JULY 1995

SPHECOS 29

A FORUM FOR ACULEATE WASP RESEARCHERS

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This issue of **Sphecos** has depleted our reproduction fund. It is now zero. Thus more donations will be needed to keep this newsletter going. Your past support has been wonderful and very gratifying, and I hope that some of you will be able to help out again so that we can continue. Duplication costs for a normal size issue are roughly $650 (700 copies).

The meetings of the International Society of Hymenopterists will be in Davis, California this summer (Aug. 12-17). Nancy and I hope to see many of you there. It should be a great meeting. Lynn Kimsey and her gang are going all out to make this meeting a success.

My retirement plans were announced in **Sphecos** 28. I am searching for a replacement editor so that the newsletter does not die. I will bring this up at the meetings in Davis. It is imperative that someone come forward to take over.

I now have my own e-mail address: mnhen023@sivm.si.edu. You can reach me here for regular correspondence and change of address notices. Submissions to **Sphecos** should still be sent to Terry.

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RESEARCH NEWS

Dick Bohart (Dept. of Entomology, Univ. California, Davis, CA 95616-8584) reports, "I am working on *Bembecinus* again. The two papers underway: *Entomognathus* and *Bicyrtes* are essentially done."

Walter Borsato (Museo Civico di Storia Naturale (Sez. di Zoologia), Lung. Porta Vittoria, 9, 37129 Verona, Italy) writes: "At the present I am preparing a revision of some australian Eumenidae of the genera *Ischnoceolia* Perkins (Eumenidae Discoeliinae), *Australodynerus* G. Soika and *Sterndyneriellus* G. Soika."

Bolívar Garcete Barrett (Sección Invertebrados, Mus. Nac. Hist. Nat. Paraguay, Sucursal 19 Campus, Ciudad Univ., Central XI, San Lorenzo, Paraguay.) writes, "I am presently working on systematics, biogeography and biology of polistine wasps in Paraguay. In addition, with Massimo Olmi, I'm preparing a list of Dryinidae of Paraguay, and with the help of Jim Carpenter I'm planning to study the long-overlooked collection of A.W. Bertoni. I am also the curator of Hymenoptera at this museum."

Arkady Lelej (Inst. Biology and Pedology, Vladivostok-22, 690022, Russia) "I am now finishing the third paper in the series on Smicromyrmini with a review of six genera (four of them new). I plan to continue my work and study of another difficult group – Oriental Trogaspidiini – and prepare a key to the genera of this tribe. It will take at least one year or more and I'll try to receive a grant (you know about the serious problems in Russia and my salary – less than US$ 100 per month, not even enough for food).

Peter van Ooijan (Prof v. Bemmelenlaan 61, 3571 El Utrecht, Holland) says, "Not much research news, my Pompilid collection has gone to the ITZ Amsterdam, and after reorganising their Dutch collection and halfway reorganising the Palearctic collection I quit pompilids. My Sphecid collection, including the type specimen of *Tachysphex picnic*, has joined the collection of the RMNH at Leiden.

"As for myself I am working on software, rearing tropical fish, trying to rear aculeates in my garden and wondering

OBITUARY

George R. Ferguson
(January 8, 1915- June 24, 1994)

George Ferguson passed away last year at the age of 79. The following account of his life is taken largely from an article that appeared in the September 1986 issue of the college newsletter, *The Oregon Stater*, but we have also had access to his obituary published in the June 26, 1994 issue of the newspaper *Corvallis Gazetter-Times*. – editor.

George was born in Bolivar, Louisiana, the son of Lloyd and Ethel Collins Ferguson, but he grew up in southern California. He attended the University of California, Berkeley but received his bachelor's and master's degrees from Oregon State University. Ferguson left OSU to continue his studies at Ohio State University, where he earned a doctoral degree in entomology in 1941.

"I decided to specialize in the chemical control of insects," he notes, "because that's where the jobs were." Although he returned to the Oregon State U. Agricultural Experiment Station as assistant entomologist in 1941, he was to leave again in 1943. His major professor had recommended him for a research position on a special project at the University of New Hampshire that was financed by Swiss-owned Geigy Corporation. "Being young and adventurous," says Ferguson, "I accepted the offer at the University of New Hampshire – a one year postdoctoral appointment – because it involved a 'secret' compound and promised to be a challenging project."

The secret compound, which had been smuggled out of Switzerland by Geigy Corporation during World War II, turned out to be DDT. That substance would have enormous impact toward the end of the war, when it was still strictly controlled by the military, and after the war, when it was finally released for general use. During the war, DDT was used successfully for lice control to eliminate typhus epidemics in Southern Europe and to control mosquitoes and malaria in the South Pacific. After the war, it proved of great benefit in agriculture.

Ferguson's career and success from the time he moved to the University of New Hampshire were inextricably tied to the development, testing, and production of DDT. He was soon asked to look at the possible uses of DDT in agriculture, and he carried out laboratory and field tests using some of the techniques that he had developed for his doctoral research. At the end of World War II, when many chemical firms went into the production of DDT, Ferguson recommended to Geigy Corporation that it should set up its own laboratory to develop DDT and other products. He then became chief entomologist and technical director of the Agricultural Chemicals Division, Geigy Chemical Corporation, a position he held until 1953. At that time he was asked to regroup that division, and he became president. "It was my job to lead the company out of the red by developing new products," says Ferguson. "We opened two additional large plants – in Alabama and Louisiana – and produced other chemicals. I had the satisfaction of turning a business around and seeing the company grow from five to 150 million dollars a year."

Ferguson became executive vice-president of Geigy in 1969 and vice-president of CIBA-Geigy in 1970 following the merger of the two firms. He retired from the corporation in 1972.

After retiring from his productive career in the corporate world, George moved back to Corvallis, Oregon in 1973 from Scarsdale, New York, so that he could resume the systematic study of wasps at his old alma mater. He was given a courtesy appointment in the Department of Entomology at Oregon State University where he assisted graduate students. George dedicated his time to studying wasps, and organizing and classifying a portion of the large insect collection at OSU. He donated his substantial worldwide collection of wasps (more than 80,000 specimens) to OSU.

George first became interested in bees and wasps in the thirties when he took a course on beekeeping at Oregon State University from entomology professor Herman Scullen. While his professional career was in the field of insect control, his keen curiosity about wasps became a life-long avocation that took up most of his spare time. In retirement George pursued studies of sphecid wasps in the genera *Cerceris*, *Eucerceris* and *Philanthus*, possibly influenced by his early contact with Herman Scullen, who worked on these wasps for many years. Apparently George hoped to publish revisions of these genera, and although his knowledge of them was vast, the revisions unfortunately never saw the light of day. However, between 1981 and 1984 he published nine papers on these genera in which he described new species, keyed species of certain species groups, clarified the status of many names, established lectotypes, etc.

Ferguson's Wasp papers

1976. The distribution and origins of northwest sphecid wasps. Bull. Oregon Ent. Soc. (61):492.

1981. Synonymy and distribution records in the genus *Eucerceris* (Hymenoptera: Philanthidae). J. NY Ent. Soc. 89:172-183.

1982. Descriptions, synonymy and sex associations in the genus *Eucerceris* (Hymenoptera: Philanthidae). J. NY Ent. Soc. 90:147-160.

1983a. Two new species in the genus *Philanthus* and a key to the *politus* group (Hymenoptera: Philanthidae). Pan-Pac. Ent. 59:55-63.

1983b. The types of cercerine wasps described by Nathan Banks (Hymenoptera: Philanthidae). J. NY Ent. Soc. 91:223-234.

1983c. Descriptions of two previously misidentified species of North American *Cerceris* and related synonymy (Hymenoptera: Philanthidae). J. NY Ent. Soc. 91:235-241.

1984a. (with Colin Vardy). *Vespa serripes* F., a junior synonym of *Cerceris arenaria* (L.) (Hym., Philanthidae). Ent. Monthly Mag. 120:55-57.

1984b. Revision of the *Philanthus zebratus* group (Hymenoptera: Philanthidae). J. NY Ent. Soc. 91:289-303.

1984c. The types of some American *Cerceris* with lectotype designations (Hymenoptera: Philanthidae). J. NY Ent. Soc. 91:431-441.

1984d. An annotated synonymic list of North American and Caribbean wasps of the genus *Cerceris* (Hymenoptera: Philanthidae). J. NY Ent. Soc. 91: 466-502.

lific writer on insect natural history in his native language. He published a series of volumes, 1943-1983, that he called his own "souvenirs entomologiques". He translated the titles as *Memoranda of a naturalist* and *Fifty years observing insect life*. The series consisted of vignettes of behavior of a variety of insects but concentrated on solitary wasps and bees. More than half of the 150 titles were never published in entomological journals.

He loved children, and published several books just for them. At the elementary level he designed a kindergarten book on *Polistes* in 1971, entitled *Ashinagabachi* (long-legged wasps); the text and illustrations were by H. Kubota and N. Tomioka respectively. In 1974 he published a book for older children, *Lives of wasps and bees*, with photographs by H. Oda. This book was awarded the prestigious Mainichi Publications Culture Award for 1974 from the Mainichi Newspapers.

In 1982 he published an elegant book, *Japanese Wasp and Bee Life Illustrated Phylogenetically*. The text is by Iwata, and the 84 color plates of numerous, excellent photographs of adults and nests are by his co-authors, K. Kozima, M. Matsuura and K. Goukon. In my letter acknowledging receipt of this handsome book, I congratulated Kunio on the splendid contribution that would enable the layman to appreciate the beauty and complexity of the animals that we love so much. I commented on the quality of the photographs that were so sharp, with color so true, and with a wonderful depth of focus. Regrettably, the book is out of print; there are no plans to republish it.

I am grateful to Kazuko Iwata for furnishing the following biographical data for Kunio. He was born 25 May 1906 in Osaka. The family moved in 1910 to a residential suburb, Ikeda. His father died in 1917, leaving his widow to raise Kunio and five sisters in needy circumstances.

Iwata received his Master's degree from the Agricultural Department of Kyoto University in 1931, and remained for several years as an unpaid assistant in the laboratory. Between 1934 and 1941 he taught biology in several high schools. He submitted his D.Sc. thesis to Kyoto University before his departure to Hainan Island, China, and subsequently was awarded the degree. Kunio was a research member of Kihara Biological Institute, 1942 to 1946. He was repatriated after the war, but all of his data and records of those years were lost.

When Iwata returned to Japan he taught first at Kagawa Agricultural College, and then at Hyogo University of Agricultural. The latter institution later became the Agricultural Department of Kobe University. In 1961 he was in Thailand for five months searching for natural enemies of agricultural pests, a period during which he continued his behavioral studies of wasps and bees. Kunio retired from Kobe University in 1970 because of the age limit.

He married Kazuko Toshima in 1948. They had two sons, Kusuo (1949) and Makio (1953), and there are five grandchildren, a boy and four girls.

Kunio died 29 November 1994, and a memorial service was held on 10 December at Takigawa-Kinen Kaikan of Kobe University.

It seems appropriate to conclude these reminiscences with a copy of Iwata's personally drawn New Year's card for 1988 showing him in a characteristic pose with his family. He was a genial, modest man, a cherished friend, and a superb scientist.

Kunio Iwata
Kanatodai. 2-18-3
Kita. Kobe. JAPAN

species which, depending on their phylogenetic history, are members of different **taxa**. These taxa are **named**, e.g., *Sceliphron*, Sphecini and Prionychina. All together they form the actual **taxon** whose proper **name** is Sphecinae. In the traditional classification each named taxon like Sphecinae has been assigned a categorical rank to indicate its position in the categorical hierarchy. Thus, the term "subfamily" is a **category** designating the rank of the taxon with the proper name Sphecinae in the traditional classification.

As De Queiroz & Gauthier (1994: 27) have shown, "the current nomenclatural system is clearly non-evolutionary." The most accepted method that accomplishes this goal is provided by the theory of phylogenetic systematics sensu Hennig (I prefer to use the term 'phylogenetic systematics' rather than 'cladistics' to emphasize the methodological differences. For detailed explanations of the theoretical basis of phylogenetic systematics see e.g. Wiley 1981 and Ax 1987). Given that the central principle of phylogenetic systematics is the recognition and characterization of species and monophyletic taxa one may ask what role a system of biological nomenclature can play in this scientific process. As the existence and the recognizability of natural entities are independend of the way scientists name them, the naming of taxa has no influence on any scientific process that is part of a phylogenetic analysis. Only following the recognition and characterization of the natural entities one should ask which name is the best for each entity. As scientists need to communicate with each other it is necessary to give each of these entities a proper name. The function of a taxon name is to refer unambiguously to a certain taxon. The set of rules and principles that govern the selection and the use of taxon names to exclude or at least minimize ambiguity, that is synonymy and homonymy, is called a nomenclatural system.

In summary, species and monophyletic taxa can be and have to recognized in nature. Any relationships between the scientific process of analysing phylogenetic relationships and the naming of recognized taxa do not exist: the structure and the type of taxon names need not reflect any information about the taxa they name to gain unambiguity but are only a question of conventions.

Nevertheless, ever since Linné's nomenclatural system based on the assignment of the so-called Linnaean categories like "familia" and "ordo" started the development of the present rules of the ICZN any taxon name has to be connected to such a category to adhere to the rules. One can say that categories lead to a classification of given taxa, that is, taxa are ordered into subjective classes (Griffiths 1976). As has been shown above the assignement of a proper name to a certain taxon is principally sufficient to gain unambiguity in a nomenclatural system. What information content does the additional category express to justify its existence and that could not be expressed by the proper name itself? Is there any logical reason why named monophyletic taxa must be classified? The subjectivity of using categories is clearly seen in the often discussed problem concerning the "best" categorial rank to assign to the main bee subgroups. Some hymenopterists prefer to say "subfamily Colletinae", while nowadays the majority advocates to use a "higher" rank, that is "family Colletidae" (e.g. Michener 1986, Michener et al. 1994). Unfortunately, there is no logical and scientific reason for how one could come to prefer one possibility rather than the other. The same is true for the "Sphecidae". While the vast majority agrees with the use of subfamilies in Bohart & Menke (1976), Albert Finnamore (in: Goulet & Huber 1993) "elevates" the sphecid subfamilies to family level. Menke & Pulawski (1993) wonder about Finnamore's argument for doing so, that is to "... make the classification comparable to that widely accepted in the Apiformes" (Finnamore), is never reversed: "Why not make bees comparable to sphecids and recognize only Apidae" (Menke & Pulawski). Indeed, their question is justified but one cannot expect a satisfying answer to it (that is a scientific one). The conflict clearly shows the arbitrariness in assigning categories. The widely accepted usage of subfamilies in Bohart & Menke is simply a result of convention induced by the comprehensiveness of their monumental study. Nevertheless, as Finnamore's family category as well as Bohart & Menke's subfamily category lack any scientific foundation or even requirement, it is impossible to find any scientific reason to prefer one of them. (Nevertheless, one may ask if the names of the sphecid subgroups in the form **Larrinae** rather than **Larridae**, independent on whether they are traditionally ranked as a subfamily or a family, should be protected as well-established names in the -inae form used by Bohart & Menke to gain stability.) Anyway, the point is that the discussion about the "best" category does not lead to a better understanding of the groups studied. Furthermore, this discussion appears as if it deals with a scientific problem while it is just one of formalism.

It should be stressed that many more difficulties appear when one attempts to adapt the classification system of the Linnaean categories to a phylogenetic system. The encaptic hierarchy of sister groups with their identical rank leads to the demand for identical categories in a classification system. Due to the high number of sister groups the use of categories is very limited. For example, this is easily seen in Byron Alexander's (1992) comprehensive analysis of the subgroups within the Apoidea that are traditionally ranked as tribes. If we recognize, in accordance with common practice, the Apoidea as a superfamily and one of the most basic groups like Laphyragogini as a tribe, innumerable additional categories are necessary to classify each pair of sister groups between these categorial ranks. Farris (1976) has attempted to solve this problem proposing eight prefixes to increase the number of possible categories. Nevertheless, verbal constructions like "Gigapicotribe" even more show the subjectivity of assigning categories to taxa: Who would be able to decide between "Gigapicotribe" and "Megapicotribe" depending on what a scientist believes to be the best for his purpose?

This problem is closely related to the term "stability" with respect to nomenclature. Stability in the sense of the ICZN aims at the uniqueness and distinctness of the taxon name itself (in combination with the category assigned to this name). As this is correct, taxon names are able to change their meaning, that is a taxon name is related to slightly different taxa in different times, depending on the scientific progress. This situation leads to confusion and to the requirement to supplement old names with more information to specify what a certain scientist means. E.g. using the name Vespidae makes it necessary to specify if one refers to the monophylum including the Euparagiinae, Masarinae, Eumeni-

HYMENOPTERA DATABASE

I have created on the PC a program in DBase IV for listing the species of Hymenoptera. The program includes 13 groups of Hymenoptera (Table A) and it is possible to expand it. For each genus there are 4 database files (Table B): the first for species, the second for subspecies, the third for synonymies of species and the fourth for synonymies of subspecies. Every file is used for printouts and searches (Table C).

At present the number of species included in the program is:

Group	Species	Subspecies	Syn. spec.	Syn. subspe.
A	1067	94	1285	22
B	660	25	283	3
C	6342	75	2839	0
D	1687	36	563	3
E	1061	305	340	23
F	330	95	82	4
G	2245	559	1219	106
H	2630	663	1424	163
I	1440	268	891	115
L	3033	229	1551	51
M	3736	467	1141	89
N	2338	249	1271	88
O	6914	895	2932	180
Total	33483	3960	15821	847

Every species record is composed of:
- Name of the genus
- Valid name of the species
- Author
- Year of publication
- Name of nominate genus
- Corology
- Further notes.

Some of these fields may be lacking. The listed species are from all over the world but with a preference for the Holarctic Region. In the list there may be some mistakes; it is a basis for subsequent work.

If there are entomologists interested in having a copy of my program and database, they may send me a diskette

E L E N C O S P E C I E H Y M E N O P T E R A

SCELTA DEL TAXON DA ELABORARE

Symphyta		A – Tutte le famiglie
Apocrita	Terebrantia	B – Ichneumonoidea+Evanioidea
"	"	C – Chalcidoidea
"	"	D – Proctotrup.+Cynipoidea+Altre
"	Aculeata	E – Chrysidoidea
"	"	M – Scolioidea
"	"	F – Formicoidea
"	"	G – Vespoidea+Pompiloidea
"	"	O – Sphecoidea
"	"	H – Colletidae+Halictidae+Melittidae+Apidae
"	"	I – Andrenidae
"	"	N – Megachilidae
"	"	L – Anthophoridae

Scegli il taxon da elaborare (anche per terminare)

Table A

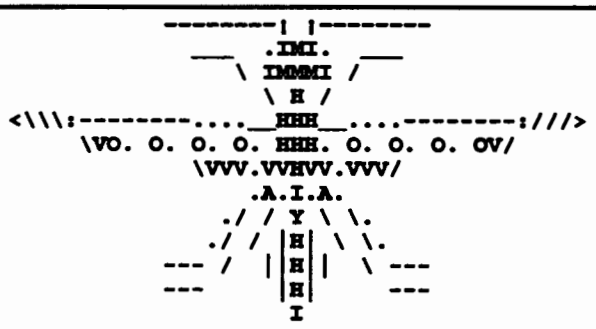
S T A M P A

A – Checklist specie italian
B – Elenco genere attuale
C – Elenco generico italiano
D – Elenco specie Collezione
E – Situazione spec. singola
F – Elenco per gruppo specie
G – Ricerca nome nel Genere
H – Ricerca nome nell'Elenco
I – Elenco genere nominale
L – Elenco alfabetico Generi
M – Elenco nomi per Autore

U – Fine della elaborazione

Operare scelta prego >> <<

Table C



	Specie	Subspecie	Sin. specie	Sin. subspecie
NQ in Archivio	6914	895	2932	180
NQ in Elaboraz.	4	1	1	1
Dim. file Arch.	1099326	142305	419276	29340
Dim. file Elab.	636	0	143	0

TAXON scelto: SPHECOIDEA Genere in elaborazione: Rhinocorynura

(I) Inserire — (M) Modificare — (A) Annullare — (G) Aggiungere — (S) Stampare — (T) Togliere annullati
(N) Scelta nuovo taxon — (C) Copiare archivio — (E) Ripristinare archivio — (Z) Finire

Table B

submit for publication. In an attempt to find out whether or not Mr. Pape had published these observations, I searched through various biological, entomological and natural history journals from the southwestern U. S. After striking out I telephoned Howard Evans, Karl Krombein and Arnold Menke, all avid aculeate Hymenoptera literature perusers, but none of these individuals had seen anything in print about a cave-inhabiting pompilid wasp. I have been advised to repeat Mr. Pape's interesting and valuable observations in this journal before I misplace or forget them.

Mr. Pape's notes on this species extend from October 7, 1990 to May 17, 1992. Both males and females of *A. evansi* were active during the months of March, April, May, September, October, November and December. In addition there are two specimens of this species in the University of Arizona Insect Museum, both from high elevations in mountains, collected in July and October. The sum of these collection and observation dates indicates that *A. evansi* is probably multivoltine in the region. When Mr. Pape revisited Arkenstone Cave in June, July and August 1991 he saw no wasps, suggesting a moderately lengthy period of summer diapause at this locality. Ambient (air) temperatures outside of the cave during periods of observation averaged 29°C and inside of the cave, 21°C. Relative humidity in the cavity remains a constant 100%.

Observations of wasps with and without prey were made rather continuously from late morning (1019-1100 hours) to mid-late afternoon (1430-1630 hours) on certain days. A total of 17 wasps exited the cave from 1019 to 1152 on April 4, 1992. Before exiting, females paused, cleaned their antennae, wing–flicked, remained motionless for 30 seconds or so and walked or flew away. The first female with prey entered the cave at 1206 of that day. Hunting forays occurred outside of the cave, mostly between the hours of 1000 and 1200. Provisioning and nesting activities took place within the cavern mostly after these hours. Wasps with prey spiders penetrated the cave into total darkness to distances of 30-60 meters from the cave entrance in order to reach their nesting sites. Except for one flight, all provisioning wasps walked or ran on the cave floor, "seldom" on the walls. Speed of transport depended upon the differential sizes of the wasps and their prey, the directness of the route taken and the number of obstacles encountered. One provisioning female took eight minutes to walk and run 23 meters. During prey transport, the wasp "placed her mouthparts near the tip of the abdomen of the spider just above the apex (dorsal). She then approached the spider from the right rear and grasped it in the (normal) fashion by a chelicera (dorsally) and proceeded to haul it off. Several times she stopped to rub her hind legs together or run her antennae through cleaners, never once releasing the prey." In a photograph showing prey transport, the wasp's long, thin antennae and hindlegs are angled forward and backward, respectively, possibly to obtain tactile information about the unlit immediate environment. At times, two wasps traversed the cave floor "side by side" or in tandem. Mr. Pape believed that this behavior was "not...totally random." As many as four wasps were simultaneously seen in one "room" of the cave. Some wasps became agitated when near other females. Retrieval of one wasp's abandoned spider by another female was observed.

Provisioning wasps quickly entered "small holes" in the walls of the cave, disappearing entirely from sight. One female entered the same hole twice with successive prey and as many as two or three wasps disappeared into a single hole. Because the walls of the cave mainly consisted of solid rock no provisioning cells could be located. Twenty–seven spiders taken from provisioning wasps were all identified as *Selenops* sp. (see above). Color photographs sent to me by Mr. Pape show that the spider's legs had been amputated at the coxal-trochanteral joints and sometimes the pedipalps had been partly or entirely removed, often unevenly so. The prey spiders were not "free–living" inside of the cave; rather, they lived outside of the cave entrance where the wasps hunted for them in "thick vegetation." Only a "few" males were encountered inside of the entrance to the cave and never deep in the cavern. A single male-female *A. evansi* interaction involved a four second-long antennal "exchange" (= touching?) on the floor of the entrance.

In Mr. Pape's last letter to me, he asked the following questions: (1) Why do the wasps wing-flick only outside, not inside of the cave?; (2) Why do they never relinquish their grasp of the prey during transport?; (3) How do the wasps navigate within the dark confines of the cave? Do they follow a chemical trail, air movements within the cave or floor landmarks?; (4) How do they pre-select their nesting sites?; (5) What are the nests (cells) like and how are the immature stages protected from parasitism and predation?; (6) Will females accept artificial nesting tunnels? In this correspondence Mr. Pape included diagrams of (A) routes of two provisioning *A. evansi;* (B) random exit paths of 12 females at cave entrance; and, (C) artificial nesting chamber design (with dimensions).

Literature Cited

Deyrup, M., J. T. Cronin, and F. E. Kurczewski. 1988. *Allochares azureus:* an unusual wasp exploits unusual prey (Hymenoptera: Pompilidae; Arachnida: Filistatidae). Psyche 95: 265-281.

Evans, H. E. 1948. Biological notes on two species of *Anoplius* (Hymenoptera: Pompilidae). Entomol. News 59: 180-184.

Evans, H. E. 1949. The strange habits of *Anoplius depressipes* Banks: a mystery solved (Hymenoptera, Pompilidae). Proc. Entomol. Soc. Wash. 51: 206-208.

Evans, H. E. 1959. Prey records for some midwestern and southwestern spider wasps (Hymenoptera: Pompilidae). J. Kansas Entomol. Soc. 32: 75-76.

Evans, H. E. and C. M. Yoshimoto. 1962. The ecology and nesting behavior of the Pompilidae (Hymenoptera) of the northeastern United States. Misc. Pub. Entomol. Soc. Amer. 3: 67-119.

Kurczewski, F. E. 1989a. Observations on the nesting behavior of *Auplopus caerulescens subcorticalis* and other Auplopodini (Hymenoptera: Pompilidae). Great Lakes Entomol. 22: 71-74.

Kurczewski, F. E. 1989b. Ecology, mating and nesting of *Tachypompilus ferrugineus nigrescens* (Hymenoptera: Pompilidae). Great Lakes Entomol. 22: 75-78.

Kurczewski, F. E. 1990. Additional observations on *Tachypompilus ferrugineus* with emphasis on male behavior (Hymenoptera: Pompilidae). Great Lakes Entomol. 23: 159-163.

seems much less likely in view of the persistent failure to find genitalic or other structural difference.

We thank Colin Vardy for advice on *Pepsis* taxonomy.

Reference

Alayo D., P. 1954. El género *Pepsis* Fabr. en Cuba (Hymenoptera – Pompilidae). Publ. Univ. Oriente, Santiago de Cuba (37):1-25.

Apparent Bird Predation on *Trypoxylon* Brood

by
Christopher K. Starr
St Augustine, Trinidad

The following observations are from Abraham "Bram" Willink's argentine country house at Taff del Valle, Tucumán (1985m), mid-December 1993. On the outside walls of the house and outbuilding I found numerous disused mud nests of an unidentified *Trypoxylon* sp., each with up to about 30 cells. The cells lay parallel to the wall, forming a narrow comb up to three cells broad, i.e. no cell was separated from the wall by more than two cells. I saw no adult wasps or nesting activity at that time, early summer. A nest of apparently the same species in the Instituto Miguel Lillo collection is associated with wasps identified as *T. fabricator*. A quick look at it suggests that it is indeed a member of the *fabricator*-group, but the wasp seems too small and the nest unlike that of *T. fabricator*.

A peculiar feature of most nests was considerable, fairly systematic damage, such that cells were opened along most of their length, exposing the cells interiors. It did not have the appearance of haphazard damage from weather or house-cleaning. Suspecting that birds had opened the cells in search of wasp brood, I looked for nests in relatively bird-protected situations and found some behind window gratings. These were not completely enclosing, so that a small, agile bird could be expected to reach the nests, but it would have required some maneuvering and would have placed the bird in a situation from which it could not quickly escape.

Censusing on the two buildings, I found the following ratios of damaged:undamaged nests:

exposed surfaces 44:2
behind gratings 3:11.

The result seems plain enough, but anyone should feel free to run a chi-square test.

Bram tells me that he has often seen wrens about the buildings, although he has not noted them attacking *Trypoxylon* nests. The house wren, *Troglodytes aedon*, would seem to be the best candidate.

I am unaware of other observations suggesting that birds systematically open mud nests of any solitary wasp.

Daytime Censuses as an Estimator of Colony Size in Small-colony Wasps

by
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From the researcher's point of view, an important virtue of most small-colony wasps (stenogastrines and independent-founding polistines) is the ease with which the entire colony can be observed in/on its open nest comb. It is customary to census colonies at night, under the reasonable assumption that then and only then are all adults likely to be present. However, nighttime censuses are not always practical, which raises the question of the reliability of daytime censuses. Are there circumstances in which counts taken during daylight hours can serve as acceptable estimators of the true number of adults in the colony?

Despite the popular view of social-insect colonies as scenes of intense activity, with foragers leaving and returning at a great rate and much of the workforce away from the nest at any moment, experienced bug-watchers have long noticed that even during the active period, much of the colony much of the time is doing nothing in particular (e.g. Wheeler 1957). This tendency is quite pronounced in small-colony wasps, so that it is probably fair to say that at any given moment most adults are probably at home.

As an example, in order to collect complete colonies of *Polistes olivaceus*, *P. stigma* and *Ropalidia marginata* during daytime in the Mariana Islands, Miyano (1994) first collected all wasps present at each nest and then waited at least one hour to net any returning adults, on the reasonable assumption that a forager was unlikely to be away for more than an hour. From 14 founding-stage (i.e. before emergence of the first workers) and growth-stage (i.e. with workers present but no reproductive offspring yet emerged), each with a maximum of 13 adults, he collected a total of 45 adults initially and 16 that returned later. In other words, only about 1/4 of adult females were absent from the nest at once. Furthermore, almost half of the colonies had no wasps returning during the waiting period, so that the entire colony was probably present in the initial collection.

This raises the possibility that the highest figure from a series of daytime censuses of a colony could be treated as an acceptable estimate of the true number of adults resident on the nest. How many censuses should it take to reach such an estimate? My purpose here is to report a very small data-set from one species, which nonetheless seems quite suggestive.

During 3-4 July 1994 in the Dominican Republic's Parque Nacional del Este, I did seven daytime and three nighttime censuses of each of 11 founding-stage colonies of *Polistes crinitus* on nests with up to 27 cells. All brood was quite young, apparently consisting of eggs and 1st-3rd instar larvae.

A surprising result is the inconstancy between nighttime censuses of a single colony. Although the numbers did not vary greatly, in only three of the 11 colonies were all three censuses identical, even though no colony had more than six adults.

Only one colony (with a single adult) was constant across all seven daytime censuses. However, even here the variation between one census and the next was not very great. In fact, if one looks only at the first three and the last three daytime censuses, the numbers of colonies constant for all the three censuses are four and three, respectively, virtually the same as at night. Nonetheless, the average number of wasps present at night is somewhat higher than in the active period, as expected.

If numbers are inconstant even at night, should the lowest or the highest number be taken as reflecting the true number of resident adults? I will evade this question by noting that I am not concerned here with what it means to be "resident" on a nest but with the degree of similarity between daytime and

was found. "Miakha St. Pk., Fla., Feb. 18, 1937, ♂; Type Motes miakha." Since this information is identical with that accredited to the type, the specimen is presumed to be the type of *muspa*.

The species of Sphecidae in which Pate stated that the type was deposited in the Academy collection, but have not been found there, are as follows: *Ectemnius (Hypocrabro) alpheus*, *E. (Hypocrabro) texanus ais*, *E. (Hypocrabro) satan*, *Psammaecius (Hoplisoides) alaya*.

SPHECIDAE

Ammoplanops ashmeadi, Trans. Amer. Ent. Soc. 64:397, 1939 [H, A].
Ammoplanops cressoni, Trans. Amer. Ent. Soc. 64:395, 1939 [H].
Ammoplanops foxi, Trans. Amer. Ent. Soc. 64:409, 1939 [H].
Ammoplanops moenkopi, Trans. Amer. Ent. Soc. 64:402, 1939 [H].
Ammoplanops timberlakei, Trans. Amer. Ent. Soc. 64:404, 1939 [H].
Ammoplanops vierecki, Trans. Amer. Ent. Soc. 64:406, 1939 [H, A].
Ammoplanus (Ammoplanus) chemehuevi, So. Calif. Acad. Sci. Bul. 41:151, 1943 [H, A].
Ammoplanus (Ammoplanus) loti, So. Calif. Acad. Sci. Bul. 41:146, 1943 [H].
Ammoplanus (Ammoplanus) quabajai, So. Calif. Acad. Sci. Bul. 41:156, 1943 [H].
Ammoplanus (Ammoplanus) sechi, So. Calif. Acad. Sci. Bul. 41:149, 1943 [H].
Ammoplanus (Ammoplanus) tetli, So. Calif. Acad. Sci. Bul. 41:147, 1943 [H].
Ammoplanus (Ammoplanus) unami, Trans. Amer. Ent. Soc. 63:101, 1937, [H].
Ammoplanus (Ammoplanus) vanyumi, So. Calif. Acad. Sci. Bul. 41:154, 1943 [H].
Ammoplanus (Parammoplanus) apache, Trans. Amer. Ent. Soc. 63:106, 1937 [H].
Ammoplanus (Parammoplanus) lenape lenape, Trans. Amer. Ent. Soc. 63:104, 1937 [H].
Ammoplanus (Parammoplanus) lenape olamentke, So. Calif. Acad. Sci. Bul. 41:160, 1943 [H, A].
Aphilanthops (Clypeadon) phoenix, Pan. Pacific Ent. 23:66, 1947 [H].
Arigorytes anaetis, Canad. Ent. 79:55, 1947 [H].
Astata dominica, Ent. News 58:230, 1947 [H].
Belomicrus apache, Trans. Amer. Ent. Soc. 66:15, 1940 [H].
Belomicrus bridwelli, Trans. Amer. Ent. Soc. 66:93, 1940 [H].
Belomicrus cahuilla, Trans. Amer. Ent. Soc. 66:39, 1940 [H, A].
Belomicrus cladothricis eriogoni, Trans. Amer. Ent. Soc. 66:70, 1940 [H, A].
Belomicrus cladothricis prosopidis, Trans. Amer. Ent. Soc. 66:72, 1940 [H, A].
Belomicrus cucumonga, Trans. Amer. Ent. Soc. 66:76, 1940 [H, A].
Belomicrus forbesi penuti, Trans. Amer. Ent. Soc. 66:27, 1940 [H].
Belomicrus istam, Trans. Amer. Ent. Soc. 66:81, 1940 [H].
Belomicrus jurumpa, Trans. Amer. Ent. Soc. 66:53, 1940 [Hj.
Belomicrus mescalero, Trans. Amer. Ent. Soc. 66:87, 1940 [H].
Belomicrus pachappa, Trans. Amer. Ent. Soc. 66:73, 1940 [H].
Belomicrus quemaya, Trans. Amer. Ent. Soc. 66:47, 1940 [H].
Belomicrus sechi, Trans. Amer. Ent. Soc. 66:60, 1940 [H].
Belomicrus serrano mono, Trans. Amer. Ent. Soc. 66:46, 1940 [H].
Belomicrus serrano serrano, Trans. Amer. Ent. Soc. 66:42, 1940 [H, A].
Belomicrus timberlakei, Trans. Amer. Ent. Soc. 66:91, 1940 [H].
Belomicrus tuktum, Trans. Amer. Ent. Soc. 66:84, 1940 [H].
Belomicrus vanyume, Trans. Amer. Ent. Soc. 66:17, 1940 [H].
Belomicrus vierecki, Trans. Amer. Ent. Soc. 66:56, 1940 [H, A].
Bicyrtes oribates, Rev. de Ent. 6:220, 1935 [H, A].
Crossocerus (Blepharipus) callani, Notulae Nat. 91:5, 1941 [H].
Crossocerus (Blepharipus) stictochilos, Lloydia 6:304, 1944 [H].
Crossocerus (Blepharipus) stricklandi, Lloydia 6:301, 1944 [H].
Crossocerus (Yuchiha) phaeochilos, Lloydia 6:276, 1944 [H].
Diploplectron kantsi, Ent. News 52:6, 1941 [H].
Diploplectron vierecki, Ent. News 52:4, 1941 [H].
Ectemnius (Clytochrysus) yosemite, Notulae Nat. 171:3, 1946 [H].
Ectemnius (Hypocrabro) dizoster, Trans. Amer. Ent. Soc. 73:17, 1947 [H].
Ectemnius (Hypocrabro) 10-maculatus tequesta, Notulae Nat. 171:9, 1946 [H].
Ectemnius (Hypocrabro) taino, Trans. Amer. Ent. Soc. 73:22, 1947 [H].
Enoplolindenius (Enoplolindenius) chibcha, Rev. de Ent. 13:416, 1942 [H].
Enoplolindenius (Enoplolindenius) paria, Rev. de Ent. 13:419, 1942 [H].
Enoplolindenius (Iskutana) georgia, Rev. de Ent. 13:393, 1942 [H].
Enoplolindenius (Iskutana) jaragua, Rev. de Ent. 13:401, 1942 [H].
Enoplolindenius (Iskutana) orotina, Rev. de Ent. 13:397, 1942 [H].
Enoplolindenius (Iskutana) ponca, Rev. de Ent. 13:395, 1942 [H].
Euplilus (Euplilus) calverti, Notulae Nat. 190:1, 1947 [H].
Euplilus (Euplilus) diopura, Notulae Nat. 190:4, 1947 [H].
Euplilus (Euplilus) tristani, Notulae Nat. 190:3, 1947 [H].
Foxia navajo, Trans. Amer. Ent. Soc. 64: 146, 1938 [H].
Foxita atorai, Rev. de Ent. 13:380, 1942 [H].
Harpactostigma (Arcesilas) rutilum, Trans. Amer. Ent. Soc. 64:69, 1938 [H].
Hoplisoides umboniada, Notulae Nat. 91:1, 1941 [H].
Losada paria, Notulae Nat. 55:4, 1940 [H].
Metanysson (Huachuca) arivaipa, Trans. Amer. Ent. Soc. 64:186, 1938 [H].
Metanysson (Metanysson) coahuila, Trans. Amer. Ent. Soc. 64:183, 1938 [H].
Metanysson (Metanysson) yavapai, Trans. Amer. Ent. Soc. 64:178, 1938 [H, A].
Moniaecera (Moniaecera) evansi, Ent. News 57:239, 1947 [H].
Moniaecera (Moniaecera) foxiana, Trans. Amer. Ent. Soc. 74:49, 1948 [H].
Moniaecera (Moniaecera) pinal, Notulae Nat. 185:10, 1947 [H].
Motes (Notogonius) mescalero, Canad. Ent. 75:200, 1943 [H].
Motes (Notogonius) muspa, Canad. Ent. 75:201, 1943 [H].
Nitela cerasicola, Brooklyn Ent. Soc. Bul. 32:5, 1937 [H].
Nysson (Epinysson) maiae, Trans. Amer. Ent. Soc. 64:137, 1938 [H].
Nysson (Nysson) chumash, Notulae Nat. 63:1, 1940 [H].
Nysson (Nysson) coyotero, Notulae Nat. 63:3, 1940 [H, A].
Nysson (Nysson) partamona, Trans. Amer. Ent. Soc. 64:139, 1938 [H].
Ochleroptera jamaica, Ent. Nerrs 58: 94, 1947 [H].
Oxybelus philippinense, Philip. Jour. Sci. 64:383, 1938 [H].

tions are very difficult, particularly in the Dryinidae, and that males are far more conservative structurally. This fact probably makes males more valuable for generic analyses than females. However, the author bases his phylogenetic statements on females. Females are so highly specialized for parasitic behavior that deriving a phylogeny for the Dryinidae based on female characteristics may show little useful resolution. Additionally, it makes no sense to do a phylogenetic analysis of species found in such a small, biogeographically unremarkable region. The species found here undoubtedly have sister species in other, not necessarily adjacent regions, not just in the area of Denmark and Fennoscandia. The cladogram on page 32 is a classic of its kind.

However, overall this book is a thorough, and valuable work. It is clearly and concisely written, and contains one of the most detailed treatments of the biology and morphology of these families ever published. It certainly contains the most beautiful illustrations of these wasps I've ever seen.

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ALLOTYPES

For some years now, I have been serving as a review editor. This has exposed me to the writings of authors from all over the world. I have been amazed by the fact that some taxonomists have no real appreciation of the term allotype. For example, some writers will describe and designate the allotype of a previously described species! Such action is simply improper. Why? The explanation is simple. When an author describes a new species, a holotype is designated, and any other type specimens cited in the original description are paratypes. Some authors designate one paratype as an "allotype" to indicate that it is the opposite sex of the holotype. But that does not change the fact that it is still a paratype. If an author describes a new species from only one sex, then anyone that subsequently finds the previously unknown opposite sex can describe it. But it is improper to identify one specimen as the "allotype". Type material (holotype and paratypes (and allotype) can only be designated in the original description. Subsequent descriptions of an unknown sex are simply that.

Arnold Menke

DERIVATION OF SCIENTIFIC NAMES

Providing the derivation of the names of new species is something that authors occasionally omit in their original descriptions. The consequences of this can sometimes be disconcerting, and in the case of patronyms, downright dishonorable. Occasionally a species name is published with a spelling different from that intended by the author. This happens because an author may miss a typesetting error during reading of proofs, or he or she may, in some cases, not even see proofs. Under the provisions of the Code of the International Commission on Zoological Nomenclature, specifically Article 32, the original spelling of a name cannot be emended unless there is clear evidence in the original description of the intended spelling. I offer two examples that illustrate this point.

I described a new species of *Ammophila* from Utah (Menke 1966) and called it *uinta*, after the Uinta Indians of that region. The printer spelled the name *unita* throughout the description, and I did not see the error during proof reading. Unfortunately, I did not give the derivation of the name, so there was no evidence in the original description itself that would permit me to emend the name to *uinta*, my intended spelling. Thus the species will forever be *unita*.

The North American hymenopterist, S. A. Rohwer, described (1910) a new species of *Pemphredon* (he actually used the generic name *Ceratophorus*), and the published spelling was *gennelli*. Rohwer did not state in his description that he was dedicating the species to the American lepidopterist, Fordyce Grinnell, Jr., although the specimen on which the description was based was collected by him and apparently "grinnelli" was the intended spelling. The Code is very clear here (see Art. 32(c)(ii) and examples). Unless there is explicit evidence in the original description of the intended spelling, the name must stand as printed. Since Rohwer did not say that he was naming the species after Grinnell, the species must forever be called *gennelli*.

These two examples clearly demonstrate the desirability of providing the derivation of any new species name. This is especially true for species named after people. If you think highly enough of someone to name a species after them, you should tell the world that you are naming the species in honor of "John" or "Jane Doe". Otherwise the honor is lost, and you have no recourse if somehow the name is misspelled when published.

Arnold Menke

Menke, A. S., 1966. New species of North American *Ammophila*, Part II (Hymenoptera, Sphecidae). Proc. Biol. Soc. Wash. 79:25-40.

Rohwer, S. A., 1910. Descriptions of new psenid wasps from the United States (Hymenoptera; Psenidae). Proc. Ent. Soc. Wash. 12:99-104.

ABE MAKES COMMERCIAL NEWS

[Abstracted by Robin Edwards from an article in The Nikkei Weekly, Tokyo: Vol 32, No.1644, October 31, 1994, page 5.]

A Nikkei staff writer reports on Takeshi Abe's creation of a sports drink containing some of the compounds found in the saliva of hornet larvae. Abe, of the Institute of Physical and Clinical Research in Japan, figured that this saliva must be responsible for the amazing power that enables adult hornets to beat their wings more than a thousand times a minute, and to fly over 100km a day. His analysis of the saliva showed it contained large quantities of the amino acids, glycine and proline.

Abe's concoction has been tried by marathon runners, rugby and ice hockey players, and all have reported improved results if they drink the "potion" before play begins. The actual contents of the drink are not reported!

IVth INTERNATIONAL COLLOQUIUM ON SOCIAL INSECTS

First Announcement

The *Russian Language Section of the International Union for the Study of Social Insects* announces its IVth International Colloquium which will be held in St. Petersburg (Russia) from Friday 16 till Thursday 22 August 1996. The Colloquium will cover all aspects of behaviour, ecology and physiology of social and presocial arthropods and will be international with a broad participation of colleagues from other IUSSI sections and other scientists from abroad.

The official languages of the Colloquium will be English and Russian. The scientific meetings are scheduled for four full days, the other two days being devoted to excursions all over St. Petersburg, its beautiful palaces, museums and environs. An additional excursion tour could be organized for two days after the Colloquium closure.

Papers presented to Colloquium (up to 25 typewritten pages in English or in Russian) will be published in the IV volume of the *Proceedings of the Colloquia on Social Insects*. The authors will receive 50 reprints of each article without charge.

We would be happy to see all our foreign colleagues among the participants of the IVth International Colloquium on Social Insects in St. Petersburg.

If you intend to participate, please, send us a short application (see below). We will send out the second announcement at the beginning of 1996.

Communication:

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Tel.: (+7) 812 218-96-79; Fax: (+7) 812 218-08-52, 218-13-46; E-mail: vk@socium.spb.su

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Michener, Charles D.
1995. Some genus-group names of bees (Hymenoptera, Apoidea). J. Kansas Ent. Soc. 67(4):373-377. (Volume erroneously dated 1994)
Mochi, Allessandro and Damiano Luchetti
1993. Note faunistiche su alcuni sfecidi italiani (Hymenoptera). Boll. Ass. Romana Ent. 47:103-107.
Momoi, Setsuya
1995. Requiem for Dr. Kunio Iwata. Insectarium 32(5):7-9. (in Japanese)
Nesterov, M.A.
1994. A new species of a wasp of the genus *Gorytes* (Hymenoptera, Sphecidae). Tr. Zapovednika "Daurskiy" (3):91-93.
Nonveiller, Guido
1994. Description du nouveau genre afrotropical *Spinulomutilla* et de onze espèces nouvelles (Hymenoptera: Mutillidae) (Deuxième partie) (1). Ann. Soc. Entomol. Fr. (N.S.) 30(4):367-389.
O'Donnell, Sean
1995. Necrophagy by neotropical swarm-founding wasps (Hymenoptera: Vespidae, Epiponini). Biotropica 27(1):133-136.
1995. Division of labor in post-emergence colonies of the primitively eusocial wasp *Polistes instabilis* de Saussure (Hymenoptera: Vespidae). Ins. Soc. 42:17-29.
O'Donnell, Sean and R.L. Jeanne
1995. The roles of body size and dominance in division of labor among workers of the eusocial wasp *Polybia occidentalis* (Olivier)(Hymenoptera: Vespidae). J. Kansas Ent. Soc. 68(1):43-50.
Olmi, Massimo
1994. Descrizione di *Gonatopus vidanoi*, nouva specie del Cile, e del maschio di *Gonatopus lacualis* Olmi. Mem. Soc. ent. ital., Genova 72:327-330.
1994. The Dryinidae and Embolemidae (Hymenoptera: Chrysidoidea) of Fennoscandia and Denmark. Fauna Ent. Scand. 30. 100 p.
1994. New species of Dryinidae from Madagascar (Hymenoptera: Chrysidoidea). Frustula Ent. N.S. 17(30):1-12.
Olmi, Massimo and Eduardo G. Virla
1993. Contribution to the knowledge of the Dryinidae of Argentina (Hymenoptera: Chrysidoidea). Phytophaga 4:57-67.
Osten, Till
1994. Beobachtungen zum Paarungsverhalten von *Scolia cypria* Saussure 1855 (Hym. Scoliidae). Linzer biol. Beitr. 26(1):335-341.
1994. Zweiter Beitrag zur Kenntinis der Scoliidenfauna von Zypern (Hymenoptera: Scoliidae). Entomofauna 15(43):501-508.
Petersen, Børge
1994. A bibliography of the Palaearctic Mutillidae, 1753-1993 (Insecta, Hymenoptera). Steenstrupia 20(8):185-207.
Quinn, Mark A., D.D. Walgenbach, R. Nelson Foster, K.C. Reuter and J.P. McCaffrey
1995. Tritrophic associations between spider wasps (Hymenoptera: Pompilidae), wolf spiders (Araneae: Lycosidae), and grasshoppers (Orthoptera: Acrididae) on mixedgrass prairie. J. Kansas Ent. Soc. 68(1):7-19.
Radchinko, V. and Yu. A. Pesenko
1994. "Protobee" and its nest: a new hypothesis on early evolution of the Apoidea (Hymenoptera). Ent. Obozr. 73(4):913-933. (in Russian with English summary)
Raveret Richter, Monica A., and Cynthia L. Colvin
1995. *Vespula vidua* wasps scavenge caterpillar baits. J. Kansas Ent. Soc. 67(4):426-428. (Volume erroneously dated 1994)
Roig-Alsina, Arturo
1994. A new genus of Plumariidae, with notes on the relationships among the genera of the family (Hymenoptera: Chrysidoidea, Plumariidae). Mitt. Münch. Ent. Ges. 84:91-96.
Sakagami, Shôichi F.
1995. Dr. Kunio Iwata's works on wasps. Insectarium 32(5):4-6. (in Japanese)
Sarmiento M., Carlos E.
1994. Lista de las avispas sociales (Hymenoptera: Vespidae) de Colombia. Rev. Biol. Trop. 42(1/2):357-363.
Schneider, Laura C. and Fernando Fernández C.
1994. Hymenopteros con aguijon (Hymenoptera: Aculeata) del Parque Regional Natural Ucumari, p. 277-289 *in:* Ucumari, un caso tipico de la diversidad biotica andina, J.O. Rangel Ch. (ed.). CARDER and Universidad Nacional de Colombia, Pereira.
Silvera, Orlando Tobias
1994. *Polistes (Epicnemius) occultus*, a new neotropical social wasp (Vespidae, Polistinae). Stud. Neotrop. Fauna Environ. 29(4):189-196.
Silvera, Orlando Tobias and Antonio Tobias Silvera
1994 (1995?). Comparative morphology of skeletal parts of the sting apparatus in neotropical polistine social wasps (Hymenoptera, Vespidae, Polistinae). Sociobiology 25:295-327.
Shima, Sulene Noriko, Sôichi Yamane and Ronaldo Zucchi
1994. Morphological caste differences in some neotropical swarm-founding polistine wasps. I. *Apoica flavissima* (Hymenoptera, Vespidae). Jpn. J. Ent. 62(4):811-822.
Shimizu. Akira
1994. Phylogeny and classificaton of the family Pompilidae (Hymenoptera). TMU Bull. Nat. Hist. (2):1-142.
Smissen, J. v.d.
1994. Zur Kenntnis der Weibchen von *Arachnospila virgiliabnormis* Wolf, 1976 und *Arachnospila alvarabnormis* (Wolf, 1965)(Hymenoptera: Pompilidae). Drosera '94(1/2):63-70.
Soika, A. Giordani
1990. *I Katamenes* dell'Africa del Nord. Lavori - Soc. Ven. Sc. Nat. 15:97-100.
1992. Di alcuni eumenidi nuovi o poco noti. Lavori - Soc. Ven. Sc. Nat. 117:41-68.
1993. Noona Dan Expedition 1961-1962: Hymenoptera, Eumenidae. Lavori - Soc. Ven. Sc. Nat. 18:19-24.
1993. Eumenidi di Sulawesi e Borneo raccolti da C. van Achterberg. Lavori - Soc. Ven. Sc. Nat. 18:25-31.
1994. Nota sulle specie orientali del genere *Rhynchium* Spinola (Hymenoptera, Eumenidae). Lavori - Soc. Ven. Sc. Nat. 19:37-52.
Sorg, Martin and Klaus Cölln
1994. Zu den Bethylidae und Chrysididae von Gönnersdorf (Kr. Daun) (Hymenoptera Aculeata: Chrysidoidea). Dendrocopos 21:179-189.
Stange, Lionel A.
1994. The tiphiid wasps of Florida (Hymenoptera: Tiphiidae). Fla. Dept; Agric. Consum. Serv., Ent. Circular No. 364. 2 p.
Strumia, Franco
1995. *Hedychridium mochii* new species from Burma and *H. monochroum* Buysson ssp *lampunense* Tsuneki new synonymy (Hymenoptera Chrysididae). Boll Soc. ent. ital., Genova 126(2):155-159.
1995. Two new species of *Adelopyga* from Africa. Boll Soc. ent. ital., Genova 126(3):255-259.
Tano, Tadashi
1994. The type specimens preserved in the Tsuneki Collection. (I) Superfamily Sphecoidea (Insecta: Hymenoptera) of Japan. Ent. J. Fukui (14):3-8. (in Japanese)
1994. The type specimens preserved in the Tsuneki Collection. (II) (Insecta: Aculeata). Ent. J. Fukui (15):43-48. (in Japanese)
Tano, Tadashi and Tadao Murota
1993. On the new recorded Pompilidae from Fukui Prefecture, Central Japan, with a species new to Japan (Hymenoptera). Ent. J. Fukui (13):51-52. (in Japanese)
Tano, Tadashi, C. Nozaka, H. Kurokawa and Tadao Murota
1994. Studies on the Philippine Sphecoidea (Hymenoptera). Ent. J. Fukui (13):51-52. (in Japanese)
Toro, Haroldo and Elizabeth Chiappa
1995. Hipotesis sobre factores determinantes de dimorfismo sexual en *Sphex latreillei* Lep. (Hymenoptera: Sphecidae). Acta Ent. Chilena 19:13-19.
Toro, Haroldo and Sergio Elortegui
1994. Ajuste genital en la copula de Thynninae (Hymenoptera: Tiphiidae). Parte II: *Elaphroptera nigripennis* (Smith). Rev. Chilena Ent. 21:125-134.
Valentine, Barry D.
1995. Identity of the Philippine anthribid weevil prey of the wasp, *Cerceris luzonensis* Crawford. Coleop. Bull. 49(1):52.
van Zuijlen, J.W.A.
1994. The *amazonica* species group of the genus *Nitela* Latreille (Hymenoptera: Sphecidae: Crabroninae). Zool. Med. Leiden 68(23):249-269.
Vardy, Colin R.
1994. Unusual predation by a British social wasp (Hym., Vespidae) on a spider. Ent. Mon. Mag. 130:188.
Virla, Eduardo G. and Massimo Olmi
1994. Description of *Gonatopus virlai* Olmi, a new species from Argentina, and initial data on its development stages (Hymenoptera, Dryinidae). Fragmenta ent. 26(1):85-94.
Weisco, William T.
1995. Book Review: Queen number and sociality in insects. J. Keller, ed. Ann. Ent. Soc. Amer. 88(1):105.
Williams, Paul H.
1994. Phylogenetic relationships among bumble bees (*Bombus* Latr.): a reappraisal of morphological evidence. Syst. Ent. 19:327-344.
Yamane, Seiki and Josef Gusenleitner
1993.Two new species of the genus *Ancistrocerus* (Hymenoptera, Eumenidae) from Taiwan. Linzer biol. Beitr. 25(2):987-991.
Yamane, Seiki and Tadaski Tano
1995. The Ryûkyû species of the genus *Cerceris* (Hymenoptera, Sphecoidea, Philanthidae). Jpn. J. syst. Ent. 1(1):11-21.
Yanega, Douglas
1994. Arboreal, ant-mimicking mutillid wasps, *Pappognatha;* parasites of neotropical *Euglossa* (Hymenoptera: Mutillidae and Apidae). Biotropica 26 (4):465-468.
Yildirim, E. & Özbek, H. 1993. Polistinae (Hymenoptera: Vespidae) of Turkey. Türk. ent. derg. 17:141-156.