

A CLASSIFICATION OF THE NORTH AMERICAN SPIDERS.

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The author has frequently been asked why he did not make a key for the families of spiders. He has answered that a correct key was impossible. But as such questions are getting more numerous, and connected with a desire to know something about spiders, the author has decided to put together what he could as a contribution to the classification of our spiders, principally for the use of those who are unable to obtain the costly works necessary for study.

I shall consider the family the highest group separated by definite characters; not but what certain families possess transition forms, but that the groups higher than the families are not defined by definite characters, but by tendencies. Two groups above the families I shall recognize, the higher the division, the lower the section; the section embracing certain families, the division one or more sections. To these I shall not attempt to make a key, but only designate their general characters and the families which they embrace. In the key for the families I shall be arbitrary; but in the system which follows I shall try to indicate the natural affinities.

The classification of spiders is difficult because of the few characters that can be used. This is not often understood by those who study insects. Let the entomologist cut off from his insect the wings, the antennæ, one pair of palpi, unite the abdominal segments, obliterate all sutures, and how many characters will he have left! Yet even then he will have far more than the student of spiders can find in his subject.

A few words in explanation of the characters used in the key. The body of a spider is very definitely divided into two parts—the anterior, the cephalothorax; the posterior, the abdomen. Upon the anterior part of the cephalothorax are the eyes; the region they occupy is called the eye region. The eyes are arranged in transverse rows; abbreviations referring to them are frequently used, as S. E. side eyes; A. E. anterior eyes; P. E. posterior eyes; M. E. middle eyes; from these are made compounds, A. S. E. anterior side eyes, etc. Dark coloured eyes are diurnal, light coloured eyes are nocturnal. The region between the anterior row of eyes and the anterior or clypeal margin of the cephalothorax is called the clypeus or fillet. A groove on the meson toward the posterior part of the cephalothorax is called the median groove. There are more or less distinct furrows extending from the groove to the sides,

these are the radial furrows ; the region of the cephalothorax between the anterior pair and embracing the eye region is called the head or pars cephalica. The mandibles are the anterior pair of mouth-parts ; they are two-jointed, the second joint being called the fang, and furnished with the opening of the poison gland. The maxillæ form the second pair of mouth-parts ; to the sides of the maxillæ are attached the palpi, which in the adult male have the terminal joint peculiarly modified for sexual purposes. Between the maxillæ and articulated to the sternum is the lip. The sternum is the ventral plate of the cephalothorax, the entire region between the base of the legs. The legs, of four pairs, are numbered from before backward, I., II., etc. The legs are seven-jointed ; the joints are called, beginning at the most basal, coxa, trochanter, femur, patella, tibia, metatarsus, and tarsus ; in a few peculiar groups there is an eight joint, the onychium. At the end of the tarsus, or onychium if present, are two claws, equal in size ; below and between them is frequently a third, smaller and more curved. The claws may be furnished with teeth, and are called dentated. Sometimes under the two larger claws, in place of a third, is a dense brush of hairs called a scopula. The abdomen is joined to the cephalothorax by a slender pedicel. At, or near, its extremity on the under side or venter are the spinning organs called spinnerets ; these are of three pairs, the middle pair smaller and concealed by the other two. The spinnerets are probably always two-jointed, but in some spiders one pair is very prominently so. At the base of the lower pair of spinnerets is sometimes a transverse surface provided with spinning tubes ; this is called the cribellum. Complementary to this in function is a row of stiff hairs or bristles on the posterior metatarsi called the calamistrum. Near the base of the spinnerets is a pair of stigmata, which are sometimes placed much more anteriorly, even nearer the basal than the distal end of the abdomen. When so situated there is formed a transverse ridge or fold on the venter. Near the base of the venter is a pair of transverse slits ; these are the lung-slits. In some spiders there are two pairs. Between them on the median line is the opening of the genital organs ; in the female called the epigynum. Its structure, together with the structure of the male palpal organ, is of utmost importance in the determination of species.

Because of certain peculiarities, I shall treat the cave forms separately in the key. The characters of the families as indicated in the system should be used in connection with the key.

KEY TO THE FAMILIES OF SPIDERS OF THE U. S.

- 1 { Fang moving vertically, usually two pairs of lung slits 31
 1 { Fang moving horizontally, but one pair of lung slits 2
- 2 { Cave species 3
 2 { Not cave species 5
- 3 { Six eyes, in three groups of two each, body round *Dysderidae*
 3 { Eyes not so arranged, body more elongate 4
- 4 { Two claws to tarsi *Clubionidae*
 4 { Three claws to tarsi *Theridiidae*
- 5 { Eyes six 6
 5 { Eyes eight 9
- 6 { A pair of stigmata just caudad of the lung slits *Dysderidae*
 6 { No stigmata close to lung slits 7
- 7 { The six eyes in three groups of two each *Scytodidae*
 7 { The six eyes in two groups of three each 8
- 8 { Legs very long and slender (*Spermophora*) *Pholcidae*
 8 { Legs short (*Neophanes*) *Dictynidae*
- 9 { Cephalothorax produced in front of pars cephalica, which is very small,
 maxillæ closely surrounding the lip, mandibles small, cephalo-
 thorax roundish 10
 9 { Not such spiders 12
- 10 { S. E. touching *Pholcidae*
 10 { S. E. separated, P. S. E. and P. M. E. touching 11
- 11 { Apex of abdomen surrounded by a circle of bent hairs *Urocteidae*
 11 { Abdomen without such hairs *Filistatidae*
- 12 { Eyes equal or subequal, often dissimilar *, more or less in two rows
 variously curved, forming a group much wider than long 20
 12 { Eyes unequal, similar, in three or four rows, forming a group almost
 as long or longer than wide 13
- 13 { With a calamistrum and cribellum (*Hyptiotes*) *Uloboridae*
 13 { Without calamistrum or cribellum 14
- 14 { Largest eyes in anterior row 15
 14 { Largest eyes not in anterior row 16
- 15 { Eyes in three rows *Attidae*
 15 { Eyes in four rows *Lyssomanidae*
- 16 { Two claws to tarsi, only two eyes in anterior row *Ctenidae*
 16 { Three claws to tarsi 17

* Dissimilar=eyes of two colours, dark and light; similar=eyes of but one colour.

17	{	Two eyes in anterior row.....	18
	{	Four eyes in anterior row.....	19
18	{	A high clypeus.....	<i>Oxyopidae</i>
	{	Almost no clypeus.....	<i>Podophthalmidae</i>
19	{	Eyes of second row immensely larger than those of the third row...	<i>Dinopidae</i>
	{	Eyes of second row not much larger than those of third row.	<i>Lycosidae</i>
20	{	With calamistrum and cribellum, three claws to tarsi.....	21
	{	Without calamistrum and cribellum.....	22
21	{	S. E. not as far apart as M. E., clypeus high.....	<i>Dictynidae</i>
	{	S. E. as far or farther apart than M. E., clypeus low.....	<i>Uloboridae</i>
22	{	Tarsi with two claws.....	23
	{	Tarsi with three claws.....	27
23	{	Second pair of legs longer than the fourth, all eyes similar, cephalo- thorax somewhat roundish.....	24
	{	Second pair of legs not longer than the fourth, A. M. E. diurnal, rest nocturnal, cephalothorax more elongate.....	25
24	{	A. M. E. very close to clypeal margin, clypeus low.....	<i>Sparassidae</i>
	{	A. M. E. some distance from margin, clypeus higher.....	<i>Thomisidae</i>
25	{	Mandibles very large, trochanters long.....	<i>Prodidomidae</i>
	{	Mandibles and trochanters normal.....	26
26	{	Maxillæ with a concavity or furrow.....	<i>Drassidae</i>
	{	Maxillæ convex.....	<i>Clubionidae</i>
27	{	But one pair of spinnerets.....	<i>Palpimanidae</i>
	{	Three pairs of spinnerets.....	28
28	{	Clypeus wider than ocular area.....	29
	{	Clypeus narrower than ocular area.....	30
29	{	Lower spinnerets longer than upper, two-jointed.....	<i>Enyoidae</i>
	{	All spinnerets equally short.....	<i>Theridiidae</i>
30	{	Superior pair of spinnerets longer than the others, two-jointed, A. M. E. diurnal, S. E. separated, not far from M. E.....	<i>Agalenidae</i>
	{	All spinnerets short, S. E. often touching, often far from M. E.	<i>Epeiridae</i>
31	{	Legs very long and slender.....	<i>Hypochilidae</i>
	{	Legs stout and shorter.....	32
32	{	Two pairs of lung slits.....	33
	{	But one pair of lung slits.....	<i>Catadysidae</i>
33	{	Palpi arising from the side of maxillæ.....	<i>Atypidae</i>
	{	Palpi arising from the tip of the maxillæ.....	<i>Theraphosidae</i>

A SYSTEM OF SPIDERS.

Division I.—*Gnaphosæ*.

This embraces but one section.

Section I.—This section contains the spiders which have the mandibles moving vertically. With the exception of one doubtful form they have four lung sacs. There is no epigynum in these forms, the male palpal organ is very simple, consisting of a bulb tapering on one side to a tube; the tarsus of the palpus is not at all modified. They are a tropical group and include the largest and most powerful spiders known. They have developed from primitive spiders like *Filistata*.

Family 1, *Atypidæ*.

This includes but one genus, *Atypus*, whose members are quite rare.

Family 2, *Theraphosidæ*.

These are the tarantulas. We have two sub-families.

1 {	Inner distal angle of maxillæ slightly prolonged; palpi somewhat lateral.....	<i>Eriodontinæ</i> .
	Inner distal angle of maxillæ not prolonged; palpi terminal.....	<i>Theraphosinæ</i> .

The *Theraphosinæ* may be divided into two tribes.

{	Three claws to tarsi.....	<i>Trionchi</i>
	Two claws to tarsi.....	<i>Dionchi</i>

The *Dionchi* have one genus *Eurypelma*; the true tarantulas. The *Trionchi* may be separated into two groups.

{	Median groove longitudinal.....	<i>Mecicobothri</i>
	Median groove transverse.....	<i>Epicephali</i>

Family 3, *Hypochilidæ*.

This is represented by one peculiar genus *Hypochilus*. In the shape of the body and the length of the legs it has great resemblance to a *Pholcus*. It has a calamistrum and cribellum. The only species in the U. S. spins a web similar to some *Therididæ*.

Family 4, *Catadysidæ*.

Represented by one genus *Catadysas*, which has not been seen since described by Hentz. It stands on the dividing line between the typical members of this division and the more typical spiders, in having but two lung-sacs.

Division II.—*Micrognatha*.

With but one section.

Section II.—This includes spiders of the most primitive and comprehensive form; “prophetic types” as the older naturalists would call them. They have a roundish cephalothorax which projects in front of the small pars cephalica. The maxillæ closely surround the lip. The mandibles are small. The legs are usually long and slender, and they make irregular webs.

Family 5, *Filistatidæ*.

These are the lowest spiders. The pars cephalica is no larger than the eye-tubercle of *Phalangida* with which it is homologous. The male palpal organ is the most simple, only a tube at the end of the tarsus. *Filistata* occurs in the southern parts of our country.

Family 6, *Urocteidæ*.

This family is represented by one species of *Thalamia* in the Southern States.

Family 7, *Scytodidæ*.

This distinct group is represented by two genera, somewhat rare in the Southern States.

Family 8, *Pholcidæ*.

Here the legs are long and slender, the tarsus in the typical forms being furnished with an eighth joint. The forms are principally southern. I include in this family *Pholcus*, *Spermophora* and *Spitharus*.

Division III.—*Vera*.

Here we come to the typical and more common spiders. It embraces three sections.

Section III.—This is about the same as the *Tubitelariæ* of certain writers. The cephalothorax is usually low and elongate. The abdomen also is commonly elongate and low. The legs fitted for running. The eyes are equal in size and plainly in two rows.

Family 9, *Dysderidæ*.

These have but six eyes; just behind the lung-slits is a pair of stigmata. The forms are uncommon.

Family 10, *Prodidomidae*.

We have but one genus and species in the Southern States.

Family 11, *Drassidae*.

This embraces a number of common spiders. The body is low and flat, the legs short and stout, the spinnerets usually projecting behind. They spin no web but lead a wandering life in search of prey, mostly at night. There are two sub-families.

- { A dorsal groove present *Drassinæ*.
- { No dorsal groove present *Micarinæ*.

The latter group is represented by *Micaria* which is quite rare.

The *Drassinæ* may be divided into two tribes.

- { Hind row of eyes recurved *Gnaphosi*.
- { Hind row of eyes straight or procurved *Drassi*.

The former includes *Gnaphosa*, *Poecilochroa* and *Pythonissa*. The latter includes *Echemus*, *Drassus*, *Prothesima* and *Teminius*.

Family 12, *Clubionidae*.

Closely related to the preceding family, they are usually light coloured, while the *Drassidae* are dark.

The legs are a little longer and more slender, the spinnerets less prominent, and the abdomen more round. It may be divided into three sub-families.

- 1 { A transverse furrow on the venter *Anyphaeninae*
- 1 { No transverse furrow on the venter 2
- 2 { A stiff, horny shield either on dorsum or around the base of the pedicel *Corinninae*
- 2 { Abdomen wholly soft *Clubioninae*

The latter sub-family may be divided into two tribes.

- { Two rows of very strong spines under tibiae I. and II. *Phrurolithi*
- { Tibiae I. and II. not strongly armed *Clubioni*

Family 13, *Agalenidae*.

Not a very extensive family; most numerous in the west. The pars cephalica here is very distinct, and occupies the whole width of the cephalothorax in front. One genus, *Cybaeus*, disagrees with the characters of the family, as the spinnerets are all short; the genus will, however, be readily recognized as belonging to the family because of its general resemblance to other more common forms. Two well marked sub-families can be recognized.

- { A transverse furrow on venter, lower spinnerets widely separated
 { No ventral furrow, spinnerets as usual.....*Hahninae*
 {*Agaleninae*

The latter may be divided into two tribes.

- { Upper spinnerets long, two-jointed.....*Agaleni*
 { All spinnerets short.....*Cybaeni*

Family 14, *Enyoidae*.

The lower spinnerets here are long and two-jointed. Otherwise much like the preceding family. We have one genus, *Habronestes*, in the Southern States.

Family 15, *Palpimanidae*.

Peculiar in having but one pair of spinnerets. One genus, *Lutica* from Utah.

Family 16, *Dictynidae*.

This family is much like *Agalenidae*, but have the accessory spinning organs. They are usually smaller. They spin small irregular webs, hanging from the under side.

Section IV.—This includes a large number of common spiders. They spin webs to catch prey. Most of the forms are very much alike in appearance. The abdomen short and rounded, the cephalothorax short with well developed pars cephalica, and the legs somewhat long, always with three claws. The spinnerets are short, the male and female organs well developed.

Family 17, *Theridiidae*.

This is the largest family of spiders, and many of its members are very small. They spin irregular webs, and hang inverted from the under side. The males frequently possess peculiar sexual modifications of the head. They can be arranged in three sub-families whose limits are not distinct. Their general characters are as follows :—

Theridinae.

The abdomen is large and roundish, the cephalothorax short, the legs long and quite slender; mandibles thinner than femur I.; male palpal organ without tarsal hook.

Erigoninae.

These are smaller species, the abdomen not very much larger than the cephalothorax, and a little elongated. The legs are shorter than in the *Theridinae*, and the male palpal organ has a tarsal hook; the epigynum not projecting, the legs without long spines, head of male often curiously modified.

Lingphinae.

These have longer legs than the preceding, and they are more spiny; the epigynum often projects. They are more usually marked than the *Erigoninae*, and are generally larger.

Family 18, *Epeiridae.*

This includes the common orb-weaving spiders; a few other genera are included—*Pachygnatha*, *Glenognatha*, *Bellinda* and *Mimetus*. They are very similar to the *Theridinae*, but have a low clypeus. Three sub-families may be recognized.

- | | | | | |
|---|---|--|-------|-------------------------|
| 1 | { | Body with spine-like projections..... | | <i>Gasteracanthinae</i> |
| | { | Body without such projections, at most with two basal humps..... | 2 | |
| | { | Male mandibles large, body elongate..... | | <i>Tetragnathinae</i> |
| 2 | { | Mandibles small, body shorter..... | | <i>Epeirinae</i> |
- These sub-families, like those of the *Theridiidae*, also intergrade.

Family 19, *Uloboridae.*

Related to the *Epeiridae* by their habit of building orb-webs, but their structure quite distinct. We have but two genera, *Uloborus* and *Hyptiotes*.

Section V.—This includes the *Laterigradae* of authors. The body is flattened, the first two pairs of legs long, the abdomen short and roundish.

Family 20, *Thomisidae.*

These are frequently found upon flowers and fences waiting the approach of some insect. There are a great number of cases of protective resemblance in the group. They walk most easily sideways, and many throw off their legs very readily.

- | | | | |
|---|---|-------|----------------------|
| { | Two front pairs of legs much larger and longer than the others, no scopula..... | | <i>Thomisinae</i> |
| { | Two front pairs of legs not larger than the others, a scopula present. | | <i>Philodrominae</i> |

Family 21, *Sparassidae.*

These resemble the *Philodrominae* of the preceding family. They occur in the south and southwestern parts of the U. S.

Division IV.—*Oculate*.

Here the eyes are strongly unequal in size; the pars cephalica very large, the eyes in three or four rows. They are the most active and highly developed spiders. They spin no web but hunt their prey.

Section VI.—This includes the *Citigradæ* of most authors.

Family 22, *Ctenidæ*.

These have much affinity with the *Sparassidæ*. There is but one genus in the Southern States.

Family 23, *Lycosidæ*.

These are the "wolf-spiders" which run among leaves and grass and over rocks. Their legs are moderately long and quite stout, with many hairs and spines. The mandibles are large and strong.

{ Ocular area slightly broader than high *Dolomedina*
 { Ocular area as high or higher than broad *Lycosina*

Family 24, *Dinopidæ*.

One genus quite peculiar in the South.

Family 25, *Podophthalmidæ*.

One peculiar genus in the Southern States.

Family 26, *Oxyopidæ*.

Three genera, mostly southern and western forms. Somewhat intermediate between the *Lycosidæ* and the *Attidæ*.

Section VII.—The *Saltigradæ* of authors, the "jumping-spiders". Their body compact, the legs short and stout, the size medium. The *Hymenoptera* of spiders.

Family 27, *Attidæ*.

This contains nearly all the forms of the section. Three sub-families may be recognized.

1 { Ant-like spiders, slender legs *Synemosinae*
 { Not ant-like, legs more stout 2
 2 { Eye region longer than thoracic region *Ballinae*
 { Eye region shorter than thoracic region *Attinae*

The latter may be separated in two tribes.

{ Cephalothorax low, depressed *Marptusi*
 { Cephalothorax high, raised *Phidippi*

Family 28, *Lyssomanidæ*.

One genus in the Southern States.