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# Geographic distribution of the genus *Orius* Wolff (Heteroptera: Anthocoridae)

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**Abstract:** Geographic distribution of 70 species of *Orius* in the world is studied. All species are arranged in 14 zoogeographic categories: Afrotropical endemic, Australian endemic, Holarctic endemic, Nearctic endemic, Neotropical endemic, Oriental endemic, Palaearctic endemic, Afrotropical palaearctic, Australia Oriental, Holarctic Oriental, Nearctic Neotropical, Nearctic Oriental, Nearctic Palaearctic Oriental Palaearctic, and so on. The result suggests the Oriental region is the origin center of *Orius*. [En, 2 fig. 1 tab. 27 ref.]

**Key words:** entomology; *Orius*; zoogeography; fauna

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The *Orius* Wolff is the largest genus belonging to family Anthocoridae<sup>[1]</sup>. Many papers have been involved in the classification of this family, which have added our knowledge on the diversity and distribution<sup>[2~19]</sup>. The genus *Orius* are small predaceous insect that occur in a variety of habitats where they feed on different arthropods including thrips, scales, aphids and mites. A few species have been introduced deliberately as biological control agent, such as the species: *O. insidiosus*, *O. tristicolor* and *O. sauteri*. Integrated pest management programs often include these predators, which has given us greater knowledge about these species than those found in natural ecosystems<sup>[20~25]</sup>. However the zoogeographic distribution on the *Orius* is very poor at present, thus, more zoogeographic information to be known is of significance for the genus.

## 1 Materials and methods

According to zoological recorder and recent data both home and abroad<sup>[1~19]</sup>, they have been updated by including all the species and most of described species published up to 2002 inclusive. The borders of the various zoogeographic regions are as specified in the relevant catalogues and largely corresponds to the classic definition of insect biogeographic regions by Chen Xue-xin<sup>[26]</sup>. Moreover, the southern border of the Palaearctic in China is situated Huanghe (Yellow) River at 35°N based on Hoffmann<sup>[27]</sup>.

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In order to analyse the representation of geographic distribution of all the regions species to *Orius* in the fauna of the world (Table 1), the all of species occurring in the all region of world can be arranged in 14 zoogeographic categories. Afrotropical endemic, Australian endemic, Holarctic endemic, Nearctic endemic, Neotropical endemic, Oriental endemic, Palearctic endemic, Afrotropical-Palearctic, Australia-Oriental, Holarctic-Oriental, Nearctic-Neotropical, Nearctic-Oriental, Nearctic-Palearctic Oriental-Palearctic, and so on.

Table 1 Distribution on all species of the *Orius* Wolff

Species	Geography distribution	Fauna							Fauna category	Data sources
		Afr	Aus	Hol	Nea	Neo	Ori	Pal		
1. * <i>Orius agilis</i> (Flor)	China(Nei Monggol, Gansu, Hebei), Northern Palearctic	-	-	-	-	-	-	+	Pal	Ghauni, 1972
2. <i>O. albidipenni</i> (Reuter)	Middle East	-	-	-	-	-	-	+	Pal	Yasunaga, 1997c
3. <i>O. armatus</i> Gross	Australia	-	+	-	-	-	-	-	Aus	Gross, 1954
4. * <i>O. atratus</i> Yasunaga	China (Taiwan), Japan	-	-	-	-	-	+	-	Ori	Yasunaga, 1997a
5. * <i>O. bifilaris</i> Ghauni	China (Yunnan, Sichuan), Pakistan, India	-	-	-	-	-	+	-	Ori	Ghauni, 1972
6. <i>O. bunnescena</i> (Poppus)	South Africa	+	-	-	-	-	-	-	Afr	Carayon, 1961
7. <i>O. bulgaconus</i> Ghauni	Pakistan	-	-	-	-	-	+	-	Ori	Ghauni, 1972
8. <i>O. camerunensis</i> Poppus	Cameroon	+	-	-	-	-	-	-	Afr	Poppus, 1909
9. <i>O. canariensis</i> Wagner	NW Africa, Canary Island, Israel	-	-	-	-	-	-	+	Afr-Pal	Wagner, 1952
10. <i>O. candioper</i> Herring	America	-	+	-	-	-	-	-	Nea	Yasunaga, 1997c
11. <i>O. chadwicki</i> Woodward	Australia	-	+	-	-	-	-	-	Aus	Gross, 1954
12. <i>O. championi</i> Herring	Colombia	-	-	-	-	+	-	-	Neo	Herring, 1966
13. * <i>O. chinensis</i> Bu	China (Yunnan, Shaanxi, Sichuan)	-	-	-	-	-	+	+	Pal-Ori	Bu et al, 2001
14. <i>O. cocciphagus</i> (Hesse)	Southern Africa	+	-	-	-	-	-	-	Afr	Carayon, 1961
15. <i>O. conchaconus</i> Ghauni	Pakistan	-	-	-	-	-	+	-	Ori	Ghauni, 1972
16. <i>O. diespter</i> Herring	Canada	-	-	-	+	-	-	-	Nea	Kelton, 1978
17. <i>O. euryale</i> Herring	Mexico	-	-	-	+	-	-	-	Nea	Herring, 1966
18. <i>O. flagellum</i> Innavuori	Arabian Peninsula, Yemen	-	-	-	-	-	+	-	Ori	Yasunaga, 1997c
19. <i>O. flaviceps</i> (Poppus)	Western India	-	-	-	-	-	+	-	Ori	Muraleed, 1972
20. <i>O. florentiae</i> Herring	Bolivia, Colombia, Argentina	-	-	-	-	+	-	-	Neo	Herring, 1966
21. <i>O. fuscus</i> (Reuter)	Colombia, Venezuela	-	-	-	-	+	-	-	Neo	Yasunaga, 1997c
22. * <i>O. gladius</i> Zheng	China (Sichuan, Zhejiang), Nepal	-	-	-	-	-	+	+	Pal-Ori	Zheng, 1982
23. <i>O. harpocrates</i> Herring	America	-	-	-	+	-	-	-	Nea	Herring, 1966
24. <i>O. heteronide</i> Woodward	Australia	-	+	-	-	-	-	-	Aus	Gross, 1954
25. * <i>O. horvathi</i> (Reuter)	China (Sichuan, Shaanxi, Hebei), Palearctic	-	-	-	-	-	+	+	Pal-Ori	Bu et al, 2001
26. <i>O. ianthe</i> (Distant)	India	-	-	-	-	-	+	-	Ori	Muraleed, 1972
27. <i>O. indicus</i> (Reuter)	India	-	-	-	-	-	+	-	Ori	Muraleed, 1972
28. <i>O. insidiosus</i> (Say)	USA (Hawaii) West-India Island, North America	-	-	-	+	+	-	-	Nea-Neo	Kelton, 1978
29. <i>O. ixionides</i> Herring	Honduras	-	-	-	-	+	-	-	Nea	Herring, 1966
30. <i>O. jasionis</i> Herring	Honduras	-	-	-	-	+	-	-	Nea	Herring, 1966
31. <i>O. lacides</i> Herring	America, Panama, Argentina	-	-	-	+	+	-	-	Nea-Neo	Herring, 1966
32. <i>O. laevigatus</i> (Fieber)	Europe, Northern Africa	-	-	-	-	-	-	+	Pal	Yasunaga, 1997c
33. <i>O. lanatus</i> Carayon	Southern Africa	+	-	-	-	-	-	-	Afr	Carayon, 1961
34. <i>O. latibasis</i> Ghauni	India	-	-	-	-	-	+	-	Ori	Ghauni, 1972
35. <i>O. laticollis</i> (Reuter)	Western Palearctic	-	-	-	-	-	-	+	Pal	Yasunaga, 1997c
36. <i>O. lesliae</i> Herring	America, Panama, Argentina	-	-	-	+	+	-	-	Nea-Neo	Herring, 1966
37. <i>O. limbatus</i> Wagner	Canary Island	-	-	-	-	-	-	+	Pal	Wagner, 1952
38. <i>O. linebergi</i> Wagner	Southern Europe, Canary Island, Northern Africa	-	-	-	-	-	-	+	Pal	Wagner, 1952
39. <i>O. luridoides</i> Ghauni	Pakistan	-	-	-	-	-	+	-	Ori	Ghauni, 1972
40. <i>O. madeirensis</i> (Reuter)	Madeira Island	-	-	-	-	-	+	-	Ori	Yasunaga, 1997c
41. <i>O. majusculus</i> (Reuter)	Europe, Russia	-	-	-	-	-	-	+	Pal	Yasunaga, 1997c
42. <i>O. minutus</i> (L.)	China(North), Holarctic Region, Northern Africa, Thailand	-	-	+	+	-	-	+	Hol-Ori	Yasunaga, 1993
43. <i>O. maxidentex</i> Ghauni	Pakistan, India	-	-	-	-	-	+	-	Ori	Ghauni, 1992
44. <i>O. miyamotoi</i> Yasunaga	Japan	-	-	-	-	-	+	-	Ori	Yasunaga, 1997c
45. * <i>O. nagaii</i> Yasunaga	China (Anhui, Hebei, Shandong), Japan, Korea, Russia	-	-	-	-	-	+	+	Pal-Ori	Yasunaga, 1993

table 1 continued

Species	Geography distribution	Fauna						Fauna category	Data sources		
		Afr	Aus	Hol	Nea	Neo	Ori			Pal	
46. * <i>O. neimengguansis</i> Bu	China (Nei Monggol)	-	-	-	-	-	-	+	Pal	Bu <i>et al.</i> 2001	
47. <i>O. niger</i> (Wolff)	China (Yunnan, Xinjiang), Palaearctic, India	-	-	-	-	-	-	+	+	Pal-Ori	Bu <i>et al.</i> 2001
48. <i>O. pallidicornis</i> Reuter	Mediterranean Sea	-	-	-	-	-	-	+	Pal	Reuter, 1884	
49. <i>O. pallidus</i> (Poppius)	Argentina, Brazil	-	-	-	-	+	-	-	Neo	Yasunaga, 1997c	
50. <i>O. peke</i> Herring	Colombia	-	-	-	-	+	-	-	Neo	Herring, 1966	
51. <i>O. perpunctatus</i> Reuter	Mexico, Guatemala, Brazil	-	-	-	+	+	-	-	Nea-Neo	Reuter, 1884	
52. <i>O. persequens</i> White	USA (Hawaii)	-	-	-	+	-	-	-	Nea	White, 1879	
53. <i>O. piceicollis</i> Lindberg	Canary Island, North Africa	-	-	-	-	-	-	+	Pal	Yasunaga, 1997c	
54. <i>O. pluto</i> (Distant)	India	-	-	-	-	-	-	+	-	Ori	Muraleed, 1972
55. <i>O. pumilio</i> (Champion)	America, Mexico, Western India Island	-	-	-	+	-	+	-	Nea-Ori	Yasunaga, 1997c	
56. <i>O. puncticollis</i> Poppius	Srilanka	-	-	-	-	-	-	+	-	Ori	Poppius, 1909
57. <i>O. ratanae</i> Nnovalhier	Canary Island	-	-	-	-	-	-	+	Pal	Yasunaga, 1997c	
58. <i>O. reesi</i> (White)	Chile, Argentina	-	-	-	-	+	-	-	Neo	White, 1879	
59. * <i>O. sauteri</i> (Poppius)	China (Sichuan, Hubei, Gansu, Shanxi East-north), Japan, Korea, Russian far East	-	-	-	-	-	-	+	+	Pal-Ori	Yasunaga, 1993
60. <i>O. shyamavarna</i> Muraleed	India	-	-	-	-	-	-	+	-	Ori	Muraleed, 1972
61. <i>O. sibiricus</i> Wagner	West and North Palaearctic	-	-	-	-	-	-	-	+	Pal	Wagner, 1952
62. <i>O. strigicollis</i> Poppius	China (Hubei, Fujian, Taiwan), Japan	-	-	-	-	-	-	+	+	Pal-Ori	Poppius, 1909
63. <i>O. sublaevis</i> (Poppius)	China (Taiwan), India, Indonesia	-	+	-	-	-	-	+	-	Aus-Ori	Yasunaga, 1997a
64. <i>O. takaii</i> Yasunaga	Japan	-	-	-	-	-	-	+	-	Ori	Yasunaga, 2000
65. * <i>O. tantillus</i> Motschulsky	China (Guangdong), Australian, Oriental	-	+	-	-	-	-	+	-	Aus-Ori	Chauri, 1972
66. <i>O. thripobrus</i> (Hesse)	South Africa	+	-	-	-	-	-	-	-	Afr	Carayon, 1972
67. <i>O. thyestes</i> Herring	Colombia	-	-	-	-	+	-	-	Neo	Herring, 1966	
68. <i>O. tristicolor</i> (White) *	North America, West India Island	-	-	-	+	-	+	-	Nea-Ori	White, 1879	
69. <i>O. trivandrensis</i> Muraleed	India	-	-	-	-	-	-	+	-	Ori	Muraleed, 1972
70. <i>O. vicinus</i> (Ribaut)	China (Xinjiang, Nei Monggol, Yunnan), Europe, Middle Asia, Russia	-	-	-	-	-	-	+	+	Pal-Ori	Bu <i>et al.</i> 2001

Abbreviations: Pal=Palaearctic, Nea=Nearctic, Ori=Oriental, Afr=Afrotropical, Neo=Neotropical, Aus=Australian, Hol=Holarctic; “+” = distributing the region, “-” = not distributing the region; marked “\*” distributed on China

## 2 Results and discussion

The result indicates that there are 18 species distributing in the Oriental, 13 species in the Palaearctic, 8 species in the Neotropical, 7 species in the Nearctic, 5 species in the Afrotropical, 3 species in the Australia, 1 species in the Holarctic, respectively, 9 species distributing in the vicinity area Ori-Pal, 4 species in the Nea-Neo, 2 species in the Aus-Ori, 2 species in the Nea-Ori, 1 species in the Hol-Ori, 1 species in the Nea-Pal and 1 species in the Afr-Pal (Figure 1), and accounting for 25.7%, 18.5%, 11.4%, 10.0%, 7.1%, 4.2%, 1.4%, 12.8%, 5.7%, 2.8%, 2.8%, 1.4%, 1.4% and 1.4% of the total species of the *Orius* Wolff accordingly.

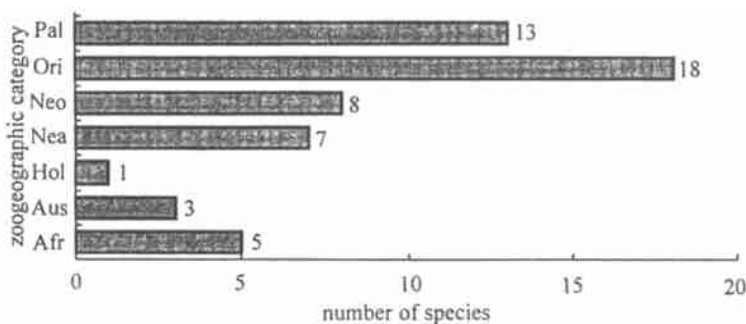


Figure 1 The single faunal composition on all of the species

Based on these results and information, it is suggested that the genus *Orius* is rich in both Oriental and Palaearctic. The species *O. minutus* L. distributes all of area except Australian and Neotropical. Moreover, The Oriental is a composite area, containing both the Nearctic-related and the Palaearctic-related species. The geographic distribution of the genus *Orius* indicates that the greater part of them are of boreal (Oriental) origin, and the center of origin of this genus is situated between Oriental and Palaearctic according to definition of faunal distribution. (Figure 2) The most of species of *Orius* distribute in provinces Sichuan and Yunnan of China, and this study also suggests that southwestern China should be treated as a key area for biodiversity conservation.

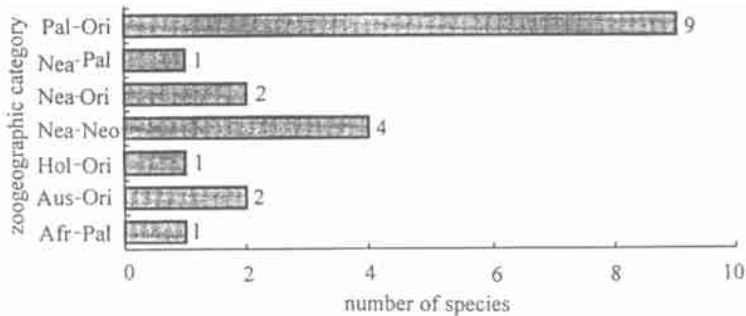


Figure 2 The vicarious faunal composition on all of the species

To further determine the origin of many species, more faunistic and phylogenetic data is needed. The result presented here would be a basic form for such works in the future.

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## 小花蝽属地理分布的研究 (半翅目: 花蝽科)

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**摘要:** 对世界分布的小花蝽属 70 种昆虫的地理分布进行了研究。将所有种按照 14 个地理分布类型进行了整理, 它们分别是古北区特有种 13 种, 东洋区特有种 18 种, 新北区特有种 7 种, 新热带区特有种 8 种, 全北区 1 种, 非洲区特有种 5 种, 澳大利亚区特有种 3 种, 澳大利亚区-东洋区 2 种, 古北-东洋区 9 种, 新北-新热带区 4 种, 新北-东洋区 2 种, 新北-古北区 1 种, 全北-东洋区 1 种, 非洲-古北区 1 种。结果表明东洋区可能为小花蝽属的起源中心。图 2 表 1 参 27

**关键词:** 昆虫学; 名录; 小花蝽属; 动物地理; 区系