) is the only large, clear yellow, butterfly with falcate front wing likely to be taken in Arkansas and should be considered a stray, being a breeding resident of south Texas. The wings are yellow, very finely edged in black and with a conspicuous dark discocellular spot in the front above. Wingspread is about two and one half to three inches. Members of the group are commonly referred to as the angled sulphurs.

Phoebis sennae (L.), the cloudless sulphur, is a member of the genus *Phoebis* known as the tropical sulphurs. It is the one found most commonly in Arkansas.

The males are an unmarked clear yellow. The females vary from whitish to yellowish orange and are brokenly bordered with dark brown or black with a large discocellular spot above in the front wing. It feeds mostly on member of the family Fabaceae and has two or more broods annually. Wing spread is about two and one half inches.

Phoebis agarithe (Boisduval), the orange sulphur, is reported to be indigenous in the state. It superficially resembles *P. sennae* but the clear unmarked orange of the males is characteristic.

Dimorphism is present. The females may vary from salmon pink to orange and are more heavily marked with dark brown. Wingspread is about two and one half inches.

Phoebis philea (Johansson), the orange barred sulphurs, is a strikingly beautiful butterfly with its broad wings marked with orange on a yellow background. Wingspread often is two and three quarters to three inches. Dimorphism is present and the females, while yellow orange marked with dark brown, have the caudal edge of the hind wing marked conspicuously with orange, and the front wings a more even colored orange yellow. The female also has a row of marginal dark spots in both wings. In addition it has both a post-medial and a submarginal row of dark brown spots on the front wing above.

Phoebis statira (Cramer) is a beautiful white and yellow butterfly with black-edged wing. It may occasionally be found in Arkansas, but must be considered a stray. The wings are yellow fading into white distally. The wing spread is about two inches. *Kricogonia lyside* (Godart) another butterfly that may be taken as a stray, is similarly colored but narrowly or not at all margined in black and the wings are yellow bsically, white medially and yellow distally.

Nathalis iole Boisduval, the dainty sulphur, is one of our more common butterflies and is our smallest member of the group known as the little sulphurs. It is yellow and dark brown or black above with longitudinal dark bars in both the front and hind wings. The wing tips of the front wings are also dark, faintly tipped with yellow distally. Wingspread is usually less than one inch. It feeds on members of the family Fabacease. It is indigenous to Arkansas and the adults may be taken at flowers in similar habitat to *C. eurytheme*.

Eurema daira (Godart), the fairy yellow, may be found within the borders of the state, but is rare. It has a wingspread of about

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one inch. The wings are conspicuously margined in dark brown or black with a dark bar in the front wing above. The dark bar may be present or absent in the winter form, but is always present in the summer form. It may be confused with *Eurema nise* (Cramer) whenever the dark bar is absent, but can be separated by the broader dark markings on the margin of the hind wing. Preferred habitat for the adult is brushy places along the edge of woods near open places. Preferred hosts are members of the family Fabaceae. Wingspread is about one and one eighth inches.

Eurema mexicana (Boisduval). The downward projecting "eyeless dog face" and pointed front wing are characteristics of this species. It is reported to be common in Oklahoma and is usually taken on flowers along the western edge of Arkansas. Dimorphism is present with the females differing from the males in having less dark marginal marking in the hind wing. These dark markings are usually present only as an apical patch whereas the males are noticeably more deeply margined in black. Wingspread is about one and three eighths inches. The ecology of this insect is poorly understood.

Eurema nicippe (Cramer), the sleepy orange, is easily recognized by its bright orange, black tipped wings with a dark discocellular comma shaped mark. The wingspread is about one and one half inches. Dimorphism is present. The males are usually solid orange with wide black margins, the females with orange and diffused black margins. Its preferred food is Senna (*Cassia* sp.) and clover. Other species of Fabaceae are frequently fed upon. Three broods or more occur annually. Adults are usually taken in swamps and meadows.

Eurema lisa Boisduval and LeConte, the little sulphur, is easily separated from similar species by a discocellular dark mark and a wide black border on the rounded wing tip. Food plants are from the family Fabaceae. Wingspread is about one and three eighths inches. Adults may be taken on flowers in open fields and along roadsides.

Eurema nise (Cramer), the nise sulphur, a widespread tropical species that might stray into the state, is separated from *E. lisa* by the absence of any discocellular dark mark and a narrower dark margin. Its hind wing is usually lighter yellow than its front wing. The adults prefer edges of woods but when disturbed do not fly out into open spaces as do the similar *E. lisa*. Its preferred host is the sensitive plant, (*Mimosa pudica*). Wingspread is about one and one quarter inches.

The subfamily Euchloeinae is separated from other white butterflies by the characteristic mottling or marbling on the underside

of the hind wing. They are known as the orange tips. Characteristically, the males in most species have a bright orange patch above on the front wing. There are only two species found in the state.

Anthocaris midea Hubner, the falcate orange tip, is a small white butterfly with a wing spread of about one and one half inches. The front wing tip is falcate, and is a bright orange color in the males and gray in the female. The underside of the hind wing in both sexes is mottled in yellow-green. It is found mostly in deciduous woodland. Larval food is principally rock cress (*Arabis lyrata*) and Hedge mustard (*Sisymbrium*). It has about one and one half inch wingspread.

Euchloe olympia (Edwards), the olympia is the only representative of the genus *Euchloe* with in which the males are not orange tipped. It is easily recognized by its yellow-green marbled pattern on the underside of the hind wing which shows through the delicate wing. The front wing is white with scattered dark markings. It is native to the state and is found in open woodland and nearby meadows in early spring. Its food is similar to *A. midea*. Wingspread is about one and one half inches.

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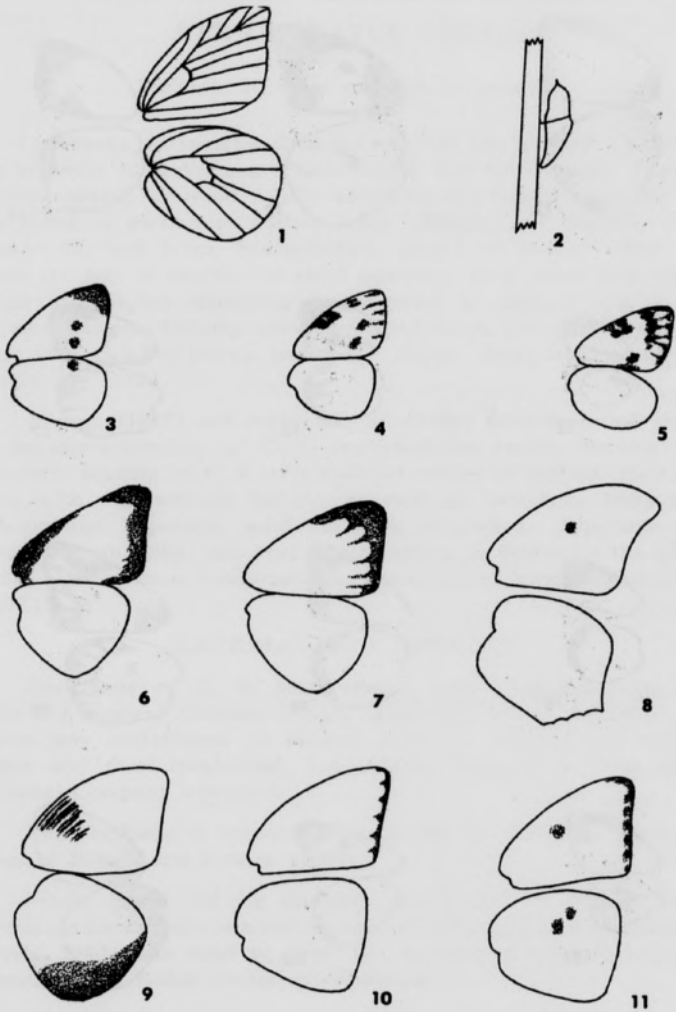


Fig. 1-11. Characteristics of Pieridae. 1, Wing venation; 2, Chrysalis; 3, *Pieris rapae* male plus female; 4, *Pieris protodice* male; 5, *P. protodice* female; 6, *Appias drusilla* male plus female; 7, *Ascia monuste* male, female; 8, *Anteos maerula* male plus female; 9, *Phoebis phila* male plus female; 10, *Phoebis agarithe* male, or *Phoebis sennae* male; 11, *P. agarithe* female or, *P. sennae* female.

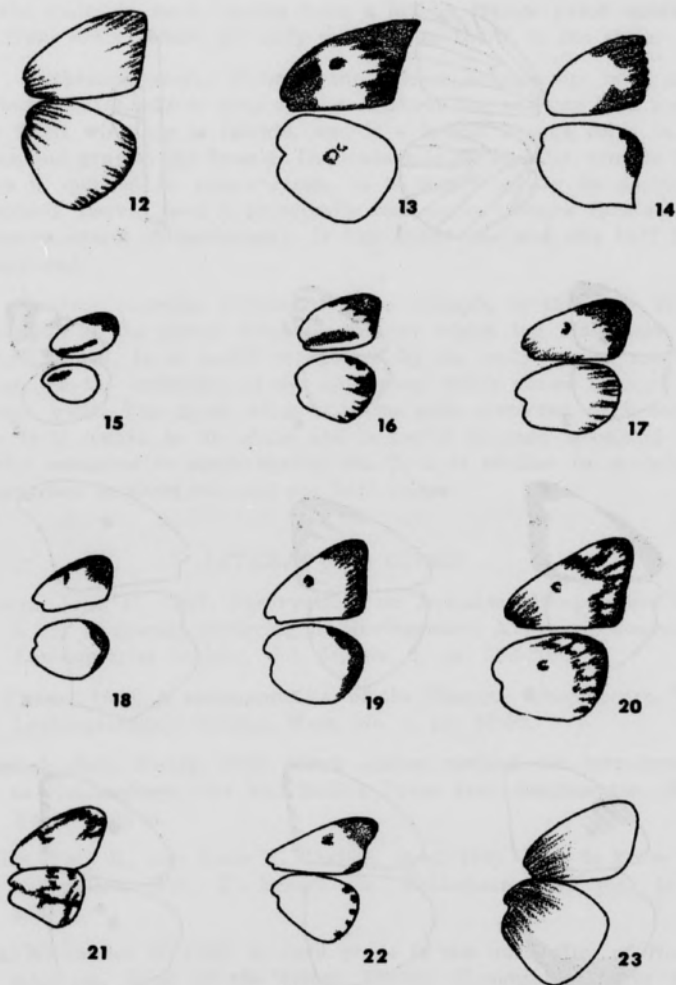


Fig 12-20. Characteristics of Pieridae Cont. 12, *Kricogonia lyside* male and female; 13, *Colias cesonia* male plus female; 14, *Eurema mexicana* male plus female; 15, *Nathalis iole* male and female; 16, *Eurema daira* male plus female; 17, *Eurema nicippe* male plus female; 18, *Eurema lisa* male and female; 19, *Colias pilodice* male; 20, *Colias eurytheme* female; 21, *Euchlae olympia* male plus female; 22, *Anthocaris midea*; 23, *Phoebis statira* male.