

**INTRA- AND INTERSPECIFIC VARIATION
IN THE GENUS *URACIS* RAMBUR, 1842,
WITH A KEY TO THE KNOWN SPECIES
(ANISOPTERA: LIBELLULIDAE)**

J.M. COSTA and T.C. SANTOS

Departamento de Entomologia, Museu Nacional, Universidade Federal do Rio de Janeiro,
Quinta da Boa Vista, São Cristóvão, BR-20.940-040 Rio de Janeiro, RJ, Brazil

Received June 3, 1994 / Revised and Accepted August 2, 1996

Based on 1200 adult specimens of both sexes, mostly from Brazil, the extend of variation in wing coloration and in the number of cross-veins is analyzed in 5 of the 7 known spp., viz. *fastigiata* (Burm.), *imbuta* (Burm.), *infumata* (Ramb.), *ovipositrix* Calv., and *siemensii* Kirby. It is concluded, sympatric spp. may present similar color patterns, therefore the latter can not be utilized to differentiate between the taxa.

INTRODUCTION

Uracis Rambur is a neotropical genus, characterized by some primitive venational features, such as the position of arculus between 2nd and 3rd antenodals, the base of wing narrow, increased number of cubital cross-veins, and the hind wing triangle distal of arculus. Out of the 7 nominal species (DAVIES & TOBIN, 1985), *fastigiata* (Burm.), *imbuta* (Burm.), *infumata* Ramb., *ovipositrix* Calv., *reducta* Fraser and *siemensii* Kirby, are distributed in South and Central America, while *turrialba* Ris is confined to Central America.

In order to assess the extend of intra- and interspecific variation in wing coloration and in the number of cubital cross-veins, we have analyzed 1200 specimens of both sexes, pertaining to 5 species, from various localities, mostly from Brazil (cf. Tab. I).

CALVERT (1948) suggested that those *imbuta* individuals which have the proximal side of the hind wing triangle at the arculus, represent a more primitive state for the genus, while the *imbuta* individuals with the distally placed proximal side of the triangle, and also the other congeners, display a more specialized condition. We agree with Calvert, but so only with reference to *imbuta* and *fastigiata*, since in

all other analyzed species the proximal side of the hind wing triangle occurs distally of arculus.

PROVENIENCE OF MATERIAL EXAMINED

Uracis fastigiata: BRAZIL, Amazonas (São Paulo Olivença, Manaus, Manicoré, Jurúá, Canamari, Eirunepé, Benjamin Constant, Tabatinga); - Acre (A. Feijó, Taracá); - Amapá (Serra do Navio); - Rondônia (Ouro Preto d'Oeste); - Roraima (Nova Vida, Ariquemes, Colônia Apiáu); - Tocantins (Santa Fé); - Pará () Fordlândia, Óbidos, Belém, Tucuruí); - Maranhão (Rosário); - Paraíba (Areia); - Bahia (Itabuna); - Mato Grosso (Barra dos Bugres, Diamantina); - PERU, Satipo. - *U. imbuta*: BRAZIL, Amazonas (Manaus, Careiro, Estirão do Equador, Janereté, Manicoré, São Paulo Olivença, Médio Javari, Benjamin Constant, Tabatinga, Aldeia Kasawá, Taracá, Uapés); - Amapá (Serra do Navio, Porto Platon, Oiapoque); - Pará (Belém, Conceição do Araguaia, Benevides, Benfica, Fordlândia, Santo Antônio do Tauá, Tiriós, Carajás, Tucuruí, Paricatuba, Paragominas, Aura, Altamira); - Roraima (Ariquemes, Maracá, Igarapé Macapiau); - Rondônia (Gidanana, Ouro Preto d'Oeste, Pimenta Bueno); - Maranhão (Rosário, Imperatriz); - Piauí (Teresina); - Ceará (Ubajara); - Pernambuco (Recife, Jaboatão, São Lourenço da Mata, Ipojuca, Igarapé, Caruaru); - Alagoas (Maceió); - Bahia (Jeriperi, Jaguariju, Salvador, Valença); - Goiás (Emas, Brasília, Jataí); - Mato Grosso (São Félix do Araguaia, Diamantina, Utiariti, Chapada dos Guimarães, Barra dos Bugres); - Paraná (Curitiba); - COLOMBIA, Rio Negro. - *U. infumata*: BRAZIL, Amazonas (Manaus, São Paulo Olivença, Janereté, Eirunepé); - Pará (Conceição do Araguaia); - Rondônia (Porto Velho, Vilhena); - Mato Grosso (Diamantina, Sinop); - PERU, Lima. - *U. oviposatrix*: BRAZIL, Amazonas (Marmelos, Manaus, São Paulo Olivença, Taracá, Manicoré, Aldeia Kasawá); - Pará (Serra da Macacheira, Fordlândia, Belterra, Carajás, Itaituba, Santarém); - Roraima (Caracaraf); - Rondônia (Ouro Preto d'Oeste); - Amapá (Serra do Navio, Médio Amapari); - Acre (Cruzeiro do Sul); - Mato Grosso (São Félix, Barra dos Bugres); - São Paulo (Penápolis); - Santa Catarina (Rio das Antas); - PERU, Rio Jucuri. - *U. siemensii*: BRAZIL, Amazonas (Manaus, Posto Xingu, Parintins, Aldeia Kasawá, Manicoré, Eirunepé, São Paulo Olivença); - Pará (Belém, Cachimbo, Carajás, Óbidos, Porteira, Belterra, Fordlândia, Conceição do Araguaia, Marmelos, Tiriós, Arapium, Aldeia Mapuera); - Rondônia (Vilhena); - Maranhão (Santa Luzia); - Mato Grosso (Utiariti, Sinop, Diamantina, Araguantins, São Félix); - Minas Gerais (Riacho Fundo); - Goiás (Emas); - São Paulo (Penápolis).

The numbers and the general provenience of the specimens studied are given in Table I.

Table I
Number of *Uracis* specimens examined

Species	Brazil					Other countries	Total
	North	Northeast	Center-West	Southeast	South		
<i>fastigiata</i>	95	3	8	-	-	4	110
<i>imbuta</i>	626	166	39	-	1	1	833
<i>infumata</i>	36	-	4	-	-	2	42
<i>oviposatrix</i>	66	-	5	1	2	1	75
<i>siemensii</i> ♂	62	1	10	1	-	-	74
<i>siemensii</i> ♀	54	-	11	1	-	-	66
Total	939	170	77	3	3	8	1.200

SPECIES DESCRIPTIONS

URACIS FASTIGIATA (BURMEISTER, 1839)

Figures 1, 2a

In wing coloration, three types could be discerned, viz. (1) apical spot surpassing the proximal side of pterostigma, – (2) not surpassing, and – (3) wings hyaline.

While in specimens from NE Brazil and Peru the apical spot does not surpass the proximal side of pterostigma, in the Center-West region of Brazil this condition was found in 87% of specimens (in 13% it does surpass), and in northern Brazil the three types were represented in resp. 15, 80 and 5% of the examined specimens.

There are 5-7 cubital cross-veins in the fore wing, while 5-6 of these were counted by CALVERT (1902), who called them the “submedian” cross-veins.

U. IMBUTA
(BURMEISTER, 1839)

Figures 1, 2b

The two types discerned in wing coloration are: (1) apical spot not surpassing the proximal side of pterostigma, and – (2) wings hyaline.

The first condition occurred in all specimens from NE Brazil, in 96.5% from northern Brazil, in 95% of those from the Brazilian Center-West Region, as well as in the 2 specimens examined from southern Brazil and from Colombia. In all others the wings were hyaline.

The number of cubital cross-veins in the fore wing varied between 1 and 3.

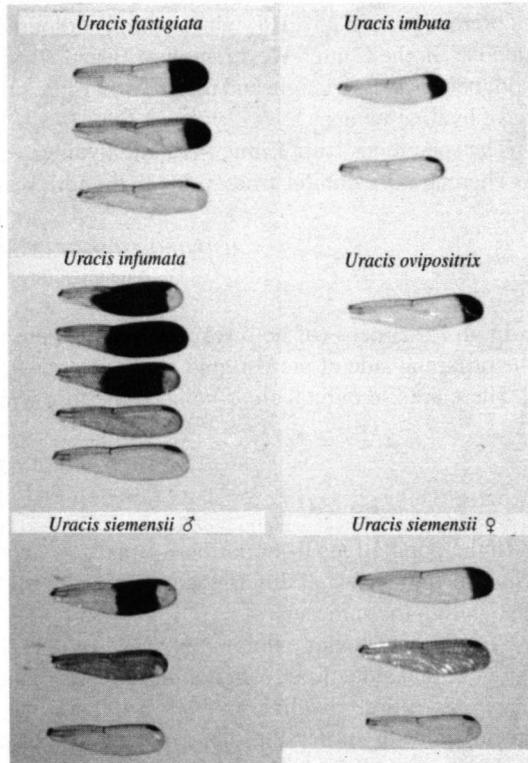


Fig. 1. Variation of wing coloration in five *Uracis* species

U. INFUMATA (RAMBUR, 1842)

Figures 1, 2c

The wings are either hyaline or spotted, and there is a variation in the size of the spot.

In northern Brazil the variation is as follows: (1) a spot occurs between triangle and the proximal side of pterostigma in 5.5% of individuals, (2) apical spot reaching the subnodus, in 5.5%, (3) a spot between the subnodus and the proximal side of pterostigma, in 25%, (4) wings entirely coloured, in 11%, and (5) wings hyaline, in 53%. In the Center-West region of Brazil, 75% of examined individuals have a spot between the triangle and the proximal side of pterostigma, the remaining 25% have hyaline wings.

The specimens from Lima, Peru, are hyaline.

There are 5-7 cubital cross-veins in the fore wings.

U. OVIPOSITRIX CALVERT, 1909

Figures 1, 2d

In all specimens (of both sexes) studied, there is an apical spot, not surpassing the proximal side of pterostigma.

There are 2-4 cubital cross-veins in the fore wing.

U. SIEMENSII KIRBY, 1897

Figures 1, 2e-f

In the populations from northern Brazil and from the Brazilian Center-West region, there is a sexual dimorphism, coupled with the variation in wing coloration also within the same sex.

The northern males exhibit 3 patterns, viz. (1) a spot between the subnodus and the proximal side of pterostigma, in 55%, (2) wings entirely coloured, in 5%, and (3) wings entirely hyaline, in 40%. Similar is the situation in the females: (1) an apical spot not surpassing the proximal side of pterostigma, in 20%, (2) wings entirely coloured, in 5%, and (3) wings entirely hyaline, in 75%.

In males from the Center-West region, there is either a spot between subnodus and the proximal side of pterostigma (50%), or the wings are hyaline (50%). All females from this region have hyaline wings.

In southeastern Brazil, there is no variation: the wings are hyaline in both sexes.

It should be noted that in all individuals as described above under (1), there is a light spot near the wing base, alternating from white to brownish, depending on the angle of observation.

There are 2-4 cubital cross-veins.

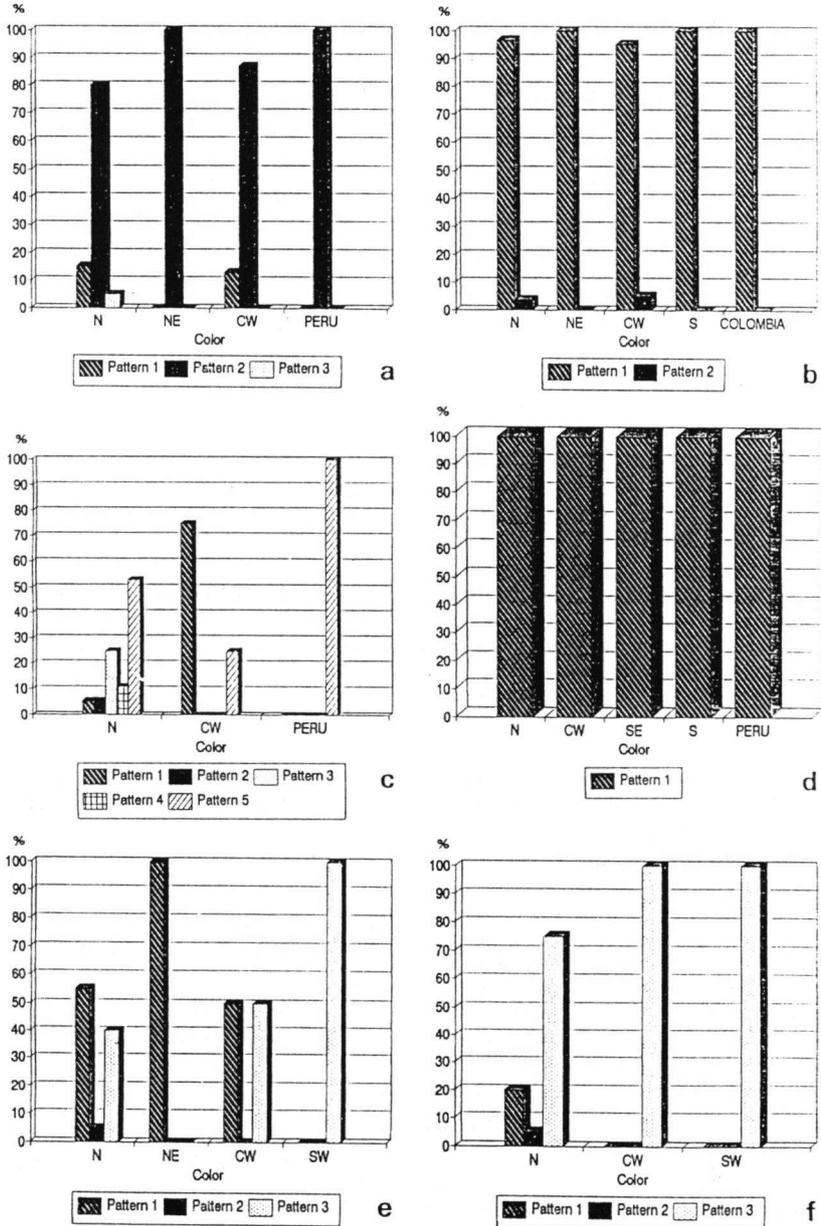


Fig. 2. Geographic variation of wing coloration in five *Urucis* species (for pattern descriptions see text): (a) *U. fastigiata*; – (b) *U. imbuta*; – (c) *U. infumata*; – (d) *U. ovipositorix*; – (e-f) *U. siemensii*, (e): ♂, – (f): ♀. – [Regions of Brazil: N = North; – NE = Northeast; – CW = Center-West; – SE = Southeast; – S = South; – SW = Southwest]

CONCLUSION

Due to the considerable geographic variation, in *Uracis* the color of the wings does not allow a precise species identification, the sympatric species may present the same wing color patterns.

On the other hand, the intraspecific variation in the number of the cubital cross-veins is small, therefore this is considered a relatively reliable feature in discrimination between the species.

KEY TO THE SPECIES

- 1 Triangle of hind wing crossed; subtriangle of fore wing with 3-5 cells 2
- 1' Triangle of hind wing free; subtriangle of fore wing with 3-4 cells 5
- 2 Supratrangles of fore wings free; fore wing with 1-3 cubital cross-veins *imbuta*
- 2' Supratrangles of fore and hind wings crossed; fore wing with 3-7 cubital cross-veins 3
- 3 Discoidal field of hind wing with 2 rows of cells, reaching or surpassing the level of bifurcation of M1+2 *fastigiata*
- 3' Discoidal field of hind wing with 1 row of cells reaching or surpassing the level of bifurcation of M1+2 4
- 4 Discoidal field in fore wing with 2-3 cells, followed of 2 rows of cells, reaching or surpassing the level of subnodus; 1 row of cells in anal field *infumata*
- 4' Discoidal field in fore wing with 3 cells, followed of 2 rows of cells, reaching the level of subnodus; 2 rows of cells in anal field *turrialba*
- 5 One cubital cross-vein in fore and hind wing; supratriangle in fore wing crossed; discoidal field in fore wing with 2 rows of cells, surpassing the subnodus *reducta*
- 5' Two to four cubital cross-veins in fore wing; supratriangle in fore and hind wings free; discoidal field in fore wing with 3 cells, followed by 2 rows of cells, until the subnodus 6
- 6 Anal field with 3 rows of cells; discoidal field in hind wing with one row of cells, not reaching the level of bifurcation of M1+2 *ovipositrrix*
- 6' Anal field with 2 rows of cells; discoidal field in hind wing with one row of cells reaching or surpassing the level of bifurcation of M1+2 *siemensii*

ACKNOWLEDGEMENTS

We are grateful for the loan of specimens to Dr ANGELO B.M. MACHADO and for the fellowship from the (Brazilian) Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq).

REFERENCES

- BURMEISTER, H., 1839. *Handbuch der Entomologie*, Vol. 2, Pt 2(2): *Neuroptera*. Enslin, Berlin.
- CALVERT, P.P., 1902-1908. Neuroptera (Odonata). *Biologia cent.-am.* 50: 17-420, pls 2-10 excl. – [*Uracis*: Apr. 1906, pp. 217-219].
- CALVERT, P.P., 1909. Contributions to a knowledge of the Odonata of the neotropical region, exclusive of Mexico and Central America. *Ann. Carneg. Mus.* 6(1): 73-280, pls 1-9 excl.
- CALVERT, P.P., 1948. Odonata (dragonflies) of Kartabo, Bartica district, British Guiana. *Zoologica* 33(2): 47-87, pls 1-2 excl.

- ERICHSON, W.F., 1848. Die Insecten. *Schomburgks Reise in Guiana* 3: 583-586.
- FRASER, F.C., 1946. Notes on Amazonian Odonata in the Leeds Museum. *Trans. R. ent. Soc. Lond.* 97: 443-472.
- HAGEN, H.A., 1861. *Synopsis of the Neuroptera of North America, with a list of South American species*. Smithson. misc. Collns, Washington.
- KIRBY, W.F., 1897. List of the Neuroptera collected by Mr E.E. Auston on the Amazonas &c. during the recent Expedition of Messrs Siemens Bros. Cable S.S. "Faraday", with descriptions of several new species of Odonata (dragonflies). *Ann. Mag. nat. Hist.* (VI) 19: 598-617, pls 12-13 excl.
- RAMBUR, P., 1842. *Histoire naturelle des insectes névroptères*. Roret, Paris.
- RIS, F., 1813-1816. Libellulinen monographisch bearbeitet. *Collns zool. Edm. de Selys Longchamps* 15/16: 837-1278.