MINUTIAE FROM THE MUD D'AUB

Apologies to Fernando Fernández of Bogota, Colombia. He was responsible for the "Pepsi" cartoon on the last page of Sphecos 22, but his name got left off.

We have not been getting much research news lately, and the Forum has languished also. How about some feedback from the more than 600 of you out there that read this rag!

The first issue of the new Journal of Hymenoptera Research should be out sometime in August. This journal should be subscribed to by any active hymenopterist — where else will you find so many papers under one cover on your favorite animals? If you have not yet subscribed see pages 21-22 of Sphecors 22 for details and application form.

RESEARCH NEWS

Michael Archer (Dept. of Biology, College of Ripon and York St. John, York YO3 7EX, England) has just published two papers on Vespa (see Archer 1991 in Recent Literature). His goal is to try and cover all of the species of Vespinae in terms of taxonomy and biometrics. The next paper dealing with Vespa crabo and V. dybowskii is in press.

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Ølstein Berg (Båstadveien 73, N-1370 Asker, Norway) writes: "Last winter I spent a couple of months in South East Asia, chiefly Malaysia, collecting some 230 aculeates. Most families are represented. If any Sphecors readers could help in identifying some of these, I would be grateful. I also have problems identifying Norwegian Chrysididae and Ancistrocerus."

Folke K. Larsson (Dept. of Zoology, Uppsala University, P.O. Box 561, S-751 22 Uppsala, Sweden) is still working with thermoregulation and mating behaviour in bees and digger wasps. During a trip to the Galapagos Islands, Ecuador, in March 1991 he studied the endemic Galapagos carpenter bee, Xylocopa darwini. At his study site at Isla Santa Cruz he observed colonies of a digger wasp that Mr. Colin Vardy at The British Natural History Museum later identified as Bicyrtes variogata (Olivier). This species occurs throughout the Neotropical region, but has not previously been reported from the species-poor Galapagos. Dr. Larsson is now most interested in further reports concerning this species at the Galapagos Islands.

Peter van Ooijen (Gekko Software, Voorstraat 5b, 3512 AH Utrecht) reports "I am sending you some research news. To be honest, the lack of news. For some years now I have been running a small software company. After staring at my monitor all day (and night) I don't have the energy to stare through a microscope. So I have made a decision to stop all entomological work. Not all biological work: in a couple of aquaria I keep a collection of (mainly) catfish. Very interesting from a systematical point of view, and very relaxing as company."

"I donated my collection of Pompilidae to the museum of ITZ in Amsterdam. My collection of Sphindae, including the type of Tachysphex picnic, has merged into the collection of Mr. Raimond Hensen."

"My collection of literature remains. Through the years I have collected a complete (for the Palearctic region) number of reprints and photocopies on pompilids. They would be helpful to anyone interested in these wasps. I am offering them to anybody who is willing to pay for the shipping costs. I guess it is well over 6 kilograms in weight. Anybody interested?"

"Sphecors has always been (and still is) very nice reading. Thank you very much for the inspiration it gave. I hope it will help my literature find its way to a new home."

Arnold Menke is going to have Sphecid Wasps of the World scanned into his Macintosh computer. Terry Nuhn will be responsible for this job. Once it is in the computer Arnold plans on revising the book with much help from other specialists. Initial plans are to upgrade all of the species checklists and
perhaps produce a separate catalog of Sphecidae.

HELP NEEDED

Polistes in the Galapagos Islands

I have been contacted recently by an Ecuadorian student, Maria Teresa Iasso, who is working with Dr. Sandra Abdjabro on the Galapagos Islands. They are studying the introduction and spread of Polistes versicolor throughout the Galapagos with the aim of controlling this species before it endangers endemic species. Maria writes:

"The wasp seems to show some aggressiveness against humans and may be difficult to control. This wasp may have a significant impact on the Galapagos ecosystems, including the native and endemic bees and wasps. we are asking for your help. We need more information about this species."

They need information on life history, possible biological control agents, and effective chemical control (preferably not threatening to endemic species). This problem is beyond my expertise, and I would appreciate any help from hymenopterists with knowledge of this or related species that have created similar problems in the neotropics. Maria speaks and writes English well. If you have any pertinent information (anecdotal or publications), please send it to her. The full address is: Sra. Maria Teresa Iasso, Assistant of Entomology, Area of Invertebrates, Charles Darwin Research Station, Galapagos, Ecuador. I appreciate any and all assistance rendered.

Dr. Susan J. Weller
Dept. of Entomology
Louisiana State University
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PEOPLE IN THE NEWS

Astrid Lekan, at the age of 80, has moved out of her office at the University of Oslo. Her home address is: 86, N-0766 Oslo, Norway.

Roy Snelling (Dept. of Entomology, Natural History Museum of Los Angeles County, 900 Exposition Blvd., Los Angeles, CA 90007) says: "The malaria is apparently now under control - finally. Had yet another relapse (3) in August.

Pretty unpleasant and discouraging. So, after dithering about saying "it can't be", the quacks decided on the cure 'im or kill 'im approach and doubled the dosage of primaquin. Survived that. A relapse is now two weeks overdue. So, maybe... We'll see."

NECROLOGY

Dr. Friedrich Schremmer died in December of 1990.

Dr. Jacobus ("Jack") van der Vecht (July 5, 1906 – March 15, 1992) passed away after a long debilitating illness. We should have an obituary for him in the next issue.

NEW ADDRESSES

John Beardsley: 1025 Oakdale Lane, Arcadia, California 91006 USA
Sid Dunkle: Biology Dept., Collin Co. Community College, 2800 E. Spring Creek Pkwy., Plano, Texas 75074 USA.
Parker Gambino: 1333 Shore Drive, Brewster, New York 10509 USA.
Christopher Pruet: Universidad Autónoma "Gabriel René Moreno", Casilla No. 702, Santa Cruz de la Sierra, Bolivia.
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MISSING PERSONS

Gary French of Gainesville, Florida. Dr. Joself A. Khaitfman of Pushkina, formerly USSR.
Dr. Nikoiaus Mohr of Bergisch Gladbach, Germany.
Dr. Katherine M. Noonan of Albany, California.
Megan Pallett of Mississauga, Ontario.

SCIENTIFIC NOTES

New information about Dolichovespula (Vespinae)

by

Dr. M. E. Archer
(Dept. of Biology, College of Ripon and York St. John, York YO3 7EX, England)

Recently Dr. Huber (Ottawa Museum, Canada) sent me 600 specimens listed under Dolichovespula norvegicoides (Sla- den). On examination these specimens could be separated into five species including a queen of D. pacifica koczenae Eck from Norway and three queens and a male of D. adulterina artica Rohwer. Also included were 29 specimens of D. norvegica albida Sladen consisting of 29 queens, one male and two workers with the two workers lacking the orange spots on the second gastric turgum. However the largest error was the misidenification of 187 specimens of D. alpicalca Eck. Presumably the specimens had been identified before D. alpicalca had been separated from D. norvegicoides. Dr. Menke (National Museum of Natural History, Washington D.C., U.S.A.) also recently sent me a few Asiatic Dolichovespula which included what appeared to be two queens of D. xanthinctica Archer, the first queens that I have seen of this species. Fortunately these queens key out at the right place in my Key to the World Species of the Vespinae (Hymenoptera) (Sphc20 10:17-18). Further specimens included in this loan also extended my understanding of D. sinensis Archer and D. saxonica (Fabricius).

Examination of such a large number of specimens improved my understanding of the relevant species which will necessitate some changes in my Key to the genus Dolichovespula for the following reasons:

1. The shape of the gonostipes of D. alpicalca is rather more variable so changes to couplet 26 and 28 are required.
2. The presence of tyloids on the male antenna is not so simple as indicated in couplet 26.
3. Two queens with ivory white colouration seemed to be D. norvegicoides rather D. norvegica albida. Examination of nest populations is really needed to establish this observation but, if correct, then all keys to North American Dolichovespula separating the two species will be incorrect! The oculo-malar
space of *D. norvegica* is also more variable so that the HW/OMS ratio can overlap that of *D. norvegicoides*. These observations now create real difficulties in trying to write keys to separate females of *D. norvegicoides*, *D. alpicola* and *D. norvegica* (Fabricius) in North America. I have made couplet 19 into a rather extended triplet 19 and dropped couplet 20.

4. The variability of the colouration of the gastral terga and gena of *D. sinensis* has to be extended so necessitating changes in couplets 15 and 17.

5. The size of the oculo-malar space of *D. sinensis* is more variable so that the HW/OMS ratio can become less than 6 (couplet 7) so that couplet 13 needs to be modified. In addition specimens of *D. norvegica*, both nominate and subspecies *albida*, can have the HW/OMS ratio less than 6 (couplet 7) so additional notes are needed at couplet 13.

The changes to my key of *Dolichovespula* are as follows:

--- *sinensis* Archer, 1987  
--- *D. norvegicoides* (Sladen, 1918)  
--- Black projections less and of similar prominence from the second to the fifth gastral terga, sometimes detached spots present (Fig. 49). North American species.  
   
--- *norvegicoides* (Sladen, 1918)  
--- Black projections less and of similar prominence from the second to the fifth gastral terga (Fig. 59). Asian species. *xanthicina* Archer, 1980  
--- [*D. norvegica* (Fabricius, 1781) may key out at 13A. *D. norvegica* can be separated from *D. norvegicoides* by the characters given in triplet 19 and from *D. xanthicina* which has a longer oculo-malar space, HW/OMS: 5.2-5.7 on workers and 4.5-5.0 on queens.]  

15. Gena with a continuous yellow band sometimes interrupted by light brown colouration, but not interrupted by black markings. Clypeus yellow or with a small central brown or black spot, sometimes the black spot is elongated but it does not reach both the dorsal and ventral margins of the clypeus.  
--- *Dolichovespula* are as follows:

17. Centre of clypeus covered with micro-punctures. Apical gastral yellow bands increasing in width from the second to the fifth terga (Fig. 51A,B). Apical yellow bands of the gastral terga covering 50% or more of their surface, sixth tergum almost entirely yellow.  
--- *D. norvegica* Archer, 1981  
--- Centre of clypeus not covered with micro-punctures. Apical gastral yellow bands of similar width from the second to the fifth gastral terga (Fig. 51C). Apical yellow bands of the gastral terga covering less than 50% of their surface, sixth tergum at most with lateral yellow spot. Basal lateral yellow spot may be present on the first and second gastral terga and the yellow spot may be connected to the apical yellow band.  
--- *sinensis* Archer, 1987

19. Light colouration of body yellow but sometimes ivory-white. Lower genal light coloured spot usually wider than the upper spot and usually extending for half-way or more across the gena. The light coloured bands of the second to the fifth gastral terga usually of similar width although the width of the light coloured bands varies greatly from specimen to specimen (Fig. 49). No orange marks present on second gastral tergum. Fifth gastral tergum rarely with isolated black spots. HW/OMS ratio (Fig. 46) almost always less than 6.4 on workers (5.0-6.4) and 5.0-6.0 on queens (and thus unlikely to key out here). North American species.  
--- *norvegicoides* (Sladen, 1918)  
--- Light colouration of body yellow. Lower genal yellow spot usually narrower than the upper spot, and usually extending for less than half-way across the gena. The yellow bands of the second to fifth gastral terga usually becoming wider (Fig. 53). No orange marks present on second gastral tergum. Fifth gastral tergum often with isolated black spots. HW/OMS ratio (Fig. 46) almost always more than 6.4 on workers (6.4-7.8) and greater than 6.0 on queens (6.1-7.2). North American species.  
--- *alpicola* Eck, 1984

--- Light colouration of body ivory-white or North American and yellow or Eurasian specimens although pale yellow to ivory-white on eastern Asian specimens. Lower genal spot either absent or, if present, narrower than the upper spot and usually extending for less than half-way across the gena. The light coloured bands of the second to the fifth gastral terga either similar or increasing in width. Yellow subspecies often with orange marks present on the second gastral tergum on the queen and worker but on the ivory-white subspecies orange mark on the second gastral tergum absent from the queen but usually present on the worker. Fifth gastral tergum often with isolated black spots on the yellow subspecies but usually without isolated black marks on the ivory-white subspecies. HW/OMS ratio (Fig. 46) 5.5-7.6 on workers and 5.6-6.8 on queens (and thus not all workers and queens will key out here).  
--- *norvegica* (Fabricius, 1781) [In practice these three species can usually be separated readily].

26. Dorsal inner margin of the gonostipes only projecting inwards slightly (Fig. 56A), sometimes more strongly on *D. alpicola*. Sixth and seventh antennal flagellar segments with one tyloid each.  
--- *D. norvegica* Fabricius, 1781  
--- Light colouration of body yellow on North American and ivory-white or yellow on Eurasian specimens. An orange mark usually present on the second and often the first gastral terga. Clypeal black stripe usually complete being connected to the dorsal and ventral margins (Fig. 60C) although the dorsal part of the stripe can be very thin; apical clypeal margin straight; oculo-malar space longer, HW/OMS (Fig. 46) between 5.3 and 5.9.  
--- *D. alpicola* Eck, 1984
peal margin slightly concave (both species needed for comparison); oculo-
malar space shorter, HW/OMS be-
 tween 5.6 and 6.5. ............................ alpocia Eck, 1984

28. Add [D. alpocia keying here with D. saxonica have POL/PBHL greater than

Some of the species of Dolichovespula are known from very few specimens. Thus D. lama (du Buysson) is known by six specimens (3 queens, 3 workers), D. panda Archer by five specimens (1 queen, 4 workers) and D. baileyi Archer by three specimens (3 queens). In addition the males are unknown for the following species: D. flora Archer, D. panda, D. lama, D. xanthicincla and D. baileyi. The males of D. panda and D. lama would be particularly interesting to see. If anybody has undetermined Asian Dolichovespula I would be very pleased to identify them.

My College has given me the opportu-
ty to publish a second edition of my Key so it will be possible to incorporate the above and other changes in the second edition. Suggestions for further changes and improvements would be welcome from those who have at-
tempted to use the Key.

Time-sharing, Drifting, and Pilfering: Inter-nest Activities of Polybia occidentalis Foragers

by

Sean O'Donnell

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Colony integrity involving discrimina-
tion of and attacks on conspecifics which infiltrate the nest is a behavioral feature common to many social insects. The bi-
ology of nestmate discrimination is there-
fore of great interest from mechanistic (biochemical, genetic and environmental determination) an evolutionary (related-
ness, cost-benefit analysis) perspectives. Over the course of four field seasons of behavior studies on the swarm-founding wasp Polybia occidentalis in Central America I have noted several instances of movement between colonies by indi-
vividually marked foragers which raise questions about the nature of colony in-
tegrity from the invader’s, as well as the invader’s, point of view.

1. Time sharing: During my 1989 field season in Guanacaste, Costa Rica I con-
ducted studies on individually marked
workers in four colonies. Near the end of these observations a worker recog-
nizable by the distinctive pattern of her
paint marks began arriving at a colony
30 m distant from the one from which she was marked. On nearly all arrivals at the ‘foreign’ nest this forager transferred nec-
tar to workers; she was not attacked or
reared differently from other foragers
as far as I could tell. She continued to
do this for several days, while still arriv-
ing at the nest at which she was marked
on the same days. Both colonies were
well into the brood-rearing phase when
we arrived, but it is possible that one of
these colonies formed as a reproduc-
tive swarm of the other and workers
that had swarmed still remembered the
location of the older nest. If discrimina-
tion cues are at all genetically deter-
mined and relatedness is higher within
than among colonies (and their offspring
swarms) then ease of acceptance of for-
agers from offspring colonies at parent
colonies might be high. Individual revis-
iting former homes might also retain dis-
tribution cues independently of relat-
edness.

2. Drifting: The issue of relatedness
is further clouded in these observations
and those in the following section be-
cause they were made on workers
reared from combs in the lab and intro-
duced into observation colonies. If in-
duced workers are less than 24 h old
they appear to be accepted by the ob-
server colonies and enter the active
worker force with a very high rate of
success. In all field seasons (2 in Costa
Rica, 1 in Panama) marked workers
introduced into one colony switched, ap-
parently permanently, to another obser-
vation colony. As a rough estimate this
occurs in 1 of every 200 introduced
workers. Observation colonies were of-
ten close to each other (within 20 m).
Though the interpretation of drifting
based on relatedness is unclear in this
case, the drifting workers probably
spent at least several days in the origi-
nal nest. I conclude this because P.
occidentalis workers begin foraging at
a mean of 19 days of age (though a
few forage as early as 4 days of age),
and workers rarely fly before the onset
of foraging. Therefore it might be ex-
pected that introduced workers would
adopt the discrimination cues of their
home colonies before drifting.

3. Pilfering: In 1991 in Costa Rica a
single marked worker introduced into an
observation colony appeared to active-
ly steal from a second colony for sever-
al days. The colonies were approximately
15 m distant and both were located
under Citrus sp. trees. The worker in
question was distinctly marked. She
repeatedly arrived at the ‘victim’ colony;
I could not help but interpret her move-
ments on the victim nest as ‘sheepish’
but she was never obviously attacked
or challenged by the native workers.
In all cases she entered the nest then
emerged with a visibly distended gaster
in less than 1 min and flew off, often
returning within 5 min. I found that she
flew directly to her ‘home’ nest and trans-
ferred liquid to nestmates. Surprising to
me was the fact that she appeared to
be stealing water (based on her pos-
ture during liquid transfer). Though wa-
ter is perhaps not a very difficult material
to locate, its collection engages several
foragers at high work rates on most
days. This type of kleptoparasitism
of conspecific colonies could be very cost-
ly and may represent a selective force
favoring colony integrity and nestmate
discrimination ability.

My thanks to Robert Jeanne and
Karen London for their thoughtful discus-
sions of the observations addressed
above.

Remarks on
Stridulatory Organs in Mutillids

by

Till Osten

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Since 1974, when Willi Hennig sug-
gested that I study functional morpho-
ogy and phylogenetics in “Scolioidae”, I
have always observed both living and
preserved material. Knowledge of hab-
its, special morphological structures and
their functions in combination seems very
valuable to me in searching for phylo-
genetic relationships.

For many reasons I began my study
of mutillids by going to the sandy,
dry dunes of the Camargue in the south
of France for several years in a row.

On many occasions, especially in
the afternoon, I studied the different
habits of mutillids: (Tropidololita littoralis,
Smicromyrmex viduata, Dasylabris maura
and others) in their natural surround-
ings: searching for their hosts, for food,
or for their partners. This was one part
of my program of "morphological structure and function".

I also brought back more than 100 individuals to the institute (at that time the Zoologische Institut, München) to continue my observations on living material.

The results: neither in my field studies nor in my observations in the laboratory did I at any time observe "singing" behaviour in multilids, males or females, unless they were almost in body contact (distance 2 cm or less) or were directly struggling or mating. "Singing" in multilids can be induced by artificial disturbances, for example by grabbing the wasp with a pair of tweezers. I have never observed a reciprocal action to "singing", that is, an attraction and a kind of response from the partner reported by Spangler and Manley (1978, Annals of Ent. Soc. Am. 71:389-392).

Therefore "singing" in multilids, males or females, is not comparable to the "singing" in grasshoppers or cicadas. It seems to be an expression of more or less aggressive or nervous moods and has nothing to do with attracting the partner or with mating behavior. In multilids pheromones seem to play the main role in finding a partner.

From my point of view it seems very interesting to ask about the evolution of the stidulatory organs, because there should be a correlation between morphology and function. I think that the idea of the "double function" of organs will help us to understand the function of stidulatory organs in multilids.

Off-nest Gastral Rubbing Observed in Mischocyttarus immarginatus (Hymenoptera: Vespidae) in Costa Rica

by

Sean O'Donnell

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The biology of the diverse solitary-founding wasp genus Mischocyttarus is poorly known, perhaps in part due to its largely Neotropical distribution (Richards 1978). This genus is of interest to students of the evolution of social behavior and communication in the Polistinae because it is the sister group to a large clade containing all of the swarm-founding wasp genera (Carpenter, pers. comm.).

West-Eberhard (1982) proposed a scenario for the evolution of trail pheromones used in swarming by the Neotropical tribe Epiponini which included marking of nest substrates away from the nest by non-swarming wasps as an intermediate stage. The occurrence of this stage was evinced by Litte's (1981) observations of gastral rubbing (presumably involving chemical marking) near disturbed nests and between old and new sites by queens of M. labiatus.

Here I report off-nest gastral rubbing in another species, M. immarginatus.

Mischocyttarus immarginatus is a common nesting associate of the swarm-founding wasp Polybia occidentalis in Guanacaste Province, Costa Rica; colonies of M. immarginatus are rarely found more than 0.5 m distant from P. occidentalis nests (Windsor 1972, Starr 1988). On 30 July 1991 a colony of M. immarginatus was initiated by at least two females approximately 10 cm from a P. occidentalis observation colony at Hacienda La Pacifica near the town of Cañas, Guanacaste. Both nests were in a Citrus sp. tree at a height of 1.3 m from the ground.

At least one of the M. immarginatus cofoundresses rubbed her gastral venter on the upper surfaces of leaves in the nest tree on six occasions between 1430 and 1530 on 30 July. The posture and motion employed in rubbing was similar to that described for trail marking workers observed during swarm movements of epiponine wasps (Naumann 1975; Jeannie 1981): the gaster was extended with the distal tip slightly elevated and the sternites pressed against the leaf, and the wasp walked forward wagging the gaster from side to side at a rate of several wags/second. Three different leaves were rubbed, all within 1 m of the nest. All observed rubbing was performed by wasps that flew directly from the nest to the leaf. On five occasions the rubbing wasp flew off after several seconds; on one occasion the rubbing wasp returned directly to the nest. I did not observe wasps investigating rubbed leaves, and could not detect any odor on rubbed leaves. The M. immarginatus colony was joined by at least four additional females over the following two day period, though no further rubbing was observed.

If a chemical secretion was applied during leaf rubbing, it is possible that it served either as an attractant, drawing potential cofoundresses to the nest vicinity, or alternatively as a territorial marker, the function of which might be to inhibit additional nest foundations in the area. The attraction/orientation properties of Mischocyttarus marking observed by Litte (1981), and the fact that P. occidentalis colonies at La Pacifica frequently have more than one associated M. immarginatus colony, suggest that former may be the case.

References


Where have all the Agelaea males gone?

by

Justin Schmidt

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Although colonies of Agelaea are enormous with tens of thousands of individuals, and might have the most populous normal nests of social wasps, males are rare in collections. In fact, the males of several species are not even known. Why is this? Where are all the males? Two answers come to mind: 1) males are rare because very few are produced by a colony; and 2) males are produced, but then leave the colony and disappear, that is, have habits that do not lend themselves to casual collecting. I have
a few clues that reason (2) might be more likely. First, it seems improbable that a species with as large a worker population as *Agelaia* would not have the necessary latitude in resources to produce numerous males, or that the forces of sexual selection would not favor "cheater colonies" that produced more males. Rather, it seems that the mating system of species in the genus likely drives the system. Either there is little outbreeding, and the few required males are produced just before reproductive swarming (and then discarded), or there is outbreeding, but that males leave the colony, not to return. The latter scenario might occur if the species breed by a lek mechanism, much like many *Philanthus*, *Xylocopa*, etc., and that males permanently leave the colony for a lek area. In support of this possibility was an observation I made in Lomas Barbudal, Costa Rica in March 1991. We were studying a colony of *Agelaia myrmecophila* and noted an odd individual quietly resting and peering at us from the underside of a leaf of a tree about 100 m from the colony. At this time, the middle of the dry season, most of the trees were leafless. Upon capture, this odd individual was discovered to be a male. This male's behavior certainly suggested lekking behavior. Shortly after this observation, and before I could make more observations, the colony was destroyed by a large predator (presumably a *tamandua*) that had strewn the combs all over the ground. Could it be that males leave the colony soon after their emergence and spend the rest of their lives near a lek where they are not likely to be captured by net-swinging or malaise-trapping hymenopterists? Possibly others such as *Parachartergus* for which male records are also scarce have a similar behavior. Anybody have evidence to support or refute this idea?

**Chinese Wasp Venoms**

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Chinese people are much more interested in and aware of the potential uses of bee and wasp venoms than are North Americans. Consequently we have been investigating the venoms of *Polistes rotheinyy* and *P. olivaceus*. Although our ultimate goal is to develop these and other wasp venoms into products of use for society, our immediate goals have been to develop collecting techniques for obtaining the venom and to discover fundamental information about the biochemistry and activities of these venoms.

Unlike snakes, which are large, easy to milk, and yield large quantities of venom, or honey bees, whose venom can be easily collected via electrical grids over plastic sheets thought which the bees sting, venoms of *Polistes* have eluded simple collection. Over the years there were various reports of electrical systems that were used for collecting vespid venoms (including *Polistes*); but none of these were really practical. Simple evidence of this can be observed by noting that Vespa Laboratories in Spring Mills, PA, the main world-wide supplier of social vespid venoms, still collects venom by homogenizing sacs of individually dissected wasps. Our first goal was to design an apparatus that can collect venom of *Polistes en masse*. The first author succeeded in constructing such a device (Figure 1), whereby making reasonable quantities of venom available for investigation, collaboration, and potential sale. Details of the collection system were described in Chinese Patent No. 88209385.5.

Stings of most *Polistes* are painful. This, however, does not necessarily mean that the venoms have interesting biochemical or pharmacological activities. For example, the second writer investigated the venom of the spectacularly impressive pompildid *Pepsis formosa*, whose enormous size and warning coloration should be enough to deter even the most determined predator. Backing up is a sting that causes more intense immediate pain than any other insect known to the authors. Despite this, in pharmacological terms it turns out that *Pepsis* venom is essentially inactive in mammals. The LD50 is 65 mg/kg, or about 20 times less active than the ordinary honey bee venom. We tested the *Polistes* venoms for activity in mice after filtering the venom through .45 μ membranes to remove any sediment and potential bacteria. The lethali-
ties were 14 and 11 mg/kg for *P. rothenyi* and *P. olivaceus* respectively, values similar to those for some North American *Polistes* (Schmidt, J. O. 1990. p 387-419 in: Insect Defenses (D. L. Evans & J. O. Schmidt, eds.) SUNY Press: Albany, NY, and unpublished). These results indicate that the electrically-collected venom is active and suitable for continued investigation.

Social vespid venoms are often highly hemolytic, that is, they cause the destruction of red blood cells. This is the main reason that people stung by large numbers of *Vespa* or *Vespsula* often have bloody urine or kidney failure. *P. olivaceus* appear to be unusual among vespids in that their venoms contain very little hemolytic activity. Its activity is only about 3% that of honey bee venom and about 2% that of *Polistes annularis*.

Phospholipase A is the most toxic enzyme in insect venoms. It is widely distributed in venoms of vespids, apids, and ants, with the highest levels in ves-
Figure 2. Isoelectric focusing pherogram (pH 3-10) of venoms. From left to right: purchased crude Chinese honey bee venom (very low purity); *Pogonomyrmex* harvester ant venom; *Polistes major* castaneicolor venom; *Polistes olivaceus* venom; *Polistes rothneyi* venom; standards. Basic proteins migrate toward the top and acidic proteins toward the bottom.

Pidds. The level of phospholipase in *P. olivaceus* is low, being about 15-20% that of *P. annularis*.

Venoms of stinging insects contain a host of proteins whose functions are not known. Since they have no known activities, there are no simple quantitative ways to compare these proteins among species. However, one way to obtain a qualitative indication of similarity of venoms is by electrophoresis or electrofocusing. It is well known in venoms that many active components are small peptides that are extremely difficult to study by electrophoresis. For this reason, we chose isoelectric focusing, a method that separates proteins by their relative acidity or basicity, rather than by size, for our comparison. In Figure 2 is shown the pherogram of the venoms of honey bees, *Pogonomyrmex rugosus* (harvester ants), *Polistes major* castaneicolor, *P. olivaceus*, and *P. rothneyi*. Several noticeable features are evident in the pherogram. First, the venoms of *P. rothneyi* and *P. major* are the most similar. *P. olivaceus* is probably similar to the other two *Polistes*, but the much lower venom loading produced a weaker banding pattern. All of the *Polistes* venoms have rather different patterns from those of the ant and honey bee venoms. Harvester ant and honey bee venoms are also dramatically different in appearance, with the ant venom containing mostly neutral or acidic proteins and the bee venom mostly basic to very basic proteins. These results indicate that *Polistes* from different species groups and different continents exhibit similarities and gross differences from harvester ant or honey bee venoms.

At this early stage in our wasp venom research we do not really know the true value of *Polistes* venoms for research or medical or commercial use. We do know that *Polistes* venoms can now be collected and that at least the two Chinese venoms we have studied are not highly toxic and might well be good candidates for investigating via animal models potential benefits in treating various ailments including arthritis or other inflammatory diseases. Perhaps an even greater potential use for venoms is the generation of additional characters that can be used for taxonomic studies and genetics.

Protection While Collecting Nests of Pugnacious Social Wasps by

Justin Schmidt
(Southwestern Biological Institute, 1961 W. Brigha, Tucson, AZ 85745)

Several of us who enjoy reading *Sphexos* also have a predilection for collecting live colonies of stinging wasps (are the two characteristics related?). I remember once being warned by John Wenzel to be wary of (ie. avoid) colonies, especially large colonies, of *Ageiaia* and not to try to collect them. He suggested that they literally “might kill you”. Well, I tucked that advice away in my cranium somewhere and continued my usual marauding activities toward polybine wasps. From a recent trip to Costa Rica and several previous trips, I have come up with what I think is a mostly “tool proof” protection for collecting stinging wasps and living through the ordeal. I say “mostly” because as scientists, we all know that there are almost no absolutes. I will give two examples of different problems and how I solve them.

The first problem concerns wasps that are just plain nasty. We all have our favorites. My current one is *Polybia simillima*, a large black *Polybia* that builds rather large nests. My first reaction to such a creature was awe. In my experience *Polybias* are not black; so a big and black-black *Polybia* should set off some warning alarms. The alarms are real!

Anyway, the first item of necessity for an encounter with any venous colony of wasps is a good bee suit. Don’t say honey bees (commonly called “pollen pigs”) and beekeepers have never done anything for vesologists - remember beekeepers invented and have refined the bee suit to its present state (more on that later). I prefer the fully zippered variety that have velcro fasteners on cuffs, around the zipper gap at neck, etc. They cost about $50-60, which is high, but worth it at times. Next you need some form of gloves and footwear and duct tape. For gloves you can use standard leather bee gloves or your own invention. One of my favorites is two or three (depending upon the size of the critter to be captured) layers of latex surgical gloves. These have the advantage that they allow dexterity of work, without allowing too many stings. They get sweaty inside, which is a minor drawback, and once in a while a sting will get through (I intentionally pissaed off a variety of large colonies of Africanized pollen pigs to see if the gloves would hold - they did: I only got one sting through all three layers and over five hundred were in a colleagues shoes). The duct tape is for taping all gaps around gloves, boots, and anywhere. But this is not always enough.
Let's return to my example species: *Polybia similima*. I was collecting in Bija
gue, Guanacaste (see Menke's description, *Sphencos* 22:10-12) in one of Frank
Parker's favorite screw worm collecting sites and Frank pointed out a colony of
*P. similima* that had chased him off. (Mention should be made of Nomie Bid
ias [a wonderful name to match her charac
ter], originally from Frisco [San Fran
cisco for those purists] who has been in
Costa Rica for about 18 years, runs a
small pulperia, and whose husband owns the land and generously allows entomologists to collect there). I donned
my outfit and went at it. I soon retreated
with a variety of wasps inside my veil and Frank looking rather amused.

Seems that this species, like so many
Neotropical wasps, lands on you and
wiggles through any small hole to get you. In my case it was the mesh of the
veil. One must remember that although many wasps look big, they are often
thin relative to the fatter pollen pigs for
which the veils were designed. Attempt
2: put on an army type mosquito veil
with much smaller mesh. Repeat of 1,
with Frank further amused, but a little
predictive as I was bringing wasps
back to his shade canopy. The problem
this time was that the wasps crawled
under the elastic of the mosquito veil at
places where the underlying suit had
tails. Attempt 3: duct tape the base of
the veil where the wasps were under-
crawling. Same result, except Frank
was no longer amused – he got stung by
one of my "guests". Wasps were still
getting under and through the poor tape
job. Attempt 4: better job of duct tape,
plus add the bee veil to top of the mosqui
to veil. Sweet success!

Based on the above you would think that all that is needed is a good, well fit
ning, finely meshed veil or double veil (to
prevent accidental contact of the mesh
with your skin, thereby allowing stings)
and a good taping job to seal all gaps.
Wrong! You need to know (or discover
the hard way) some biology of your prospec
tive species.

My second example is *Parachartergus
fraternalis*, another black wasp (does this
say anything about black? remember
black and/or red are the classic war
ning colors). This species not only has
an effective sting, but it flies in front of
your face and sprays venom into your
eyes. I remember several times after
begging a nest, I had to crawl down a
tree blindly because of my closed and
painful eyes. The solution to this prob
lem is easier: wear goggles (old fresh-
man chem lab cut offs will do fine) or
large framed glasses (I had neither avail
able when I did my collecting). If it is a
particularly nasty job, you might want to
consider a dust mask or holding your
breath (as I do) to keep the venom aer
osol out of your nose and mouth.

In conclusion, if you are not too lazy
like many of us tend to be, you can ef
ectively and safely collect colonies of
rather pugnacious wasps. One last ap
peal – I wish the Japanese (since they
seem to be so good at creative innova
tions in consumer products), or some
body else, would invent a (bee) veil
made of strong, flexible plastic that holds
its shape and that does not get holes in
it when crumpled in collecting bags, as
do the present steel meshes.

![Pison in Costa Rica](image)

*Pison in Costa Rica (Spheneidae)*

by

Arnold S. Menke

Foty two species of *Pison* are known
in the Neotropical Region (Menke, 1988,
1989, 1990a, b), and of these, 13 occur
in Costa Rica. Two of the 13 are record
ed from Costa Rica for the first time in
this paper.

The following new records are based
on material from the insect collection at
the Universidad de Costa Rica (UCR),
Utah State University (USU), University
of California at Los Angeles, Henry
Heepenheide (UCLA), and the National
Museum of Natural History (USNM).
The UCR material is from Malaise traps
run at many different habitats by Paul
Hanson, Director of the Insect Museum.
The USU material is from Malaise traps
run by Frank Parker at various Costa
Rican locations, as well as wasps net
collected by him. The only Costa Rican
species not listed below is *chrysops*
Menke. For Costa Rican records of it
see Menke (1988, 1990a).

*Pison abates* Menke

COSTA RICA, Alajuela Prov.: San Pe
dro de la Tira, Cacao, March/April 1990,
one female (UCR). Puntarenas Prov.: 3
km SW Rincon (Osa Peninsula), Feb./
Nov. 1989, 33 females (UCR); 23 km N
Puerto Jiménez (Osa Peninsula), Jan./
April 1991, one female (UCR); Reserva
Biologica Carara, Estacion Quebrada
Bonita, Aug./Nov. 1989, one female (UCR);
Parka Nacional Corcovado, Estacion
Sirena, April/Aug. 1989, one female
(UCR).

These are the first records of *abates*
from Central America. The species was
described from Ecuador, Bolivia and
Guyana. In spite of the large number of
specimens in this sample, no males are
present, so this sex remains unknown.

*Pison arachniraptor* Menke

COSTA RICA, Alajuela Prov.: Bija
gue (20 km S Upala), Jan./Feb. 1991, one
female (USU). Puntarenas Prov.: 24 km
W. Piedras Blancas, 200 m, Dec. 1990,
one female (UCR).

These are the first Costa Rican rec
ords for *arachniraptor*, a widespread
species in South America, and previously
known as far north as Panama.

*Pison cameronii* Kohl

COSTA RICA, Alajuela Prov.: Bija
gue (20 km S Upala), Sept./Oct. 1990, one
female (USU). Limon Prov.: Parque Na
tional Tortuguero, Estacion Cuatro Es
quinas, 0 m, April/Aug., 1989, 5 females
(UCR). Puntarenas Prov.: 23 km N Puert
o Jimenez, 10 m, Jan./April, 1991, one
female (UCR); 3 km SW Rincon (Osa
Peninsula), 10 m, June/Nov., 1990, two
females (UCR); 10 km W Piedras Blan
cas, 100 m, March/Aug. 1989-1991,
three females (UCR). San José Prov.: 
Cuidad Colon, 800 m, Jan./May, 1990,
4 females (UCR).

A common, widespread species in the
Neotropical Region.

*Pison conorme* Smith

COSTA RICA, Alajuela Prov.: Bija
gue (20 km S Upala), Jan./Feb. 1991, one
female (USU). Guanacaste Prov.: Estar
cion Maritza, W of Volcan Orosi, 600
m, 1988-89, 2 females (UCR). San José
Prov.: Zurqui de Moravia, 1600 m, Feb.
1989, one female; San Antonio de Es
cazu, 1300 m, no date, one female
(UCR).
A common species in Central America.

**Pison cooperi** Menke

COSTA RICA, Heredia Prov.: La Selva Biological Station, 3 km S Puerto Viejo, April 1990, one female (UCLA). Limon Prov.: 16 km W Guapiles, 400 m, April/May, 1989, one female (UCR). Puntarenas Prov.: 3 km SW Rincon (Osa Peninsula), 10 m, one female (UCR).

Costa Rica is the known northern limit of the range of this common Neotropical species.

**Pison cressoni** Rohwer


A common Neotropical species. The gaster is entirely black in these specimens — none of the terga have cream or yellow marginal bands.

**Pison eu** Menke

COSTA RICA, Guanacaste Prov.: Cerro el Hacha, NW of Volcan Orosi, 300 m, 1988, one female (UCLA); Estacion Maritza, W. of Volcan Orosi, 600 m, 1988/89, two females (UCR); Estacion Experimental Enrique Jimenez Nuñez (14 km SW Cañas), Feb./March, 1990, April/May, 1991, 5 males, 4 females (USU). Puntarenas Prov.: 3 km SW Rincon (Osa Peninsula), 10 m, March/Nov. 1989/90, 7 males, 11 females (UCR); Parque Nacional Corcovado, Estacion Sirena, 50 m, April/Aug. 1989, two females (UCR).

A common species in Costa Rica. Known from Mexico to Colombia.

**Pison longicorne** Menke

COSTA RICA, Guanacaste Prov.: Estacion Experimental Enrique Jimenez Nuñez (14 km SW Cañas), Aug. 1-12, 1990, one female (USU). Heredia Prov.: La Selva Biological Station, 3 km S Puerto Viejo, April/May, 1990, 3 females, one male (UCR).

A commonly collected Neotropical species known from Mexico to Argentina.

**Pison maculipenne** Smith

COSTA RICA, Heredia Prov.: La Selva Biological Station, 3 km S Puerto Viejo, April 2, 1988, one female (USNM), April/May 1990, 2 females (UCRA). Limon Prov.: 7 km SW Bribri, 50 m, Oct. 1989, one female (UCR).

Costa Rica is the northernmost outpost of this species whose range includes much of northern South America. The infuscation of the forewing in these specimens is blackish, and the body is black except for red on interterginal I and sternum I of two of the three La Selva wasps.

In my revision (Menke, 1988) I discussed three different male species, anyone of which might be the male of *maculipenne*. I ended up recognizing the male with simple antennae (represented by two specimens, one from Panama, one from Venezuela) as *maculipenne* (see discussion on page 60-61). The ventral surface of the flagellum in the other two male species either had raised linear tyli on flagellomeres II-VI or welt-like tyli on flagellomeres III through VII. In the species with welt-like tyli, flagellomeres IV-VII were rounded out beneath making the articles asymmetrical. The genitalia of the male of *maculipenne* and the male with welt-like tyli and rounded out flagellomeres appear identical, and I am left wondering if the male antenna is simply variable in *maculipenne*. Perhaps the presence or absence of tyli varies with the species. However antennal features like these are usually indicative of different species, and that is the way I left things in my revision.

I have examined one male from Bijagua, Alajuela Prov., Costa Rica (USU) that has welt-like tyli and flagellomeres IV-VII are swollen ventrally. Its genitalia and sternum VIII agree with figures 172-175 (*maculipenne*) in my revision. This male is entirely black except that sternum I and the sides of tergum I are reddish brown, and the basitarsus on the mid and hind legs is weakly suffused with yellowish white. The UID is 0.66X the LID, and the OOD is 0.76X the HOD. These values are outside those for the two male specimens of *maculipenne* reported in my 1988 revision, but certainly not outside the expected range of variation if more *maculipenne* were available for study.

Since my revision was published, an additional male of the Bijagua type has become available. It was collected in Venezuela, 40 km S of Puerto Ayacucho (USNM). Its antennae and genitalia agree with the Bijagua specimen. Of particular interest is the fact that the abdomen is reddish brown except for an infusion of black on terga III-VI. The hind margin of terga I-III has a cream colored band. The mid and hind tibiae are yellow brown above, and tarsomeres II on these legs are pale. The wing membrane has a yellow tint and the marginal infuscation is brownish. All of these
color traits resemble the female holotype of *maculipenne* (see my revision, p. 59-60), and suggest that perhaps the true male of this species is the one with well-like tyli with rounded out flagellomeres. Resolution of this problem will probably require rearing of nest material to see which type of male is true *maculipenne*. The UID in the Ayacucho male is 0.88X the LID, and the OOD is 0.76X the HOD. The first value is essentially the same as what I gave for *maculipenne* (Menke, 1988, p. 60), but the OOD:HOD value is high, although not unreasonably so. The clypeus of the Bijagua and Ayacucho males is identical to that of *maculipenne* (see figs. 170-171 in my revision). This plus the fact that the genitalia are similar in all of these specimens, makes me wonder how constant male antennal features are in this complex.

**Pison pilosum** Smith

COSTA RICA, Guanacaste Prov.: Estación Experimental Enrique Jimenez Nuñez (14 km SW Casbas), Jan./May, Sept., Nov. 1980-91, 34 females, 6 males (USU).

A commonly collected species in Central America and northern South America.

Literature Cited


Further Records of Neotropical *Pison* by

A. S. Menke

I have recently examined material sent to me by Manfred Fritz of Salta, Argentina (FRITZ), Martin Cooper of Lyme Regis, England (COOPER), Lynn Kimsey, University of California, Davis (UCD), Fernando Fernández, Bogota, Colombia (FF), and Marcio L. de Oliveira, Instituto Nacional de Pesquisas da Amazônia, Manaus, Brasil (INPA).

**Pison arachniraptor** Menke

COLOMBIA, Amazonas: Mata Mata, February, 1989, one female (FF).

**Pison aranevorax** Menke

BRASIL, Amazonas: Manaus, Aug. 21, 1989, one female (INPA), Nov. 12, 1989, one female (USNM).

**Pison cameroni** Kohl


**Pison cooperi** Menke

VENEZUELA, Zulia: El Tucuco, July 24, 1975, one female (UCD).

This is the first Venezuelan record for *cooperi*.

**Pison cressoni** Rohwer


**Pison eyvae** Menke

COLOMBIA, Valle: Largo, July 25, 1975, one female (UCD).

**Pison gnythos** Menke

BRASIL, Amazonas, Manaus, March 23, 1990, one female (INPA).

This is the first record for Brasil.

**Pison longicorne** Menke

GUATEMALA, Peten: Ruinas Tikal, July 7-10, 1977, one female (UCD).

This is the first record of *longicorne* from Guatemala.

**Pison maculipenne** Smith

PANAMA, Canal Zone: Barro Colorado I., July 7-8, 1978, two females (UCD).

These specimens are the yellow winged form.

**Pison stangel** Menke

ARGENTINA, Salta: Rosario de Lerma,


Propodeal dorsum sculpture varies in these specimens from simply punctate to variably microridged (as indicated for the species in my revision, Menke, 1988: 42), but all have some fine longitudinal microridging on the upper part of the propodeal side. The Paraguay record is the first for that country.

**Pison wasbaueri** Menke


The female is the second known specimen of that sex, and its mesopleural punctuation is uniformly dense up to the mesopleural suture, a distinctive feature of female *wasbaueri*.

Literature

TECHNIQUES

A Simple and Inexpensive Method for Anesthetizing Insects and Small Arthropods

by Stefano Turillazzi
(Dep. Biologia Animale e Genetica, Università di Firenze, Italy)

Carbon dioxide is widely used to anesthetize insects. This gas is contained in cylinders which are usually too big to carry in the field, must be refilled by specialized operators, and are expensive. Faced with these problems while studying social wasps (which are not easily handled subjects) I came up with a simpler way to obtain carbon dioxide.

My very first attempt, though, was to connect a small vial (with wasps inside) to the cap of a bottle Nocera Umbrar® carbonated mineral water with a rubber tube. Shaking the bottle produced CO₂ and the wasps fell asleep in a few seconds. They recovered half a minute later. As one might suspect, the mineral water blend proved to be little different in its action from other carbonated beverages. In "controlled experiments," wasps fell asleep using even Coca Cola®, Pepsi Cola®, Dom Perignon®, etc. The different collateral effects due to the quality, nationality, popularity or exclusiveness of the beverages remain to be studied in depth.

Producing carbon dioxide is quite simple (as any chemistry student knows) and it's not necessary to carry boxes of soft drinks or to fill the laboratory with cases of champagne. A simple device that I experimented with is illustrated in fig. 1. It consists of two plastic vials with screw caps. The caps are joined by a short rigid plastic tube. The lower vial is 3/4 full of water. The insect(s) to be anesthetized is placed in the upper vial. A small glass vial containing a mixture of tartaric acid and sodium bicarbonate is put in the water and the device is quickly assembled. This method works quite well and the length of time that the insects remain anesthetized depends on the kind and size of the insects and on the time they are kept in the upper chamber. Small wasps (Stenogastrinae) submitted to the treatment were still alive and active after four months and none died while they were anesthetized.

No doubt the method can be greatly improved upon, and it may have already been developed and used by previous amateur and professional entomologists: to these persons I offer my excuses and acknowledgements.

Fig. 1

<table>
<thead>
<tr>
<th>Upper Chamber</th>
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<tbody>
<tr>
<td>Lower Chamber</td>
</tr>
<tr>
<td>water</td>
</tr>
<tr>
<td>tartaric acid &amp; sodium bicarbonate</td>
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</tbody>
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Computer Generated Labels — An Update

by Linda L. Sims and George L. Venable
(Department of Entomology NMNH, Smithsonian Institution Washington, DC 20560)

Recently, it has become apparent there exists a need for quick, yet archival quality computer generated labels. Prior investigations by the primary author (Insect Collection News — 2, (2): 26; Curation Newsletter, 10:2-3) suggested that treated laser printer generated labels seemed "adequate as long as there is no abrasion, i.e. contact between the specimens and the label...". However, a recent experience by Dr. Terry Erwin (NMNH) exposed a flaw in this technique. While field pinning specimens, ethyl acetate came in contact with the label. This exposure caused the toner on the label (and hence the information on said label) to dissolve instantly. Further experiments in the laboratory shows this to be a common problem to all labels tested by the Smithsonian’s Conservation Analytical Laboratory. Since ethyl acetate is commonly used before and after an entomological specimen is prepared, the risk of losing label information is of great concern. Therefore, laser printer generated labels can no longer be recommended.

Preliminary tests show that the H-P ink jet printer with their new indelible black ink cartridges may not suffer this problem. Anyone with experience in the use of this printer is invited to send their comments to the authors.

Sex Determination in Early Instar Wasp and Bee Larvae

Bryan Denforth (Department of Entomology, NMNH, Smithsonian Institution, Washington, DC 20560) wishes to bring to the attention of Sphex readers a recent paper describing very simple staining methods for determining the sex of wasp and bee larvae at any stage of development, from first instar to prepupa. M. J. Duchateau and P. van Leuwen (1990, Insects Sociaux, 37:232-235) describe their use of the method to determine the sex of bumble bee larvae but speculate the method may work on other bees (and presumably wasps) as well.

The method relies on first fixing the larvae in Carnoy’s fixative and then using Congo Red to stain the imaginal disks of the genitalia, which differ strikingly in morphology between males and females. The method works very well with Perdita last instar larvae, even when the staining step is eliminated. Bryan thanks Hayo H. W. Velthuis and George Eickwort for pointing this article out to him.

COLLECTING REPORTS

Galapagos and the Polistes Menace

by John Heraty
(Dep. of Biology, Carleton University, Ottawa, Ontario, Canada, K1S 5B6)

and Sandra Abedrabbo
(Station Entomologist, Charles Darwin Research Station, Apartado Postal 17-01-3891, Quito, Ecuador)

In the summer of 1991, Heraty had the opportunity to spend three months on the Galapagos Islands, Ecuador, as part of Stewart Peck’s general survey of its insects. His focus was on the Hymenoptera, in particular, the smaller parasitic groups. Generally, the Acalytes fair rather poorly, and, excluding the 29 species of ants, account for only 12.3% (30 of 243 species) of all Hymenoptera that Heraty has been able to identify (Table). He has processed about 65% of the material, and no doubt the pro-
portion of Aculeates may still drop slightly. Chalcidoidea presently account for 44.4%.

Bees are represented only by Xylocopa darwinii, and the sphecids by a mere 9 species that include Oxybelus, Bicyrates, Ectemnius, Pison, Tachysphex, Liiris, Solierella, and Nitel. Chrysidoids include three genera of bethylids (Goniozus, Rhaphiditelus, and Sclerodermus), and a number of dryinids, which include three species of aphelinines (Anteon and Deinodyrini). Pompilids have only one known species, Aporinella galapagensis.

Until recently, vespid wasps have made only a poor showing on the islands. Only one endemic species of Pachodynerus is known, and this species is about to be synonymized with a continental species. The only other mention of a vespid is a record of Polistes jadeaque collected on a boat about 200 km from the Galapagos Islands.

In 1986, the first record of Polistes versicolor versicolor was made on the island of Floreana. Over a five-year period, these wasps have spread to almost every island in the archipelago, except for a few of the more isolated northern islands. In part, the rapid spread has been due to an explosive growth in the populations of Polistes. We first encountered a few nests in the arid lowland scrub on Fernandina - nothing special - typical non-aggressive Polistes. Then we arrived at Caleta Iguana on the southwest corner of Isabela. We don't think anyone in our expedition will forget getting off the boat to be greeted by several thousand Polistes - all eager to drink our sweat and search us for caterpillars (they particularly liked Heraty's yellow backpack). A rough estimate would put 10 to 20 nests in every tree in the area. Stewart Peck's yellow trough traps collected over a gallon of wasps (nearly saturation) in four days. Adults were collected at all elevations up to about 1500 m, but numbers decreased proportionally with the height of the vegetation (here the pampa began at 400 m).

What effect is Polistes going to have on the islands? We noted that there were almost no birds in the area of highest infestation (birds are extremely abundant almost everywhere else in the Galapagos). The famous Darwin finches rely on the insects as food and increased insect abundance accompanying rainfall and can let the finches have several broods in a single season. If wasps remove the caterpillars during flush periods, the finches (a precious aspect of the Galapagos) may soon be lost through competition for a limited resource. On top of the ecological effects, tourism also may be severely affected because of the absence of bird life and high incidence of stings.

One additional note for behaviorists. While on the rim of Volcan Alcedo (about 20 meters across, 1100 m elevation) on the island of Isabela, Heraty observed what appeared to be a migration of Polistes moving along the rim in a south to north direction from Volcan Sierra Negra, an area of extremely high populations of wasps. Roughly, he counted over 300 wasps during a five-minute period, and this lasted for over two hours from when they were first noticed. It is easy to see why they have spread so rapidly. Oddly, about 1 in every 20 to 40 wasps was a yponomeutid moth!

For once, Polistes cannot be considered to be a beneficial insect that people should cultivate for control of pest insects. On top of fire ants, goats, pigs, cattle, dogs, cats, rats, and humans, this newest invasion may again bring the Galapagos Islands onto or over the brink of an ecological disaster. We would like to hear from anyone who has observed any similar population explosions of Polistes, especially where they have become a problem. If you need more information on the situation in the Galapagos, please contact one of the authors.

Guana and Mona Islands
by
Roy Snelling
(Department of Entomology, Natural History Museum of Los Angeles County, 900 Exposition Blvd., Los Angeles, CA 90007)

October 1991 was spent in the British Virgin Islands on a speck of real estate just north of Tortola called Guana Island (smile when you say that and pronounce it carefully!) courtesy of The Conservation Agency, "Skip" Lazell, and the owner of Guana Island, Dr. Henry Jarecki. Nothin' to do 'cept go out collecting, enjoying the warm sun, plenty of good food, and pleasant folks, mostly biologists. A list of Aculeata is included below. Worked out a neat way to find nests of Polistes and Mischocyttarus; when I find a likely looking shrub, investigate it elbow first. Very effective. I'm also including a map of the island, with my collecting sites marked for posterity. It's a small island, only about 340 hectares (850 acres) and its greatest elevation only 246 meters (806 feet). There is a hotel and accommodations for staff on the hogback between White Bay and Muskemelon Bay ("hotel area" on the map), but the island is otherwise now largely dry tropical forest. A few sheep and runaway biologists are the only threat to the island biota!

The insects are pretty much the routine Virgin Islands stuff, but I suspect that there is much yet to be collected in these islands. The Caribbean generally seems to be poorly collected. I did pick up 2 specimens of a small bee (Hylaeus) that may well be undescribed and this
is the first *Hyelaes* for the Virgin Islands. Two things conspicuously absent were *Bambix* and Sphincinae, although both were collected on nearby islands (Necker, Eustacia, Virgin Gorda). *Stictia signata* was present and very common. *Bicytes spinosa* was found only at North Beach. Only two social wasps, *Polistes crinitus* and *Mischocyttarus phthisicus*, were found. But, I did find an old nest of a different *Polistes*, probably *P. major*. I also picked up an extraordinarily beautiful female *Psorthaspis* (Pompilidae) that may be new; Bishop Museum also has one collected on Guana by Scott Miller and I have another from Puerto Rico. Seems to me it's time somebody paid some attention to Caribbean spider wasps — there's some neat stuff out there and nobody has really studied them since Bradley worked on the Aporinae back in 1944.

On the return, I spent a week in Puerto Rico, staying with my good friends Juan and Maribel Torres, Juan and I visited dry forest at Guanica. Very poor collecting except for the *Camponotus* we were looking for. But, did find *Pachodynerus atratus* nesting in a cave!

More importantly, we spent 2 days on Mona Island. Fabulous place. Another list of its wasps appended. Mona is, again, hot dry forest with a very low profile and virtually no surface water. It does have some interesting limestone caves and shelters where the Taino Indians left some great pictographs. There is also supposed to be a Taino ballcourt, but I didn't have time to see that. Next time.

While we were on Mona, a boatload of refugees from Dominican Republic was picked up and brought to Mona: 14 people in a 10 foot, open boat, out-board motor crapped out, no oars, no food, no water! They were a pretty bedraggled group coming ashore. One of the men saw me and exclaimed to the effect of: My God, there are still Indians on this island! (In Spanish, of course). [One has to know Roy to fully appreciate this statement!]

Oh yes, collecting on Mona was pretty good, especially for the short time there.

So much for the peregrinations.

Some new records:
- *Pachodynerus guadelupensis* (Saussure) (Vespidae) - Puerto Rico: Vega Baja and Puerto Nuevo.
- *Vespuica pensylvanica* (Saussure) (Vespidae) - Limpia Cyn., Davis Mts., Texas.

Incidentally, although I collected all groups of Hymenoptera on Guana, parasitics of all groups were hard to come by. For example, didn't see a single ophiomine at night! Of the two species of *Evanidae* collected, one is a *Brachygaster* (one specimen), the other, more common, is a *Hyptia*, probably *H. poeyi*, but with greatly reduced reddish areas (compared to Cuban specimens).

I should also make note of the fact that my acquisition of specimens on Guana was greatly aided by the enthusiastic assistance of several lovely ladies: Wenhua, Elizabeth, Robin, Roberta, Cory, and Lianna.

**GUANA ISLAND**

**ACULEATE HYMENOPTERA**

**Formicidae**
- *Leptogenys pubiceps* Emar
- *Phedole fallax* Mayr
- *Monomorium floricola* (Jordon)
- *Solenopsis geminata* (Fabricius)
- *Crematogaster steinheli* Forel
- *Wasmania auropunctata* (Roger)
- *Cyphomyrmex minutus* Mayr
- *Dorymyrmex antillana* Forel
- *Brachymyrmex obscurus* Forel
- *Camponotus sexguttatus* (Fabricius)
- *Proceratoppus peckii* (Fabricius)
- *Paratrechina longicornis* (Latreille)

**Tiphididae**
- *Myzina haemorrhoidale* (Fabricius)?

**Scoliidae**
- *Campsomeris dorsata* (Fabricius)

**Vespidae**
- *Polistes crinitus* (Felton)
- *major* Paliot de Beauvois
  [SIGHT RECORD]
- *Mischocyttarus phthisicus* (Fabricius)
- *Pachodynerus atratus* (Fabricius)

**Pompilidae**
- *Pepsis rubra* Drury
- *Aporus prolixus* Bradley
- *Psorthaspis* sp.
Sphecidae

Tachysphex alayoi Pulawski
Tachytes chrysopyga (Spinola)
* trinctus (Fabricius)
Liris ignipennis F. Smith
* luctuosus dahliomi (Cresson)?
* sp. 1
* sp. 2
Ectemnius caesius (Lepeletier & Brulla)
* sp.
Cerceris sp.
Stictia signata (Linne)
Bicyrtes spinoza (Fabricius)

Halictidae

Lasiglossum (Dialictus) sp.
* Augochlora sp. 1
* sp. 2
Megachilidae

Megachile (Pseudocentron) sp.
Coelioxys abdominalis
Guerin-Ménéville

Anthophoridae

Centris haemorrhoidalis Fabricius
* lanipes Fabricius
Anthophora tricolor (Fabricius)
Exomalopsis (E.) sp.
Xylocopa mordax F. Smith

BEES AND WASPS
OF MONA ISLAND

Evanidae

Hyptia weithi Ashmead

Vespidae

Polistes crinitus (Felton)
Mischocytarus phtihicus (Fabricius)
Zethus rufinodus Lateville
Euodynerus apicalis (Cresson)
Pachodynerus tibialis (Saussure)

Pompilidae

Prococemis sp.
Episyrus conterminus posterus (Fox)
Anoplius amethystinus (Fabricius)
* hispanioloae Evans

Sphecidae

Sphex ichneumoneus (Linné)
Sceliphron assimile (Dahloom)
Prionyx thomae (Fabricius)
Triatyrxylon (Triatyrxylon) sp.
Liris sp.

Tachysphex alayoi Pulawski
Tachytes trinctus (Fabricius)
Bicyrtes spinoza (Fabricius)
Stictia signata (Linné)

Halictidae

Lasiglossum (Dialictus) sp.
Agapostemon viequesensis
Cockereli
Megachilidae

Megachile (Eutricharae) concinna
F. Smith
* (Pseudocentron) sp.

Anthophoridae

Anthophora tricolor (Fabricius)
Centris lanipes Fabricius
Xylocopa mordax F. Smith

BOOK NEWS


This book contains 15 chapters with much information of interest to the readers of Sphecos. Two chapters relate entirely to aculeate Hymenoptera: "Holding the fort: colony defense in some primitively social wasps" by Chris Starr; and "Hymenopteran venoms: striving toward the ultimate defense against vertebrates" by Justin Schmidt. Two more chapters contain extensive sections and tables relating to aculeate wasps and other Hymenoptera: "Allomones: chemicals for defense" by Douglas Whitman, Murray Blum, and David Atsop; and "Collective security: aggregation by insects as a defense" by Kevin Vultinec. In addition to these chapters, several others provide concepts and information relating to Hymenoptera. "The evolution of cryptic coloration" by Malcolm Edmunds sets the theoretical stage for "hiding" or inconspicuousness among insects (and yes, a lot of wasps are cryptic). "The evolution of aposematism" by Tim Guildford is likely to become a classic (yes too, a lot of wasps are aposematic in a variety of ways). Finally, George Uetz in "Prey selection in web-building spiders and evolution of prey defenses" and Robert Lederhouse in "Avoiding the hunt: primary defenses of lepidopteran caterpillars" present information on wasps as prey and as predators.

Overall, this book has lots of information on wasps and insect biology and is a bargain at $24.50.


Keys are provided for 392 sphecid wasps found in north and central Europe, although special emphasis has been given to those found in Austria. Abundant illustrations accompany the keys which should make identification of genera and species easy. Each genus is diagnosed, number of species noted, and important references listed. Each species is briefly treated (distribution, flight period, salient features, synonymy).

This is a large format publication and should be a welcome addition to the libraries of most European wasp workers.


This is a supplement to the classic Horn & Kahle (1935-37) work on entomologists, entomological collections, and their history. This supplement covers the period from 1937 to 1961 and follows the style of the original. The main section is index of collections by owners (individuals corporate), followed by an index of museums and institutions by city, bibliography of publications about collections, and plates of determination labels (some 2,000) and entomologists (113). The entomologists pictured are virtually all German except for two pictures of Alex Melander! These pictures represent just part of the almost 5,000 pictures currently in the Institute's collection. The work itself is stated to be based on a card catalog of some 25,000 cards including some 60,000 citations. While the publication bears the former name, Institut fur Pflanzenschutzforschung Kleinmachnow der Akademie
LEFT-HANDED HYMENOPTERISTS
or
THE RIGHT-HANDED DO IT RIGHT!

Normally when a right-handed person puts labels on an insect pin, they are oriented such that when you pick up the specimen with your right hand, the words are readable without rotating the pin in your fingers. When working with museum material, I am often aggravated by locality and other labels that have been placed on the pin "backwards". That is, in order to read them, I have to twist the pin around in my fingers. As a consequence I often remove backward labels from specimens and repin them properly. It occurred to me that the reason for "backwards" labels on pins is simply that the labeler was left-handed. This interesting fact suggests that one can properly determine whether an entomologist is or was dextral or sinistral simply by observing insects that were labeled by him or her.

- The Mud D’aub

BIG BLUE BOOK ERRATA
Part 18

<table>
<thead>
<tr>
<th>Page</th>
<th>Corrected Information</th>
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<tbody>
<tr>
<td>179, LC, L 4 from bottom: 1844 is correct, not 1845.</td>
<td></td>
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<tr>
<td>179, RC, delete L 19 from bottom. Thomson did not describe dahbomni as a n.sp.</td>
<td></td>
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<tr>
<td>265, LC, L 6 from bottom: put parentheses around “Patton” and add (Linis) after “1992.”</td>
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<tr>
<td>297, fig. 84J: skoiak is correct.</td>
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<tr>
<td>368, RC, L 14: Pakistan is correct, not India.</td>
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<tr>
<td>401, RC, line 6 from bottom: delete entire entry (see kruisemani in Cossocerus on p. 426.)</td>
<td></td>
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<tr>
<td>402, LC, L 19 from bottom: Coelocorabro is correct, not (Crabro).</td>
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<tr>
<td>402, RC, L 10: 1880 is correct, not 1879; delete (Crabro).</td>
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<tr>
<td>402, RC, L 23: change punctus to punctum. The name is a noun and its ending is invariable.</td>
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<tr>
<td>403, RC, L 27: change (Crabro) to (Cossocerus).</td>
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<tr>
<td>408, LC, L 30: 1892 is correct, not 1891.</td>
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<tr>
<td>409, LC, L 23: insert (Solenius) after 1871. The species should probably be transferred to Ectemnius or Lesica preceded by a question mark.</td>
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<tr>
<td>424, LC, L 18 from bottom: 1886 is correct, not 1887.</td>
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<tr>
<td>424, LC, L 15 from bottom: 1886 is correct, not 1887.</td>
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<tr>
<td>424, RC, L 5: 1918 is correct, not 1917.</td>
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<tr>
<td>425, LC, L 25 from bottom: subtilis “Pérez” is correct.</td>
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<tr>
<td>425, RC, L 28: 1941 is correct, not 1936.</td>
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<tr>
<td>426, LC, L 19: delete entire entry (see carinatus on p. 424).</td>
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<tr>
<td>426, LC, L 35: insert “new” at end of line.</td>
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<tr>
<td>426, LC, L 43-44: delete “new synonymy by J. Leclerq” [it was published by Leclerq in 1974].</td>
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<tr>
<td>426, RC, delete L 4-5. Dahlbom did not describe borealis as a n.sp.</td>
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<tr>
<td>427, LC, L 4: delete entire entry; “transiens” was a Latin word, not a species name.</td>
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<tr>
<td>427, LC, L 24 from bottom: Dewitz is correct.</td>
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<tr>
<td>427, LC, L 25: 1886 is correct, not 1887.</td>
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<tr>
<td>427, RC, L 4: paltians (without synonymy) was treated as sp. of nigriorius by Leclerq, 1958.</td>
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<tr>
<td>427, RC, L 18 from bottom: 1886 is correct, not 1887.</td>
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<tr>
<td>427, RC, L 8 from bottom: add “lappsus for hector Cameron” at end of line.</td>
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<tr>
<td>428, RC, L 25: 1889 is correct, not 1699.</td>
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<tr>
<td>430, RC, insert as synonym after penultimate line: cypleata Thunberg, 1815 (Philantus), nec cypleata Schrader, 1759; see Schulz (1912:70).</td>
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<tr>
<td>434, RC, insert as subspecies after penultimate line: ssp. rufescens Beaumont, 1950; Algeria.</td>
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<tr>
<td>434, RL, last L: kaufmani is correct. Insert (Enthomosericus) after “1977.”</td>
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<tr>
<td>434, RC, insert as synonym after last L: kaufmani Beaumont, 1950, lap-sus or emendation.</td>
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<tr>
<td>496, LC, L 33: (Harpactes) is correct.</td>
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<tr>
<td>496, LC, L 18 from bottom: 1884 is correct, not 1888.</td>
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<tr>
<td>496, LC, L 14 from bottom: add at end of entry: nec Handlirsch, 1895. Place a † at beginning of entry.</td>
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<tr>
<td>496, RC, L 10: 1933 is correct, not 1934.</td>
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<tr>
<td>496, RC, L 25: Pakistan is correct, not India.</td>
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<tr>
<td>521, LC, L 17: 1933 is correct, not 1934.</td>
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<tr>
<td>527, LC, L 21 from bottom: pluschteckewisski is correct.</td>
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<tr>
<td>528, RC, L 12 from bottom: 1846 is correct, not 1849.</td>
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<tr>
<td>531, RC, L 25 from bottom: add parentethes around Michel and insert (Silus) after 1918.</td>
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<tr>
<td>547, LC, L 33: 1877 is correct, not 1879.</td>
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<tr>
<td>548, RC, L 3: Pakistan is correct, not India.</td>
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<tr>
<td>560, LC, L 10 from bottom: endodans is correct.</td>
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</tbody>
</table>
Jane van der Smissen
(Jesse-Owans-Str. 10
D - 2407 Bad Schwartau, Germany)

I was born in Lübeck, Schleswig-Holstein (Germany) on April 5th, 1948. I attended secondary school, married and brought up two sons. Up to the age of forty, needlework, music and literature filled my pastime. To embellish our walks I got to know, together with my husband, the voices of the birds and grasshoppers of our country. A change in our routine, however, was brought about by the fascinating *Ectemnius sexcinctus*. My husband intended to take photos of these wasps, and I knew I would get acquainted with the aculeate Hymenoptera one way or another. Some friends and well-known experts helped me, for example: Dr. Wolfram Eckloff (Museum of Natural History, Lübeck), Studiendirektor i.R. Heinrich Wolf (Pompilidae) and Prof. Dr. Volker Haeseler (Universität Oldenburg).

With their help and support I succeeded in finding (since 1987) about 360 kinds of aculeates, among them 4 new ones for NW-Germany. Three publications and one commission of research (by the office of environment, Lübeck) would have been impossible without the help of these people. I am very grateful to them for this success, and I am very glad of being allowed to take part in the investigation of the aculeate Hymenoptera.

BEE BUZZ

[From the London Times]

Sir, This morning I went into my garden shed to find a bumble bee (*Bombus terrestris*) buzzing on the inside of the window. When I enclosed it in a cloth to help its exit I noticed that the pitch of its buzz went up one octave. After releasing it I went to the piano and found that its original note was the C sharp below middle C. I wonder if any of your readers have observed the buzz-note of other Bombidae.

Yours sincerely,
G.B.R. Walkley,
14 Main Road, Newton Regis,
Tamworth, Staffordshire.

Notiziario Imenotterologico italiano

HY-MEN

Redattori:
Guido Pagliano e Pier Luigi Scaramozzino
Editore:
Museo Regionale di Scienze Naturali
Via Giolitti 38 – 10123 TORINO

Dear colleagues,

as you can see, we have started to bring out an Italian newsletter about Hymenoptera and Italian Hymenopterists.

We would like to receive any material that you believe helpful for the persuation of our project (announcements of congresses or meetings, new books about Hymenoptera ....) as well as other news that we could publish in Hy-men.

Many thanks
Hy-men editors
LITERATURE ON THE VESPINAE
1975 - 1991
(Compiled by Robin Edwards)

In **Sphecos** #1, Menke made the decision to include all literature references from 1975 in his "Recent Literature" section. Over the years I have helped to keep the Vespinae records up to near 100%, and now list some older records that I missed earlier. Also in this update are several recent publications: of particular importance are many papers by workers in New Zealand (a few others were recorded in **Sphecos** #20 and 22).

Now that I have retired, I am unable to search for more references, and so this is my last "update".


---

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Ahmadi, A. A.

Akre, R. D.

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Aldiss, J. B. J. F.

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Anon.

Anon.

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Goldberg, A., Reisman, R. E.

Golden, D. B. K.


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Müller, U.

Müller, U. R.

183 pp. [Translated from German by B. N. Chandler-Lorenz.]

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