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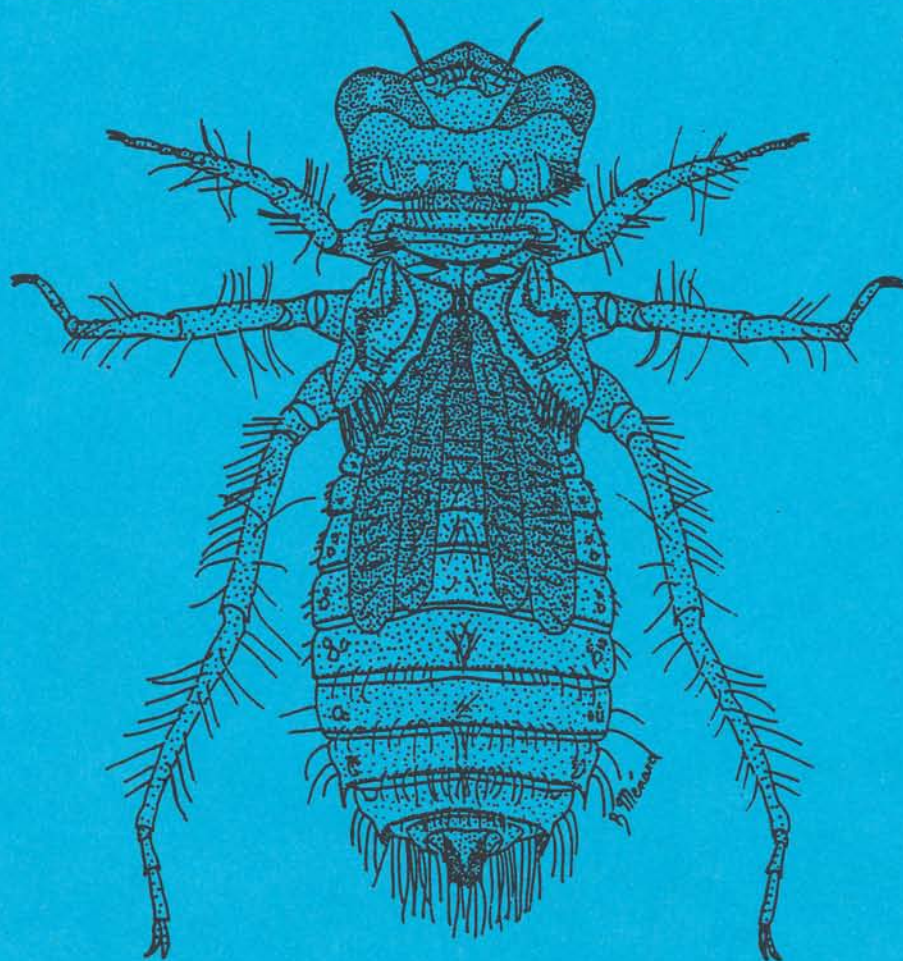
ARGIA

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THE DRAGONFLY SOCIETY OF THE AMERICAS

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ARGIA, the quarterly news journal of the DSA, is devoted to non-technical papers and news items relating to nearly every aspect of the study of Odonata and the people who are interested in them. The editor especially welcomes reports of studies in progress, news of forthcoming meetings, commentaries on species, habitat conservation, noteworthy occurrences, personal news items, accounts of meetings and collecting trips, and reviews of technical and non-technical publications. Articles for publication in **ARGIA** should preferably be submitted and hard copy and (if over 500 words) also on floppy disk (3.5" or 5.25"). The editor prefers MS DOS based files, preferably written in WORD, WORD for WINDOWS, WordPerfect, or WordStar. Macintosh WORD disks can be handled. All files should be submitted unformatted and without paragraph indents. Each submission should be accompanied by a text (=ASCII) file. Other languages should be submitted only as text (=ASCII) files. Line drawings are acceptable as illustrations.

T. Donnelly (address above) is the interim editor of **ARGIA**.

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ARGIA - The News Journal of the D.S.A.

IN THIS ISSUE

The season of 1994 is now under way, and we are - knock on wood - getting off to a much better start than last year. Two of our DSA spring trips (Alabama, and the Delaware River) suffered a bit due to bad weather (see the accounts in this issue), but the North Carolina annual gathering couldn't have been sunnier.

The big news this year is the rediscovery of *Ophiogomphus edmundo*, known previously from the holotype specimen from "North Carolina". Due to the persistence and diligence of Tim Vogt, this species has been relocated in a montane stream in the Catawba drainage of Burke Co., NC. Found only in the week before the North Carolina meeting, several members took advantage of the discovery to find some more, including on another tributary in nearby Caldwell Co. Tim's find included the hitherto unknown female of the species. This find more or less completes the list of missing gomphid species from North America! It also reminds us that gomphids (and probably most other odonates) are generally not very rare - only very elusive.

Another rare dragonfly has been discovered a long way from its apparent home range. Ken Tennesen reports in this issue of the finding of *Somatochlora hineaea* in Alabama. Should this discovery downgrade its status from "endangered"? The F&WS is about to take final action on this species, which is due to become our first endangered dragonfly.

The Society voted at this meeting to make a minor change in the name of the Society - to the Dragonfly Society of the Americas. Now that people all over the world are referring more and more to the United States as "America" (Finally we get a simple name for ourselves!), it is logical that any society dealing with the New World should adopt a name to indicate inclusion of all the countries of North, Central, and South America.

Collecting ethics are continue to be controversial. President George Harp has appointed a small

committee headed by Richard Orr to consider the issue and prepare a document which the Society can accept and which will guide us in this increasingly touchy area. If you have comments (and I trust many of you will), please convey them to Richard Orr, 9334 Farewell Rd., Columbia MD 21045 (tel 410 730 7290). There are some more commentaries on collecting in this issue.

This issue includes a note from one of our far-flung members, Stanislav Gorb of the Ukraine, who discusses the hibernation is of the widespread Old World lestid genus *Sympetma*. It raises the question whether we should pay more attention to some of our own forms, such as Texas *Lestes disjunctus australis*, which flies in the very late fall and again in the very early spring, when it does not seem to be teneral. On a related note, we are reminded of Gene Morton's short account of vernal pond libellulids in Panama aestivating in the scrub forest.

We include in this issue accounts of several trips to distant places. Sid Dunkle wins the distance prize with a trip to Madagascar, leaving us to want to see some of his excellent odonata photos. Richard Orr made it almost as far - New Zealand. Jerrell Daigle revisited Hawaii and has more on the endemic damselfly genus *Megalagrion*.

Did all of you see the account of last year's annual gathering in Bend, OR? I refer of course to the delightful article written by Will Stolzenburg of the Nature Conservancy, which appeared, accompanied by many excellent photos, in their magazine in the May - June issue. Steve Valley, who organized this highly successful trip, was invested with a reputation of a senior net-person for his dramatic capture of a *Macromia magnifica* before the author's startled eyes. Steve recently reminded me of his legendary prowess when I met him briefly in the New Jersey pine barrens. The *Cordulegaster maculata* population of one stream will long remember his prowess. "Now that's how it's done!"

A SYNOPSIS OF THE FIRST
SOUTHEASTERN DSA REGIONAL MEETING

K. J. Tennessen
S. Krotzer

Thirteen DSA members met in southern Alabama from April 15 to 17, 1994, in search of *Ophiogomphus*, *Cordulegaster*, and other early season odonates. The ardent adventurers hailed from six different states, including AL, FL, IL, KY, OR, and PA. Under cloudy skies and threat of thunder storms, we met in Monroeville on Friday afternoon, telling stories of collecting stops on the way to the meeting.

Our first gathering was in the motel conference room at 7:30 Friday night. We had just gotten started, when the motel manager informed us that there was a tornado sighted in the vicinity of Monroeville and that we should take cover. This latter suggestion was quickly heeded, as we headed for the bathtubs of our respective rooms. The saga of DSA meetings and the weather continues. At 8:20 we learned that the tornado had passed the area about 20 miles northwest of the city; still a little ruffled, we reconvened.

Charles Bridges filled us in on the upcoming 3rd edition of his excellent Odonata catalog, and wowed everybody with his specimens from Brazil. Bill Mauffray informed us of happenings at IORI and the survey he and Minter had recently completed on the Gainesville population of *Cordulegaster sayi*. After this, much discussion was devoted to ongoing problems with permitting and problems the Lacey Act presents concerning the possession and transporting of insect specimens. Carl Cook told us of some very unsettling developments regarding intrusions by the U. S. Fish & Wildlife Service, and then explained the goals of the newly formed International Scientific Collectors Association (I.S.C.A.) and the role he hoped it would play in the future. A solution of these collecting issues is desperately needed soon.

Turning to a more tasteful subject, Ken Tennessen showed some newly acquired information on variation in the *Ophiogomphus incurvatus* complex based on reared specimens from Alabama

and Georgia. He also showed a technique whereby general adult dragonflies can be fed insect prey by hand and kept alive for up to two weeks. Steve Krotzer then showed the few *Cordulegaster* specimens he and Mary Jane have collected in extreme southern Alabama that appear to have some characteristics of both *bilineata* and *sayi*.

Saturday morning greeted us with clouds and cool temperatures, but the sun began to peek through as we headed toward our various destinations. Bill Mauffray and Jerrell Daigle visited the gravel streams in Clarke County where several us had collected nymphs of *Ophiogomphus* in February, but they did not see any adults. However, they turned up several good records, such as *Cordulegaster bilineata* and *obliqua*, and *Helocordulia selysii*. Steve and Mary Jane Krotzer led a group, including Charles and Carol Bridges, Tim Cashatt, and Clark Shiffer to the Conecuh National Forest in search of the *Cordulegaster* that might be intermediate between *C. bilineata* and *C. sayi*. Although no *Cordulegaster* were seen or collected, this group succeeded in netting *Tachopteryx thoreyi*, *Coryphaeschna ingens*, *Gomphus hodgei*, and *Gomphus geminatus*. Tim Vogt, Carl Cook, Randy Payne, Steve Valley and I forayed into northern Baldwin County in search of new seepage habitats, and although we did not see any *Cordulegaster*, we obtained a few new county records, such as *Gomphaeschna antilope* and *G. fuscillata*. That evening we gathered again, crowding into one of the motel rooms. Further discussion of bureaucratic infringements and possible trouble for insect collectors dominated early, but we also talked about current individual projects and tried to decide where to go the next day.

Most of us headed for the Conecuh National Forest on Sunday, in search of gomphids and other species in some of the natural ponds in Covington County. These ponds are especially attractive, as very few natural ponds exist in Alabama. We were delighted to see *Gomphus australis*, *Gomphus cavillaris brimleyi*, and *Arigomphus pallidus*. And Steve and Mary Jane secured another new state record in *Didymops floridensis*! So much for it

being endemic to Florida. Other species of interest at the ponds were *Anax longipes*, *Coryphaeschna ingens*, *Nasiaeschna pentacantha*, *Celithemis verna*, *Lestes inaequalis*, *Enallagma dubium*, and *Ischnura kellicotti*. Common species seen were *Gomphus exilis*, *Erythemis simplicicollis*, *Ladona deplanata*, *Enallagma divagans* and *E. vesperum*, and *Ischnura posita*.

In summary, the meeting was productive, both in records we obtained and knowledge we exchanged, although we did not succeed in two main goals, namely seeing the *Ophiogomphus* adults at the water and collecting more of the unusual *Cordulegaster*. But everyone agreed that next year we should hold another southeastern regional gathering, and by consensus it will be somewhere in central Georgia.



DELAWARE RIVER TRIP - RAIN ONCE MORE

Nick Donnelly

On Friday evening 10 June a crowd of convivial odonatists gathered in the new home of Allen and Nancy Barlow to dine and contemplate what had been advertised by me modestly as the trip of the year - to the Delaware River to look for, among other things, the undescribed *Gomphus* found by Ken Soltesz in 1993. The Barlows promised a fine meal and I promised a fine trip - at least Allen and Nancy delivered. Those who had attended the last DSA trip I led - to the Adirondacks last June - were still squeezing the water out of their nets and trusting that I wouldn't do it again. I did. Yes - it rained. In fact, it rained rather hard.

However, even in the rain (more accurately during the brief respite between showers) no less than five of the *Gomphus* were taken at Skinner's Falls, which is only one of many localities, but which

appears to be probably the best place to find this large, brownish gomphid. The species is distinct from *septima* but very close to it. When we examined the exuvia (which Ken found several of last year) we noted immediately that it was very different from *Gomphurus*, and probably deserved a group of its own.

On the sunny day before the trip (unfortunately only a few people were able to get in the field that day) it was sunny and warm, and *Gomphus abbreviatus* and *adelphus* were sitting on the rocks in the river. *Macromia* was common, and *Basiaeschna* and *Didymops* were still flying.

Do I dare lead a third trip after this wet weekend? Probably not. At least one person, however, had a great time - Ailsa got a good look at a black bear and had a wonderful raft trip down the Delaware. You are supposed to get wet doing this.



MORE GOMPHID RECORDS FROM THE DELAWARE RIVER

Nick Donnelly and Ken Soltesz

In addition to numerous specimens and more exuviae of the new *Gomphus* Ken found last year, there were additional good finds this year. K.S. found more exuviae of *Ophiogomphus anomalus* (last year he found one), and one mature adult male, at two widely separated localities. This species is now firmly established from Port Jervis nearly to Hancock (70 miles of river).

The other gomphid of interest is *Gomphus viridifrons*, which is otherwise known from the south and midwest, extending northeast only to northern West Virginia and western Pennsylvania. There is a 1940 record from the Delaware River. This year N.D. dredged larvae at Port Jervis and found what he thought were two species of *Hylogomphus*. *Abbreviatus* and *adelphus* duly emerged - but so did one specimen of *viridifrons*, confirming that this species persists several hundred miles beyond its next known occurrence western Pennsylvania.

MADAGASCAR!

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Community College,
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For a naturalist, Madagascar is a fabled land, a lost mini-continent isolated since Mesozoic time where most of the wildlife is endemic. As examples, 100% of the mammals, 88% of the reptiles, and 80% of the plants are endemic. Among zoologists, Madagascar is most famous for its 23 species of Lemurs, 2/3 (54) of the world's species of Chameleons, bright green diurnal geckos, and other unusual wildlife. There are about 200 or so species of odonates, of which I found 51, known as *Angidina* (pronounced an-ghee-din) in Madagascar, with about half the Anisoptera and nearly all of the Zygoptera endemic. Madagascar is a large island, about 1000 miles long and 300 miles wide, as big as California and Oregon combined.

When I heard that Holbrook Travel of Gainesville, Florida, was organizing a butterfly collecting trip there, I had to sign on! Actually, the trip proved so popular that they organized two trips, back to back, with 15 people in the first group led by Dr. Thomas Emmel, the second group of 8 people led by Dr. Gary Ross. I was with the second group which was in Madagascar from 7 - 17 Nov 1993. Most of my group were truly fanatical butterfly collectors which took off in all directions whenever they had 10 extra seconds! It was like travelling with half a dozen Jerrell Daigles. If you can imagine that!! All of the group were characters, but particularly notable were one member who could be a movie double for Chuck Norris, and another who let me use her field guide to Madagascar birds. It needs to be said that all these folks brought me many good specimens, including some odonate species I did not otherwise see. In turn I caught them as many butterflies as I could.

This was early in the rainy season which lasts from November to April, though little rain fell either before or after our arrival. Basically, after a long and exhausting flight, in my case Dallas/New York/London/Nairobi, we arrived in an Air

Madagascar Jumbo Jet at the capitol city of Antananarivo, commonly called Tana for short. The new government of Madagascar is promoting tourism, so I think at least one jumbo jet full of tourists arrives from Europe every day, mostly from France.

The majority of Malagasys speak only Malagasy, but some speak French, and a few, English. Madagascar was a French Colony for 60 years, until 1960. One thing I had not encountered before was the close control over the amount of local money which could be taken from the country, both in Madagascar and in Kenya. Officials counted your money when you entered the country and when you left it to make sure minimal local currency was crossing the borders. The logic of this escapes me.

From Tana, which lies in the middle of the Central Plateau, we took a chartered bus over the course of the next several days to Tulear, also known as Toliara, on the southwest coast, then flew back to Tana before heading home.

While the main road is being paved now, we had slow going on miles of bumpy gravel road which cut our collecting time to only a couple of hours on some days. On the way to Tulear we stayed at the palace-like Hotel des Thermes in Antsirabe, the Soafia Hotel in Fianarantsoa, the Zahamotel in Ihosy, and the Piazza Hotel at Tulear. In Tana we stayed at the Panorama Hotel, and in an excursion to the east of Tana we stayed at the Grand Hotel in Moramanga. The nice little hotel and dining room called Cheval Blanc near the airport in Tana makes a good staging ground for the airport, but we did not stay there.

Our Malagasy leader was Dr. Voara (pronounced Voo-arr) Randrianasolo, a botanist and excellent naturalist who knew the scientific names of most of the plants, mammals, and birds in Madagascar. Also with us for most of the time to expedite everything were Faly Soamanandrarinny and Mano Randriamasy. Mano's (pronounced Man-oo) father is one of the few entomologists in Madagascar.

You can see that most Malagasy names are multisyllabic tongue-twisters for English speakers.

The prevailing winds strike Madagascar on its east coast, so generally the climate ranges from wet in the east to dry in the west. During the 2000 or so years of human occupation, the Central Plateau has been almost entirely deforested, so most of the landscape there consists of Eucalyptus groves, introduced from Australia, and grass which is burned every year. A couple of small patches of the Plateau forest, which we did not see, still survive. More about this later. Nearly all the small streams had been dammed to create rice paddies, so there is plenty of habitat for marsh odonates, and I did see plenty of interesting-looking rivers and ponds, but we had time to stop at only a few of these. The Malagasys use very little insecticide, so the odonates are not in danger in that respect.

The commonest zygopteran I saw, at many habitats, was *Pseudagrion hamulus*, males of which have an orange face, yellow-green thorax, and blue-tipped abdomen. The *Pseudagrion* of Madagascar have speciated to about 30 species like the similar *Megalagrion* (whose ancestor probably was a *Pseudagrion*) of Hawaii. It would certainly make an interesting study to compare these damselflies, especially by chemical taxonomy, on these two island groups. I collected a total of 12 species of *Pseudagrion*, but only one or a few specimens of most. I saw only two species of aeshnids. *Anax tumorifer*, which looks like *A. junius*, was common. The *tumorifer* were mixed with a few *A. imperator*, and at first that is what I thought all the *Anax* were. Fortunately I woke up in time to collect some of the *tumorifer*, which are endemic to Madagascar. Unfortunately, I bungled the few chances I had at female *Anax* and the only female caught was *imperator*.

The only gomphids of the whole trip were a couple *Paragomphus obliteratus*, and I saw no corduliids at all. The commonest libellulids included the bright red *Crocothemis erythraea*, the black and yellow *Neodythemis hildebrandti* which does have the slender body form and act rather like *Dythemis*, *Orthetrum abbotti* which looks like a blue male *Erythemis simplicicollis*, the *Pachydiplax*-like *Orthemis azureum*, and *Palpopleura vestita*. The last species is endemic to Madagascar and looks like a pruinose *Perithemis* with a dark wing pattern. The males have an unusual metallic gray pruinosity on the upper wing

surface over the dark markings. Largest of the libellulids, but not very common, was *Thermothemis madagascariensis* which closely resembles *Libellula herculea* in morphology but is black with a pruinose blue abdomen and black wing bases. At a number of places I encountered purple-red libellulids I thought were all the common African *Trithemis annulata*. To be sure, I collected a small sample from each habitat. This was a fortunate move because these turned out to be *T. persephone* and *T. selika*, both endemic to Madagascar, and none were *annulata*! So much for field identification of an unfamiliar fauna!

We made two excursions east of the Central Plateau into the rainforest, Analamazoatra National Park, east of Tana near Perinet, and Ranomafana National Park northwest of Fianarantsoa. In these parks we were allowed to collect along the main paved roads but not along the trails. The Madagascar Rainforest we saw, which was said to be virgin, did not look like South American rainforest. The Madagascar forest consisted of relatively small trees, none more than two feet in diameter, with thick leathery dark green leaves about 2 inches long. The undergrowth was dense. The forest reminded me of Latin American Cloud Forest but without most of the epiphytes.

At Analamazoatra I had time to look (in cloudy, sometimes rainy weather) along a small river, a dry forest slough, and a wet forest slough. Along the river were small numbers of several Zygoptera, the most spectacular of which was *Platycnemis sanguinipes*, with its expanded red tibiae. I could only catch one, but saw a couple of others across the river. Along the wet slough were numbers of *Platycnemis* nr. *hova* with expanded white tibiae. In the dry slough were a few *Teinobasis berlandi*, which looked and acted like *Metaleptobasis*. *T. berlandi* and *Pseudagrion lucidum* were the only odonates I saw in Madagascar which appeared to be shade-adapted. This was a major disappointment, because at Ranomafana I waded for some distance along a small rainforest stream in cloudy weather without seeing any shade-dwelling odonates at all. In South America under the same conditions I would have expected to find at least Megapodagrionids and Protoneurids.

At Analamazoatra I took the morning "off" from collecting to go with local guides to see a troop of Indris, the largest living Lemurs. These were nifty

mammals something like a gibbon, and marked with black and white. We also saw a pair of Woolly Lemurs, a nocturnal species which crouches in a ball of grey fur all day, as well as a large green chameleon, and a green and black boa. At Ranomafana I took another morning off and again saw a Woolly Lemur, this time only 10 feet away, a rare Greater Bamboo Lemur, and another species of green and black boa. The boas were about 5 feet long and very tame -- they could be picked up and handled without their trying to bite. Incredibly, Madagascar has no poisonous snakes, while mainland Africa only 200 miles or so away has mambas, cobras, and vipers! For this reason, Malagasys apparently do not persecute snakes as in practically every other country in the world.

The rainforest was quite pleasant, with only a few tabanid flies and a few leeches. Malaria is present in some parts of Madagascar, but the *Anopheles* mosquitoes which carry it bite almost exclusively at night. I was aware of being bitten by only three mosquitoes on the whole trip, none of them *Anopheles*. Another big difference from South America was the virtual lack of ants in Madagascar.

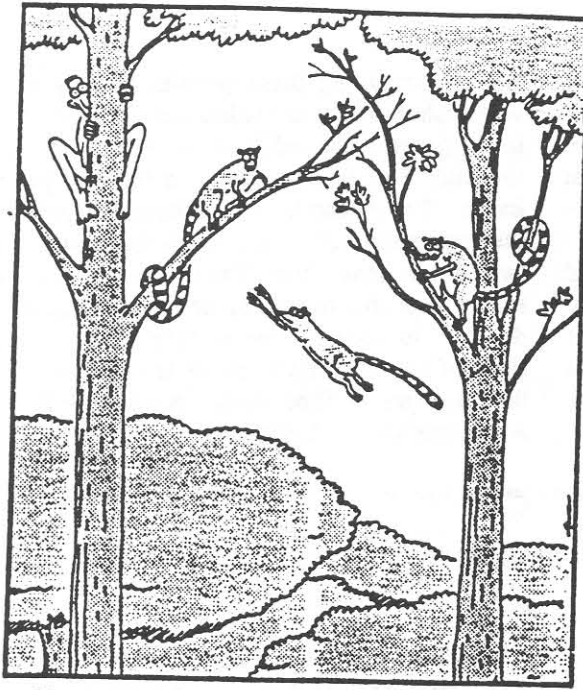
I did make two large tactical errors on this trip -- I brought only one quart of acetone, which was not enough for the 400 or so specimens I collected. And since I did not know blood flukes, which cause the bad-news disease Schistosomiasis (also known as Bilharzia), were present and common, I did not bring rubber boots. Voara said that the flukes, whose larvae burrow through your skin while you are wading, were common at places where people and cattle were present, which was practically everywhere but small rainforest streams. Having to keep my feet out of the water at most places really cramped my style. Nonetheless, I slipped into the water a couple of times, and I got water on my arms when the net got wet, but fortunately I have no sign of Bilharzia.

While we are talking about nasties, everybody but me and the Malagasys in our group got some really

bad flu-like virus, with or without diarrhea. None of us could figure out how I avoided this disease with everybody coughing and hacking all around me. We heard that people in the first group did not get sick at all. Odonates in the rainforest at Ranomafana included one male of a new species of *Nesolestes* (Megapodagrionidae), 2 species of *Platycnemis*, 6 species of *Pseudagrion*, and 2 species of *Zygonyx*. *Olpogastra lachesis* is an interesting black libellulid with yellow spots which perches on rocks in streams like a gomphid.

Also at Ranomafana, I saw and photographed a white praying mantis. Apparently this was not an albino but a white species which might look enough like a flower to attract some insects. After taking the photos I was confident I could catch the mantis, because where could a white mantis hide? I got it in my net, but my grab for it missed and it ran out and flew over my shoulder -- and disappeared!! This was one of my most disappointing misses ever!!!

At every opportunity I tried to identify the birds I saw, a grand total of 35 species, of the 256 known from Madagascar. The commonest large bird was the Pied Crow, much like an American Crow, but with a wide white band around the body and a call like a Raven. Other interesting birds were the brilliant blue and chestnut Malagasy Kingfisher, the Long-billed Green Sunbird, the long-tailed Rufous Morph of the Madagascar Paradise Flycatcher, the metallic green Madagascar Bee-eater, and a Velvet Asity, a beautiful small black bird with a metallic green mask in a family endemic to Madagascar. Common was the Crested Drongo, a black flycatcher-like bird. I saw one of these catch and gobble down a *Crocothemis*. Amazingly, a few of the birds also occur in North America, such as the Great Egret, Cattle Egret, and Common Moorhen. We saw several Madagascar Kestrels, small falcons similar to the American Kestrel, including three nestlings on a ledge of the Queen's Castle right in Tana.



Although never achieving the fame of his African counterpart, *Sida* of the Lemurs was a common sight to natives of Madagascar.

From the rainforest as we travelled west, the patches of successively drier native vegetation we saw included *Uapaca bojeri* or Tapia Forest (of the endemic family Sarcolaenaceae) which looked something like Oak Woodland, Deciduous Tropical Forest which was by far the most butterfly-rich habitat we saw (but no odonates there), *Medemia* Palm Savanna, Acacia Savanna, Octopus Tree Forest, and Dry Scrub. Octopus Trees (*Allaudia ascendens*, of the endemic family Didieraceae) have many spiny trunks with small leaves, convergent evolution to the smaller Ocotillo bushes of the U.S. deserts. These dry habitats had many strange plants, including several types of trees and *Pachypodium geayi* which had independently evolved water storage trunks. Largest of the water-tank trees were the Baobabs. While there is only one species of Baobab in all of Africa, there are seven species in Madagascar. There were also leafless vine-like milkweeds (*Cynenchum*), Dollar Vines (*Xerocisios*) with thick round leaves, and many species of *Euphorbia* trees with no leaves but thick green twigs.

New to me was the strategy of some of the local plants of looking dead all the time, as a way of avoiding being eaten by animals. We saw some plants in "full bloom" that still looked dead because they lack leaves, the chlorophyll in the

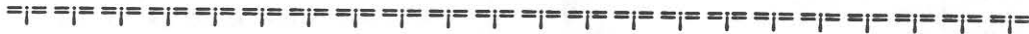
twigs is camouflaged by other pigments, and the flowers are small and gray. Hardly any odonates are in these dry environs, but we found the beautiful red *Trithemis kirbyi* at one rocky stream. We did collect at an oasis in the savanna called Relais de la Reine, at which a large hotel was being built. The oasis was a neat place, but only a few species of odonates were there, and the only one not seen elsewhere was *Pseudagrion lucidum*. Among the things I did NOT see in Madagascar were the large pill-millipedes which roll up to the size of a golf ball, and the many species of large hissing roaches which are supposed to be common. I did catch a few large spectacular blue, yellow, and red grasshoppers *Phymateus saxosus*, which could not fly well but which spread their red hindwings as a warning of their distastefulness when they were disturbed. [A lot of the information I am giving you can be found in a beautiful book by Ken Preston-Mafham called "Madagascar, a Natural History" (1991)].

The close resemblance of some of Madagascar's odonates to those of South America is, in my opinion, no accident, because other animals and plants are distributed in Madagascar and South America, but not in Africa. Good examples are the boas, with a number of species in South America and three in Madagascar, while Pythons occupy Africa. A primitive cactus occurs in Madagascar, with its nearest relatives in the New World. So it seems that perhaps Africa separated first from Gondwanaland, leaving South America and Madagascar closest to Antarctica in such a way that some species made it to Madagascar without going through Africa. If some of the odonates of Madagascar and South America are closely related, the nomenclature should be changed to reflect that fact. Since there are only about 300 species of butterflies in Madagascar, many fewer than should be in a tropical area, it is thought that Madagascar separated from other land before butterflies evolved.

While much of Madagascar's natural habitats have been destroyed, there is hope because some areas have been preserved as parks or reserves. Also, the newly elected government seems aware of the value of the native flora and fauna for ecotourism. I know at least two people who are eminently qualified to help preserve Madagascar's natural environments. These are Voara and his wife Bodo (pronounced boo-do). Voara has been appointed as Minister of Research, in which capacity he will

oversee research in six different areas, including biological research. He delayed taking his new position because of his commitment to host our group. Bodo is the Manager of the Madagascar Biodiversity Agency. In spite of its title, this is not a branch of government but a private organization which organizes ecotours such as ours, and otherwise attempts to preserve flora and fauna. Permits have been necessary to collect and export insects from Madagascar, but it is not clear what the requirements of the new government will be. However, it is likely that the Agency will be able to

expedite obtaining those permits for any of you who wish to collect in Madagascar. So with Voara in the government and Bodo in the private sector, the wildlife of Madagascar is in the best possible hands. The Agency's largest project at present is the preservation of a patch of Plateau Forest only two hours drive from Tana, one of only two remnants of this type of forest. If you can give a donation to conserve the world's wildlife, I can think of nowhere that it can be better used than at the Madagascar Biodiversity Agency, B.P. 845, Antananarivo 101, Madagascar.



KA-POWIE! IT'S KAUAI! or JURASSIC PARK DRAGONFLIES!

Jerrell Daigle

After seeing that incredible movie, Jurassic Park, I knew where I wanted to take my winter-time blues vacation! Most of the outside shots, like the electric fence scene with Waimea Canyon in the background, were filmed in Kauai just before Hurricane Iniki hit. Kauai is tied with Maui (see ARGIA 5:2) with 10 *Megalagrion* species. However, Dan Polhemus, the resident odonatist, informed me that 2 species (still found on other islands) were extirpated from Kauai.

While Nick and Ailsa Donnelly found fidgety Fiji flyers, I arrived in Honolulu, Hawaii in the evening only to find my March 1st flight to Kauai delayed til 5:40 am the next day! I spent the night in the lobby chatting with other people who where in the same boat! Eventually, I landed at the Lihue airport, rented a Hertz car, and arrived at Kay Barker's Bed and Breakfast Inn in Kapaa.

The inn is a beautiful, sprawling ranch house run by a terrific host, Gordon Barker. The five roomy, Victorian bedrooms complete with large bathrooms and desks were perfect! The two large living rooms were complete with an extensive Hawaiiiana library, TVs, and outdoor lanai. Guests met for Gordon's scumptious breakfast in the dining room and the conversations were most enjoyable! This is definitely the place for collectors to stay in Kauai!!

The best place to collect in Kauai is just a few minutes north of Gordon's place. The wide, rocky Makaleha Stream is about 2.0 miles west of Kawaihau at the end of Kahuna Road. The first time I bounded from rock to rock, I did not

encounter anything perching on the rocks or overhanging branches. After a while, I found a small seepage tributary at the base of a cliff. BINGO!! Almost immediately, I saw and swooped up a large, bright red damselfly, *Megalagrion*, of course! Guess what! Even with a hands lens, I couldn't identify it! Oh Boy! I caught a couple more nearby males of this species but soon the action quickly evaporated! Later that night, I keyed them out to *Megalagrion vagabundum*, a sun-loving open seepage species.

I started upstream in Makaleha Creek determined to find the headwaters amidst Hawaiian Heaven or so I thought! After about a mile, the rocks turned into large boulders and the climbing became more strenuous. I began to get a little discouraged at the lack of activity. All of a sudden, I rounded the bend and BINGO! Flying from rocks to boulders to rocks again were giant brick-red *Megalagrions*, including tandem pairs!! They were wary but I managed to collect several pairs plus a half-dozen individual males! This species was larger but with a green face in contrast to the red face of *M. vagabundum*. It was not 'til later at night with Zimmerman's 1948 Hawaiian keys that I was able to identify it as the endemic *M. heterogamias*. This species prefers open, rocky mountain streams and behaves just like the *Argias* back on the "mainland"!

Further upstream, the big boulders began fronting deep canyon pools encircled with colorful gravel bars and riffles covered with fallen rose-apple flowers and yellow leaves. I thought I glimpsed a tiny fleeting movement but I wasn't sure. I sat down under the shade of a guava tree for a relaxing

lunch break, drinking deeply of the beautiful surroundings. Slowly, my eyes became accustomed to the dappled patterns of the gravel riffles and they settled on an unusual, tiny yellow, blue, and red twig. Pretty, I thought. Then, it twitched!! Quickly, I scooped it up and held it half expecting it to fall apart in my hands as colorful aquarium gravel. It didn't! It was a tiny *Megalagrion* with yellow face and eyes, pale orangish-blue thorax, and carmine abdomen. I quickly dubbed it the scrambled eggs and catsup critter. In reality, it was the rare Kauai *Megalagrion orobates*, a denizen of scoured canyons subject to frequent flash flooding!

By now the lack of sleep the night before was catching up with me, so I starting back, catching *M. heterogamias*, *M. orobates*, and *M. vagabundum* here and there. Occasionally, I would spot a giant *Anax strenuus* and net it before it zipped by me. Near some springs was a immense, wet bare-faced cliff pocked with mosses and sedges. I noticed a *M. vagabundum* having difficulty perching on a greenish-black twig amongst the mosses. The twig had a blueish white spot at each end and I was struck by its casual similarity to *Phylolestes ethelae*, a giant Caribbean lepid found in Hispaniola. Wouldn't it be great to find something like that in Kauai! Then, the twig twitched tantalizingly...!! Later that night, I identified it as the very rare *M. eudytum*, a cliffside dweller at mossy waterfalls. It was the only one I caught that day and only the third collected during this trip. The other two were collected near Kalihiwai Falls at the Hwy. 56 roadside lookout in Kalihiwai.

It was getting dark but I decided to explore a tiny tributary forested with tree ferns before I heading for Gordon's beachside luau. What a difference a few hours make! Four of the slenderest blood-red *Megalagrions* I have ever seen were fighting over territorial rights to a small, shady pool at the base of a candlenut tree. It was really tough to see them in the twilight but I did manage to catch them! They were *M. oresitrophum*, a sister species to *M. calliphya* from Maui. This species may be widespread on Kauai but the difficulty in seeing them may account for its scarcity in worldwide university collections.

The following day, I hiked over 10 miles on the east Alakai Swamp trail in Kokee State Park hoping to find the recently described swamp

dwelling *Megalagrion paludicola*. Unfortunately, the swamp was bone-dry this month and I didn't see them that day or the next! The only other place where they have been collected was at the inaccessible type locality which requires an expensive chartered helicopter. However, the day was not lost. Back at the beginning of the trail at the Pu'u o Kila lookout, the aptly named *Anax strenuus* (strenuous swinging, strenuous workout --get it!) was swarming through an alate termite flight! I saw about 60 males and females but after 3 hours of much strenuous activity, I could only net a baker's dozen. Despite the lack of *Megalagrions* in the park, I really had a good time there. The mountain forest was intact and I saw many native trees such as Koa (*Acacia koa*) and Ohia'a (*Metrosideros polymorpha*) home to many of the diversified, spectacular endemic Hawaiian birds.

Luckily, I saw several of the rare Hawaiian honeycreepers such as the brilliant scarlet Iiwi (*Vestiaria coccinea*) and the crimson Apapane (*Himatione sanguinea*) feeding on the red Ohia'a blossoms. The smaller yellowish-green Amakihi (*Loxops virens*) and Elepaio (*Chasiempis sandwichensis*) were there but harder to spot among the luxuriant green tree ferns. Over a open forest pasture, I saw Pueo, the day-hunting Hawaiian owl (*Asio flammeus*) and many Moa, descendants of the jungle fowl (*Gallus gallus*). While catching some *M. heterogamias* at Kawaikoi Stream, I spooked up some Hawaiian ducks (*Anas wyvilliana*). Other interesting birds were exotics such as the Brazilian cardinal (red head and grayish-blue body), barred dove, the Shama (*Copsychus malabaricus*) which looks like a big Towhee, Erckels' francolin and the ubiquitous, squawking Mynahs.

After a few days of easy hiking, I was ready to take on the tougher, world famous Kalahau Trail (11 miles) along the Na Pali coast. I decided just to make the strenous two mile hike to Hanakapi'ai Stream and then head upstream two miles along a foot trail until I reached Hanakapi'ai Falls. I did not see anything on the stream until the trail crossed the stream about one mile downstream of the Falls. BINGO!! The first thing I saw flying over a streamside slough was a strange-looking black and white libellulid with a red epi-center and a black abdomen!! It looked so much like the Caribbean *Macrothemis celeno*, I thought I was back in the Dominican Republic!! It was not wary

but I still had the worst case of buck fever I ever had!! I missed it not once, not twice but three times before I finally corralled my first ever specimen of *Nesogonia blackburni*!! Whew!! I never did get to the falls since the collecting was good here at the ford. I got two more males of *N. blackburni*, some *M. heterogamias*, *M. oresitrophum*, *M. vagabundum*, but I missed some very fast *Anax strenuus*. Oh well! I'll get them next year!

Hawaii is a fantastic state to visit! I am thinking about proposing a future DSA meeting or a smaller collecting trip in maybe Kauai but most likely Maui which has numerous waterfalls, beautiful scenic beaches, an awesome volcano crater, excellent scuba diving, breathtaking helicopter rides, whale watching, and many scheduled Hawaiian luaus! Let me know what you all think and I will start putting it together! Til then! Aloha!



A VISIT TO NEW ZEALAND

Richard Orr

It had been over a decade since I had been south of the Tropic of Capricorn. Long enough to have forgotten what little familiarity I had once felt for the southern stars. Much as Linus needs his blanket, I have become dependent on the constellations as a basis for familiarity, a connecting thread to home, when traveling abroad. Nothing drove home the idea that I was on the opposite side of the earth as deeply as my first view of the night sky over New Zealand. Being able to trace the river Eridanus to Achernar, of seeing the giant 30 Doradus nebula imbedded like a precious gem in the large Magellanic Cloud, or seeing the globular cluster Omega Centauri at the zenith, is an experience not easily forgotten. I found myself spending many late nights and early mornings lost in the stars, star clusters, and nebula of the south circumpolar sky.

By the time I had landed in Wellington on April 28, I had already decided that one of my main goals on this trip was to search out and observe New Zealand's largest dragonfly *Uropetala carovei*. Since I had "official duties" at various locations on the North Island, I decided to stay on the North Island for the full two weeks. This was not an easy decision because, for mountain and coastal scenery, the South Island cannot be beat. In addition, the other species of Petalurid *Uropetala chiltoni*, which is just slightly smaller than *U. carovei*, occurs only on the South Island. However, the North Island is not without its share of unique sights. Becoming bored was not one of my concerns.

My short stay in Wellington did give me the opportunity to hunt down and purchase Richard Rowe's "The Dragonflies of New Zealand" along with several other local natural history guides. I strongly recommend this book since it provides detailed life histories, behavioral and ecological information, and clear descriptions (including drawings and color photographs) of the 17 New Zealand odonata species. This book, along with a good pair of close-focusing binoculars, simplified my field dragonfly identifications and observations during my stay in New Zealand.

My first New Zealand dragonfly came as a bit of a surprise. I was exploring the Botanical Gardens in Wellington, walking through their native forest section trying to learn a few native plants, when I spotted a medium-sized corduliid flying slowly back and forth at the edge of a small clearing. The native flora was immediately put on temporary hold as the adrenalin kicked in and I became totally focused on the dragonfly.

My first identification did not come easy. The female *Hemicordulia australiae* made me work for her field marks. This species, a native of Australia, became established in New Zealand during the early part of this century and has now become the most abundant and ubiquitous anisopteran in New Zealand. By the time I left New Zealand I would know this species well, but this initial female lacked the bright colors and obvious field marks of the male and her identification put me through the ringer. The dragonfly refused to land so it took me awhile to find the yellow spot on the thorax and match the abdominal markings with those in Rowe's book. During the 20 minutes that it took to make the

identification, had someone offered, I would have gladly traded a couple of my front teeth for a good long-handled net. However, in the end, the time spent making the identification was probably a plus since it forced me to learn the subtle field marks of this species. This actually saved me considerable identification time over the next couple of weeks since I was constantly running into these corduliids throughout my visit.

After completing my official Wellington responsibilities, I drove north to the Manawatu Estuary located near Foxten Beach. The Foxten Beach hotel is located at the edge of a major bird refuge on the Manawatu Estuary and provided excellent views of the tidal mud flats. An added benefit to this location is that Judith Tate, who with her husband Don owns the Foxten Hotel, just happens to be the best cook in the country.

March is the time of the fall migration of shorebirds in New Zealand and the mud flats surrounding the estuary were alive with Red Knots, Spur-Winged Plovers, Banded Dotterels, Oystercatchers (two species), Pied Stilts, Bar-Tailed Godwits and Pacific Golden Plovers. Intermixed were many other species cryptically hidden among the more common shorebirds. In all I listed over 30 species of birds from the estuary. This included Wrybills, that unique shorebird that has the tip of the bill distinctly offset to the right. No other bird in the world has such an asymmetrically shaped bill.

A couple of small creeks that entered the estuary provided me with odonates. Slow-moving sections of these streams housed large numbers of the small red damselfly *Xanthocnemis zealandica* and the large bright-blue lestid *Austrolestes colenisonis*. Both species are endemic to New Zealand and are common in many different fresh water habitats throughout the North Island. *Austrolestes colenisonis* belongs to the subfamily Sympecmatinae which, unlike the subfamily Lestinae, hold their wings together above the body. The North American common name of Spread-Winged Damselflies definitely did not fit this insect.

Four species of anisopterans were seen during my two-day stay at Manawatu Estuary. The ubiquitous *Hemicordulia australiae* was observed on a number of occasions.

I spotted the dull red Libellulid *Diplacodes bipunctata* skimming over the mud flat during the early evening of the first day. Unfortunately, this was the only one seen on the whole trip. *Diplacodes bipunctata* is widely distributed in Australia and throughout the Southeast Pacific where it often develops insular forms. According to Rowe, *Diplacodes bipunctata* is the only species of the family Libellulidae that breeds in New Zealand; although wind-blown *Plantala flavescens* and *Tramea transmarina* are noted visitors.

During the second day at the estuary, a mature male *Aeshna brevistyla* was observed flying low over the ground at the edge of a vacant field well away from the water. This species is a Gondwana relic. To find its closest relatives you must cross the Pacific Ocean to South America.

I saw my first, of many, *Procordulia smithii* at the estuary. This corduliid species is much larger and more attractive than *Hemicordulia australiae*. *Procordulia smithii* is an endemic species that turned out to be common once I moved inland. This species seemed very unconcerned about my presence. A couple of times, I reached out and captured healthy individuals with my fingers. Question -- are endemic island species of odonata generally more approachable than those found on the continents? This would not be completely unexpected or unprecedented since it is the case for many vertebrates.

From Manawatu Estuary I headed north and inland to Waitomo Caves. My attraction was an insect, but not a dragonfly. Waitomo Caves is home to the New Zealand glowworms. These are not really worms but Mycetophilid fly larvae (*Arachnocampa luminosa*). I guess to be correct, they are glow-maggots but I doubt that this taxonomically correct name would continue to draw the estimated 200,000 tourists each year to the cave.

The boat trip through Waitomo Caves with tens of thousands of points of subdued light spread across the cave ceiling is a marvelous and memorable sight. When the biological stars were glowing above me and everyone in the boat was overwhelmed and silent, I thought of the lines in Lewis Carroll's Through the Looking Glass.

"What sort of insects do you rejoice in,
where you come from?"

The Gnat inquired.

"I don't rejoice in insects at all,"
Alice explained,...

It is apparent that Alice never saw New Zealand glowworms! My hat is off to any insect, specially a Fungus Gnat, who can become a major tourist attraction.

The next few days were spent mixing work with pleasure in and around the city of Rotorua. Rotorua is famous for its geysers and hot springs and this is where the majority of the tourists concentrate. As for myself, the thermal attractions were interesting, but the nearby mountain lakes and streams occupied most of my spare time. The birding was good and I was able to find a healthy number of the native butterfly species but *Uropetala* continued to allude me.

I still had one last chance for seeing *Uropetala*. Tongariro National Park surrounds the North Island's three largest inland volcanoes. The area is much higher in elevation than my previous locations which, I hoped, would provide me with late flying *Uropetala*. Tongariro National Park is the oldest of New Zealand's National Parks and one of the truly few pristine areas left on the North Island. Even if I failed to find *Uropetala* it was immediately apparent that Tongariro National Park was going to be the highlight of the trip. I could spend a lifetime in the park with its unbelievable clear skies, clean cold flowing mountain streams, beech forests, mountain lakes, alpine glades, and miles of walking paths. Absolute paradise!

My first *Uropetala* came as if in a dream. I had just returned from a grueling six hour hike to the summit lakes between Mt. Ngauruhoe and Mt. Ruapehu where I was met with high winds and pelted with frozen rain. I was exhausted by the end of the hike since I had spent most of the previous night divided between stalking the illusive nocturnal kiwi bird and being mesmerized by the night sky. Stopping at Taranaki Falls for a short nap before continuing my trek back to home base became necessary. Here the Wairere Stream tumbles 20 meters over the edge of an 15,000 year old lava flow. Two days previous, I had hunted for

Uropetala along the Wairere and had convinced myself that the petalurid was not there. Unlike the summit lakes, at Taranaki falls it was warm, sunny, with only a slight breeze. With my shoes off and exposed lizard-like on a large sunny bolder, I quickly fell asleep.

The chattering of a couple of Rifleman (New Zealand's answer to Kinglets) stirred me from my diurnal sleep. Immediately, my eye focused on a large black dragonfly with bright yellow markings slowly glide-hunting above the surface of the stream. No problem with identifying *Uropetala carovei* – it is a magnificent animal! Bare-footed I grabbed the binoculars and followed the slow flying dragon upstream. Thank goodness (for the sake of the bottom of my feet) he soon landed in typical petalurid style on an inclining sun-facing rock. At 20 feet, through the 8 power binoculars, he was a marvelous sight. At 8 feet through the binoculars, he was truly breath-taking. Then it was gone; disappearing over the trees so quickly that I was left with the stange impression that the aerial dragon had been nothing more than an extention of an ephemeral daydream carried over from my short nap.

The rest of that day and part of the next was spent locating additional *U. carovei*. My search was successful. The Wairere cut a 15 meter deep gorge a few kilometers down stream from the falls. The rim at the top of the gorge had been undercut by the constant seepage of ground water. It was far too dangerous for me to physically get to the seepage but the movement of adult *U. carovei* in and out of the area left little doubt that it was a larval site. With an excellent vantage point a few meters away on the other side of the gorge, armed with binoculars and a pocket tape recorder, I witnessed ovipositing females, male-male interaction, feeding, and various other behavior during my last full day in New Zealand.

My last night in New Zealand was again spent looking for the Kiwi. I never found it. But a Morepork (an endemic owl), continually repeating its name beneath the southern Milky Way, made the search memorable. I will not wait another decade to slip below the Tropic of Capricorn.



Our main area of interest recently is the Clear Creek - Obed River area of Morgan and Cumberland Counties. Here the most common *Gomphus* seems to be *Gomphus viridifrons*, but *quadricolor* is also present, and we have continued to fail to take the *Ophiogomphus* Ailsa saw in 1990. On every trip I have seen at least once *Neurocordulia yamaskanensis* flying in the bright sun in the middle of the day, which I have not heard of from other collectors.

Again on this trip one of us (Ailsa) once again witnessed the incredible swimming behavior of *Calopteryx angustipennis*, which is abundant here. A male of this species flying over the clear, cold, fish infested, river, will fall into the water on its back, looking for all the world as though it has dropped dead. After lying motionless for a few seconds on the surface film it will spring again into the air, presumably to the plaudits of the admiring female hovering overhead. If this is not the same "dare devil" behavior reported in the bird world, then I don't know what it could be.

People contemplating a visit to this place should note that there are good camping places in the Catoosa Wildlife Management Area of Cumberland and Morgan Counties. The Obed River and Clear Creek are part of the national Scenic River Scheme, as is the Big South Fork of the Cumberland, in Scott and Pickett Counties. Pickett State Park is highly recommended for camping.

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TUMBLING DRAGONFLIES

Richard Orr

I was watching a dozen or so *Anax junius* flying over a pond at Virginia's Great Dismal Swamp early this spring when I saw a male perform a quick zigzag in flight which ended in multiple somersaults. I have often seen feeding dragonflies go into the quick zigzag pattern of flight when giving chase, but I cannot recall ever seeing the somersaults at the finish. I watched the same individual for a while hoping he would repeat the spin. Although, he went on feeding exhibiting the quick zigzag flight there was no repeat of the somersaults.

I probably would have written the somersaults off as "abnormal" or "unique" behavior except it happened again a couple of weeks later at Jug Bay Wetlands Sanctuary in Maryland. At Jug Bay I was waiting in ambush along a woodland stream trying to net one of the *Cordulegaster maculata* which were casually flying down mid-stream a few centimeters off the surface of the water.

I was slowly being exsanguinated by the local mosquito population when I saw the large yellow-spotted, blue-eyed, black dragonfly coming towards me. Three meters before reaching me, it quickly flew up then down (actually touching the water surface), then up again, zigzagged, and then somersaulted right in front of my face. Before I knew it, my quarry was well down stream moving on as if nothing out of the ordinary had happened. I was so intrigued with the dragonfly's tumbling that I had forgot to swing the net!

Both times that I have seen the somersaults they occurred so quickly that I can not tell you much about them. My impression was that 1) somersaults are with a head down turn, 2) more than one turn occurs (maybe three times?), 3) it occurs in a split second, and 4) the dragonfly stays fixed in one position during the somersaults without noticeably moving forward or dropping.

The preceding zigzag movements indicates that spinning might have something to do with capturing prey. Since it occurs so rarely, the tumbling behavior must not be normally triggered when prey is captured. The best explanation I can come up with is that this behavior occurs when the prey is not fully caught or needs to be repositioned in the legs. But I am guessing.

Have other members of the DSA seen tumbling dragonflies? If so, which species? Does anyone have a better explanation as to why dragonflies spin and/or if tumbling is recorded in the literature?

If I receive any responses to these inquires I will update everyone through ARGIA.

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SOME OBSERVATIONS ON THE
BEHAVIOUR OF *SYMPECMA ANNULATA*
SELYS (ZYGOPTEA; LESTIDAE) IN
AUTUMN IN THE CENTRAL UKRAINE

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Imaginal hibernation of Odonata has been reported by Bartenew (1930b) for *Sympetrum striolatum* Charp., *S. fonscolombei* Selys, *Crocothemis erythraea* Brulle, *Aeshna affinis* v. d. Linden, *Ischnura pumilio* Charp., *I. elegans* v. d. Linden, *Coenagrion* sp., *Sympecma fusca* v. d. Linden (in TransCaucasus) and for *Sympetrum danae* Sulzer, *Platycnemis pennipes* Pall., (causal imaginal hibernation in East Europe). In contrast to other odonates, *Sympecma* species (*S. fusca* and *S. annulata*) are always hibernating in the imaginal stage. Therefore, these lestid damselfly species have twin flight periods; spring and autumn ones. Individuals of the spring flight period lay eggs, from which in May-June larvae hatch out (Popova, 1953). Individuals of the autumn flight period only feed and do not lay eggs until next spring. The life history of *Sympecma* exhibits some special physiological and behavioral peculiarities of these species.

S. annulata is a widespread species in Siberia (Bartenew, 1930a) and in Eastern Europe (Artobolewski, 1929). I observed damselflies in October-November 1992 and 1993 during warm autumn days near small lakes near the village of Mrygi, Kiev Province, Central Ukraine. After a warm day damselflies move under grass and leaves on the ground, where they stay during the night. In the morning after 10 a.m. damselflies creep up the grass and warm up in the sun. From 10.30 a.m. to 3 p.m. they hunt actively in the high grass (they prefer *Calamagrostis epigeios* (L.) Roth.). Males as well as females have "patronizing coloration" mainly in grey and brown colors and keep their abdomens often near small branches of bushes or grass stems. Coloration and assisting behavior serve as good camouflage for unwarmed damselflies early in the morning and in the evening. Moreover, unwarmed *Sympecma*, in case of danger, may stand still, fold their legs, and fall down into the grass. Such insects cannot be found in the grass between grey-brown pieces of small branches and grass stems. Neither territoriality, nor sexual behavior for male as well as for female

were observed. Histological investigation revealed the presence of a great quantity of fat, especially in the abdomen, when compared with other autumn-flying damselfly species that are non-imaginal hibernating (*Enallagma cyathigerum* Charp., *Lestes virens* Charp.).

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SOME MORE INPUT ON COLLECTING
POLICIES

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I thought the following, sent by Jill Silsby in response to my enquiry, might be of some interest in view of the recent discussions in ARGIA concerning appropriate collecting of Odonata in general and rare species in particular. This is the Code officially espoused by our sister organization, the British Dragonfly Society. I offer it only for information and discussion, and in the realization that the situation in Britain is, in many respects, quite different from that in the Americas - their fauna is much less rich, and much better known, and the overall human population density higher. Nevertheless, it embodies some principles that

seem relevant to us, and I thought its publication here might be appropriate.

CODE OF PRACTICE ON COLLECTING DRAGONFLIES IN THE UNITED KINGDOM

British Dragonfly Society

Assumptions and background information.

1. Dragonflies should not be killed unnecessarily. Identification can often be achieved by observation, photography and by collecting exuviae, especially in countries like the United Kingdom where much is known about the Odonata fauna already. It is also possible to capture dragonflies, examine them and then release them undamaged. They should be released where they were caught and as soon as possible.

2. Dragonflies should only be killed when a useful purpose is served thereby. For example, the conservation value of faunistic surveys, local lists etc depend on the reliability of accurate taxonomic identification. Where doubt exists an identifiable photograph should be taken or an identifiable drawing made but, when this is not possible, a voucher specimen should be collected.

3. The main concern is to prevent significant damage to populations, especially those of rare and vulnerable species.

All the evidence suggests that collecting is almost always a negligible cause of damage to dragonfly populations, whereas serious and lasting damage can be caused by destruction or pollution of habitats. Nevertheless it is highly desirable to reduce risks as far as possible and to promote a conservation ethic. If children are not allowed to collect at all, they are less likely to become interested in dragonflies and, hence, they will not become concerned about their conservation. A balance has to be struck between preventing risk and engendering interest and study.

The occasions when dragonflies can legitimately be collected.

(a) Rare and vulnerable species and isolated populations of common species

i. Collecting voucher specimens when exuviae are not available.

ii. Collecting specimens as a necessary part of a study whose objective is to conserve population/species concerned.

iii. Collecting specimens as a necessary part of an educational display, whose aim is to promote the conservation of the species concerned.

(b) Common species.

i. Collecting specimens for reference in personal and institutional collections.

ii. Collecting specimens for serious scientific research, e.g. anatomical, physiological, ecological or ethnological studies.

iii. Collecting specimens for teaching purposes.

iv. Collecting specimens for display, for educational and/or conservation purposes.

Points to be observed when collecting.

The following have been adapted from the Code for Insect Collecting issued by the Joint Committee for the Conservation of British Insects. Bulletin of the Amateur Entomologists' Society, 31:99-101. (1972).

1. No more specimens than are strictly necessary for any purpose should be killed.

2. Readily identified species should not be killed if the object is to "look them over" for aberrations or for other purposes: if possible insects should be examined while alive and then released where they were captured.

3. The same species should not be taken in numbers years after year from the same locality.

4. Specimens for exchange or disposal to other collectors should be taken sparingly or not at all.

5. Permission should always be sought from the landowner or occupier when collecting (or studying) on private land.

While some of us are increasing the number of species, others are reviewing existing species in an attempt to define species limits and to understand variation within species. The result of these studies is commonly the realization that some presently recognized "species" are better considered as subspecies. There are many common, easily identified odonates which are objects of current interest: the Georgia and Illinois *Macromia* (*Macromia georgina* and *illinoensis*), the small white-tipped clubtail (*Stylogomphus albistylus*) and the white tail (*Libellula lydia*). During our studies of the *Macromia*, Ken Tennesen and I lamented that so few specimens existed for study (We measured more than a thousand males - it was barely sufficient for our purposes.). And I am now kicking myself for having watched white tails fly around me in Montana and Washington while I never raised a net at them.

Does this mean that all collected specimens will be the subject of an investigation? Of course not. But we have no way of knowing today what will be of interest tomorrow. Anyone who has tried to assemble specimens for any sort of taxonomic study knows all too well the inadequacy of even the finest collections. The amassing of carefully prepared collections of specimens is probably the finest legacy we can leave our taxonomic heirs.

Another more subtle point in favor of collecting is that it is the way in which most taxonomically inclined odonatists got started. I threw over an early interest in birds in favor of odonates when I first tasted the excitement of this relatively unknown group. My interest only proceeded with my collecting. Could I have found another entry into odonates? For me the collections were critical. Many other people start an interest in behavior which led to highly important and interesting results. I commend them for this and I follow their results avidly. However, I emphasize that there are equally interesting problems that require collecting, and some of us find this a highly rewarding activity.

Do odonatists endanger populations by collecting? All the evidence before me says that this is highly improbable. Not only are we highly inefficient predators, but we have no way of luring or trapping our species. We have to net them one by one, with considerably less efficiency than a kingbird sitting

on the telephone wire. And the kingbird catches gomphids all day and every day.

Studies of exuviae tell us that the ratio of emerged specimens to observed specimens is at least ten to one, or even more. On several recent occasions when a group of odonatists has sought adults of a highly desirable species (usually a gomphid) their extensive collections have not resulted in any discernible decrease in the population of the species. It is evident that collecting is not affecting the populations of these "rare" species at all, more or less the common ones.

In the past few years there has been an emphasis on finding "rare" species, and as a group we have been very successful at this. Our success has forced us to face the fact that the species we have sought are highly elusive. They are probably not intrinsically rare at all, or even endangered (this is of course contentious in some cases). A good example is the presently wide recorded distribution of *Ophiogomphus howei*. Now that we more or less know the habits of the species we have been able to find it over nearly a quarter of the U.S. But for the first 40 years of its existence it was among the very rarest of odonates in the U.S.

Does this mean that collecting will never have an adverse affect and should be completely unrestrained? Of course not. I can envision situations, especially involving very small ponds or bogs, where collecting might well endanger a local population. Discretion and judgment must always be used when collecting, even when the species collected appears to be in no danger.

Finally, there is a purpose of collecting which bothers me. Some collectors try to have one of everything, much as a stamp collector tries to have at least one of every stamp. The collection is a goal in itself. These collectors often will come across numbers of some rare species (often following a mass emergence) and take many to use as swaps. I have received some of these myself, so I am not guiltless by any means. But I am upset by the intensity with which some people build their collections.

What is the ideal collection ethic? It would be presumptuous to present a list of principles, but I am guided by the following considerations:

1) All specimens collected should be cared for and well preserved, with data. They should eventually

go to a large public collection. In this regard schools, local museums, and most universities are poor places to leave collections.

2) The collector should endeavor to collect at least one of everything at a new locality (depending on how far it is to the nearest represented locality).

3) It follows that the collector must make a major effort to identify everything collected.

4) There is no set number of specimens to collect. Often more than one specimen is excessive. In my local *Sympetrum* studies, ten specimens are too few.

5) Swapping should not be a goal of collecting. Having said that, the practice of sharing specimens has been of great benefit to many of us and will continue to do so. I prefer not to swap at all. If someone wants a few specimens of something I can spare, I prefer to donate the specimens rather than swap.

6) I know of instances where collectors have tried to catch as many specimens of putatively rare species from bog habitats as they can. I condemn this behavior, as do most odonatists.

7) Photos can be a substitute for collecting, for at least the purpose of establishing the presence or absence of some species. The person taking even a magnificent picture, however, will have to appreciate how many photographed odonates cannot be positively identified to species, especially where a choice must be made between two similarly appearing species in an area where both or neither commonly occur.

In finishing, I note that many people whom I respect prefer not to collect. So be it. Each of us has their own reason for studying (or merely enjoying) the Odonata, and I would not be so presumptuous as to say that any one's way is more serious or acceptable than anyone else's.

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FEEDING TENERAL ADULT DRAGONFLIES - AND MORE ON REARING

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Anyone who has tried to preserve teneral dragonflies in a dry state has undoubtedly seen the specimens shrivel, cave in and become distorted, even to a point where poor preservation and incomplete color development make species

identification difficult to impossible. Keeping tenerals alive is an obvious way to promote maturation (sclerotization), but captive dragonflies continuously attempt to escape and refuse to feed. For several years I have been trying to feed reared, teneral adult dragonflies, and present here some of the methods that have been fruitful.

Each individual is placed in a separate paper lunch bag approximately 10" X 5" X 3". Placing a small moist cotton ball in a plastic Petri dish on the bottom of the bag provides humidity, although in my experience in the more humid climate of the southeastern U.S., this has not been absolutely necessary.

1. Two days after emergence, the dragonfly is removed from the bag and held by gently placing all four wings between thumb and forefinger.

2. The dragonfly is then allowed to grasp a paper towel with its legs, and a small- to medium- sized insect, held in the tip of a forceps, is pressed up against the labrum and mandibles.

3. If the dragonfly grasps the insect with its mouthparts, its wings are immediately released — usually the dragonfly will remain on the towel and consume the prey.

The timing of when to release the wings upon biting of the prey is very important. So far I have found that insects such as midges, mosquitoes, craneflies, mayflies and caddisflies are readily taken and consumed. One day a male *O. incurvatus* "chain-smoked" 16 mosquitoes (took one mosquito after another from the forceps without me touching him). Placing the prey in a freezer for a few minutes makes handling them easy, and prey can be kept frozen for several days before used.

Of course, some individuals I reared refused to readily take prey, and the difference in individual eating habits was amazing. For example, in a small series of reared *Ophiogomphus incurvatus* from northern Alabama, some took prey immediately nearly every day, whereas others needed a little to much coaxing, and one or two would hardly eat at all. Repeated attempts can meet with acceptance, but sometimes little tricks are necessary. When an

individual refuses repeated forced attempts at pushing the prey into its mouthparts, try tipping the dragonfly upside down and placing a drop of water on its mouthparts. Usually the drop will be swallowed quickly; immediately place the dragonfly back on the paper towel and try feeding again. Another trick is to move the prey in a sideways motion quickly back and forth against the tips of the mouthparts. Sometimes letting the dragonfly fly a little will entice them to feed, but be aware that escape and harm can occur.

The dragonflies I have kept in the above manner in 1994 have rarely broken the tips off their wings. It appeared that aeshnids might be the most prone to attempting to fly in the small bags and damage their wings. Larger cages might prevent such damage, although I have done little experimenting with this as of yet. Most of the species I reared this year have stayed alive for 7 to 14 days. Individuals kept this long can be preserved by the acetone method and yield good specimens. If you want to release the dragonflies, I recommend that this be done before they are more than 5 days old, as those I kept longer than that had difficulty flying. I think dragonflies fed and kept in captivity should be exposed to sunlight or artificial light and be given ample space to exercise their flight muscles to better promote the maturation process. Also, feeding them at least 2 or 3 times a day may be necessary.

So far this year I have reared and fed a fair variety of species, including:

- Gomphus lividus*, *G. rogersi*, *Lanthus vernalis*, *Ophiogomphus incurvatus*, *Stylogomphus albistylus*, *Cordulegaster erronea*, *Didymops transversa*, *Basiaeschna janata*

On another note, related to the above rearings, I noticed an unusual bit of behavior in *Lanthus vernalis*. Early this year I built a small circulating stream in order to rear stream-inhabiting gomphids. The container is a plastic, rectangular box (21" X 15" X 6"). An aquarium filter pump (up to 100 gal. per min.) dumps water onto an angled splash spout, initiating flow around an oval-shaped rock (made by pouring concrete into a styrofoam mold). An air stone provides additional dissolved oxygen in front of a screened partition guarding the pump intake. Water depth is about 1.5 inches and the substrate is a one inch layer of sand and gravel. I call this system the "oval

stream". A screen cover was placed over the system to trap the emerging dragonflies.

Emergence of *L. vernalis* in the oval stream was very successful, as all 7 nymphs I brought back from east Tennessee in April emerged within 3 weeks of collection. I left 2 males and 2 females in the cage above the stream for one week, feeding them mosquitoes and watching their activity. Mosquitoes released in the cage were not freely taken or even pursued, and therefore I used the force-feeding method described above. Although I had little time to watch them, I did not see any interaction between the sexes, but I did notice on several occasions both males fly down and perch on the side of the oval concrete rock. What seemed unusual to me was that they positioned themselves facing away from the water but with the tip of the abdomen touching or slightly immersed in the flowing water. The abdomen was held quite steady in this position for minutes at a time. I wonder if this behavior is an artifact of being captive or whether it reflects a natural trait? The puzzling question is why did these males touch the water with their abdomens? I would be very pleased to hear from anyone who has seen behavior of this type or who can offer an explanation for it.



CARL COOK'S STUDY OF *MACROMIA*

Carl Cook has prepared a report of his study (supported by the F&WS) of *Macromia taeniolata* and related species. The N.M.N.H. collection has a large representation of *Macromia taeniolata*, especially from the midwest, and an apparently related specimen of a problematical species. The richness of this collection is largely due to the collecting activities of the late B. E. Montgomery, whose collection went to this museum.

The problematic specimen comes from Franklin Co., OH, but without further locality data. This form has been known from Arkansas and Texas. An additional specimen of this form was found in a collection loaned by Bob Glotzhober. This specimen was taken on the Stillwater River, Montgomery Co., OH.

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