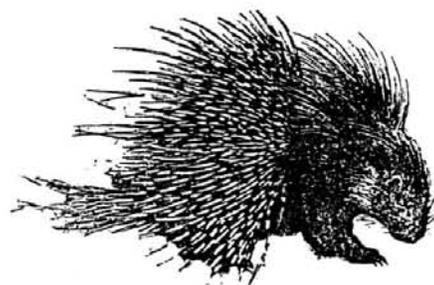


Porcupine!



Newsletter of the Department of Ecology & Biodiversity, The University of Hong Kong, in collaboration with Kadoorie Farm & Botanic Garden Fauna & Flora Conservation Departments

South China Biodiversity Study gets underway



Early this year Kadoorie Farm & Botanic Garden launched a major initiative aimed at halting the decline of forest biodiversity in South China. The great biodiversity of tropical forests is being steadily eroded across the world, with species extinctions believed to occur every day. This region is no exception, and the South China Biodiversity Study, a collaborative project with academic and Government organisations in China, is a many-stranded attempt to minimise the loss.

The coastal tropical forests of South China, in the provinces of Guangdong, Guangxi and Hainan, are among the richest biomes in the country, but are also among the most devastated. As in western Europe, centuries of intensive human impact have reduced natural forests to scattered fragments, which continue to supply food, fuel and other resources. In recent decades many forests have been set aside as nature reserves. But managing these to avoid further biodiversity loss requires information, and much of this - even basic information on current species inventories - is missing or out of date. As a result the regional distribution of most species is poorly documented, with repercussions even in such better-studied localities as Hong Kong, where environmental impact assessment is incomplete without a knowledge of the regional status of species.

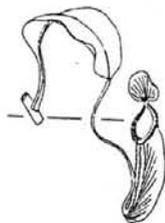
Some projects are already underway to improve the availability of relevant information in China - the Forestry Department, for example, is organising a National Terrestrial Wildlife Resources Survey, while members of the Biodiversity Working Group (of the China Council on International Cooperation in Environment and Development) have set up a national database of existing records of vertebrate and plant species. The KFBG Study seeks to complement and support such existing efforts. In the first phase (1998-1999), a team of ecologists from KFBG, joined by experts from Chinese academic institutions and from the Chinese Government, will be visiting sites in Guangdong, Guangxi and Hainan, to learn about the current distribution and status of fauna and flora, and to explore ways to improve effectiveness and communication among conservationists. On the basis of this preliminary work the project will subsequently focus on selected sites and issues of high priority. By considering the perspective of the local people, as done over the decades by the Kadoories in their commitment to disadvantaged communities in Asia, it is hoped that conflicts between humans and nature will be resolved.

The success of the South China Biodiversity Study will depend on its ability to provide the people responsible for conservation with the motivation, knowledge and experience they require to minimise biodiversity loss. Already many readers of *Porcupine!* have offered their support and expertise to this endeavour, and we look forward to proceeding in this profound spirit of cooperation.

LAWRENCE CHAU & JOHN FELLOWES

THIS ISSUE USHERS IN A new era for *Porcupine!* Kadoorie Farm & Botanic Garden has become actively involved in the production process and now takes its place alongside the Department of Ecology & Biodiversity as joint publisher. We will work hard to ensure that this new arrangement satisfies all concerned and results in an improved, more periodical, publication. Our success in this regard will undoubtedly be aided by the dynamic entrance of the DEB's Dr. Gray Williams - the Welsh Wizard - who has been "persuaded" to join the editorial team.

The opportunity to conduct a minor face-lift has been seized. However, changes are largely of style rather than of content, and *Porcupine!* remains committed to its original aim of publicising ecological research and wildlife observations from across Hong Kong. Of course, our continued ability to achieve this depends on the continued willingness of you, our ever-swelling readership, to contribute articles. Start writing *now* - we'll be back sooner than you think!

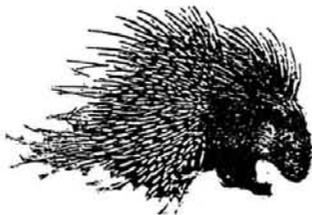


The times they are a changing – Postgraduate completion times

This next academic year brings a major change for The University of Hong Kong, with the introduction of a semester system (and modular units) and the VC's laptop initiative. These changes will have a huge impact on teaching in the University at the undergraduate level, but there are also changes afoot at the Postgraduate level. A recent review of UHK's postgraduate education by the University Grants Committee (UGC) has forced UHK to re-evaluate its postgraduate teaching. One area which has been highlighted is the poor completion times of our postgraduate students, particularly M.Phil. The concerns about poor completion rates raised by the UGC have led to two major changes: UHK's postgraduate quota has been reduced and our departmental budget is now affected by the completion rates of our postgraduates in that "extended" M.Phil. and Ph.D. degrees are now heavily penalised! This will impact greatly on our Department, as at present we have 80 postgraduates on our books and only 55 (69%) are within their minimum period. (The minimum period is now the MAXIMUM period as far as the UGC are concerned and M.Phil. degrees are therefore 2 years maximum and Ph.D.s 3 years!). To scare you even further – our average completion time is 48.8 months for a M.Phil. and 47.3 for a Ph.D. (yes, M.Phil.s take longer!!) – when compared to the Faculty this looks pretty sad, particularly for M.Phil.s., since the Faculty means are 37.5 and 45 respectively.

To try to improve completion rates we have a new Postgraduate Research Booklet (ask Flora for a

Porcupine!



**NUMBER 17
JULY 1998**

Newsletter of the Department of Ecology & Biodiversity, the University of Hong Kong, in conjunction with Kadoorie Farm & Botanic Garden Fauna & Flora Conservation Departments

copy if you don't have one) and a monthly reporting scheme to help monitor progress. Prof. Felix Wu (PVC, Research) has also outlined some changes which he thinks would benefit higher degree students, one of which would be the introduction of a taught first year at the M.Phil. (initially) level. Perhaps postgrads would like to comment on these ideas (and ways of improving Postgraduate education at UHK) in *Feedback!*

After all this, there needs to be some sort of "deliverable". Which brings us onto the subjects of seminars and publications. ATTENDANCE and GIVING postgraduate seminars are COMPULSORY for ALL postgrads in DEB! We have a new set of organizers (Michelle Wong and Richard Huang – thanks for volunteering and Good Luck!) – and thanks very much to Neil and Vicky for their sterling work in the previous year in what is a thankless task. The new incumbents give their ideas about the ALL NEW seminar series in this issue (page 3). On the subject of publications, we are now assessed on your output in terms of publications as well – which means "papers = \$\$" – so get publishing guys and girls!

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Department of Ecology & Biodiversity Visiting Professor Scheme

In April we saw the first in what the Department hopes will be a series of Visiting Professors. Roger Kitching, Professor of Ecology at Griffith University, Australia, visited the Department for a period of 8 days to generally meet with people to discuss research and also give a series of presentations. Professor Kitching gave a public seminar entitled "Biodiversity: what is it and why is it important?" to an audience of ~100 people. Roger also gave a more informal workshop (Biodiversity assessment – "rapid", "not-so-rapid" and "downright slow") which generated a great deal of interest with regard to just "how" to sample biodiversity, and a postgraduate seminar on his own research work ("Pattern and process in selected Old-World rainforests – the generation and maintenance of Biodiversity"). Both these talks raised a great deal of debate about the mechanics of biodiversity assessment. The overall message, however, of the importance of research scientists getting involved in such exercises was a recurrent theme, after all if we don't do this – who will? Roger's visit provided a good focus for the Department but

also for people outside to interact and discuss these themes with the Department as well. Such exchanges are the whole idea behind the Visiting Professor scheme and thanks to Roger for doing a great job! We shall be arranging a second Visiting Professor, hopefully for the next semester; if anyone has any suggestions for appropriate recipients, please let us know.

New links and developments

The Department now has a Memorandum of Understanding with the National University of Oceanography, Goa and the Centre for Advanced Studies in Botany at the University of Madras to undertake collaborative research in prioritized areas of mutual interest. At present "marine mycology" is the only area identified, but the MOU can be expanded to cover other fields in the future.

Most readers will know by now that SWIMS has been incorporated into the Department of Ecology & Biodiversity from 1 July 1998 and so from now on this Departmental "report" will include mention of activities there also. At present there is no further news concerning the possible extension of research facilities at the Institute (yes, we know its crowded!), but hopefully by the next issue there may be.

Research Assessment

Finally, as most of our readers know, research in the Department of Ecology & Biodiversity has a high profile. Recently we were assessed on our research output by both external and internal assessors. The external assessment gave the "biological sciences" at UHK a score of 82%, the second highest score in UHK and the highest score in "biology" in Hong Kong. The grading system for internal assessment ranged from 5 (= godlike) to 1 (= Mickey Mouse Science Kit

for Beginners). The Zoology Department scored a 3, Botany Department a 3 and the Department of Ecology & Biodiversity a 4 (with "potential for 5"). This is on a UK scale and so directly comparable to Universities/Institutions in the UK. Well done to all those publishing good stuff out there, the message is – we are pretty good – BUT we could be better – so in the next year – lets go get that 5!

Gray Williams (Postgraduate Tutor) & John Hodgkiss (Head)

The new Seminar series

DEB staff and students must have noticed that we have not been able to hold a regular series of seminars for some time. This is a very strange problem as, judging by the number of students in our department, we should be able to run seminars for almost 2 years! At present, however, we cannot guarantee enough seminars for even one month!

Previous experience has shown that many students are not eager to give a seminar although they know they are obliged to do so at least once a year (as stated in the student regulations). Although this regulation exists, many students ignore it or simply do not know about it (check your annual review form!). As time goes by, it eventually becomes the job of the seminar organizers to find and persuade someone to give a seminar.

Life is tough; willing students are not easy to find! Sometimes, however, they accept our request, but often students change their minds and withdraw at short notice. This not only causes trouble to the organizers, but it is a poor advertisement for our department, since seminars are not only of interest to our departmental

students and staff but also OTHER departments, OTHER universities and OTHER bodies such as AFD, EPD and green groups as well which rely on our timetables.

In response to these problems we plan to introduce a new system, the details of which are now being drafted and we hope to launch the new scheme in the coming September. In brief, the new system is as follows:

1. Students will be TOLD the date of their seminar (with a limited choice of dates within one month). This will allow us to draw up reliable monthly timetables which we will then circulate (and be able to put in *Porcupine!* as well).
2. The order of appearance will be sorted by two criteria: firstly date of registration and secondly by how many departmental (and no other seminar is accepted!) postgraduate seminars have been given. Thus, the longer you have been here and still not given any seminar, then the closer you will be to being the first target!
3. As you know, we have a lot of students and to avoid all the 'old' students filling up the seminar slots for months we will arrange 'old' and 'new' students to alternate (e.g., week one would be a final year student, week two a new student and week three another 'old' student etc.).
4. The new students will be selected according to the same criteria as the old students. As the idea behind the new student seminars is to present an outline of their projects it is envisaged that two new students could give seminars on the same day (say 15-20 mins each).
5. The same "double billing" could also apply for students wanting to practice conference (~15 mins) presentations. Year II and III students (and staff!) will obviously have lots to talk about/present and together with visiting speakers we

will retain the normal 45-50 mins slots for these seminars. The present flexibility with dates for visiting speakers will be maintained to ensure all visitors have the chance to speak when they are in Hong Kong.

6. To prevent students dropping out days before the seminar, any student who withdraws from their designated seminar slot has to present an acceptable explanation to the Head of Department (Prof Hodgkiss).

We know many students may think this is harsh, but seminars are important and they are a departmental duty of all students. Our aim is to continue with an effective postgraduate-run seminar series. We hope this scheme will ensure regular seminars and in time people will volunteer for seminars when they have something they want to discuss, as opposed to waiting for their 'turn'. If you have any comments please contact either of us (Richard and Michelle) or write to *Feedback!*

Thanks!

Richard Huang

Mai Po Ramsar status confirmed

In 1997 the Ramsar Bureau received a letter from the Ministry of Forestry (the authority administering the Ramsar Convention in China) confirming that, as of 1 July 1997, Mai Po Marshes and Inner Deep Bay would become China's seventh Ramsar Site.

This is in addition to the following six sites which are already Ramsar Sites in China: Xianghai, Jilin Province (105,470 ha), Zhalong, Heilongjiang Province (210,000 ha), Po Yang Hu, Jiangxi Province (22,400 ha), Dong Dong Ting Hu, Hunan Province (190,000 ha), Niao Dao, Qinghai Province (53,600 ha) and Dong Zhai Gang, Hainan Isl. (5,400 ha).

LEW YOUNG

Illegal trapping

On 6 August 1997 I found a Little Egret caught by a fish hook, hanging on a rope across a fish pond at San Tin. My colleagues and I pulled the bird to the shore. As the hook only entangled one of its primaries, the bird was not badly hurt. However it was soaked and could not fly after we released it. Later we found and destroyed a similar trap on a different pond. The traps may be aimed at cormorants.

KWOK HON-KAI

On 7 March 1998 I spotted a large baited animal trap at Luk Keng Village. I reported the matter at the management centre of Pat Sin Leng Country Park. Officers at the centre immediately went to investigate. I do not know the result of their investigation. Nevertheless I greatly appreciate the efficiency of the officers of Pat Sin Leng Country Park management centre, as well as

KFBG NEWS



Native tree nursery

KFBG set up a native tree nursery in October 1997, with the aim of promoting the planting of more native tree species in Hong Kong. The seeds of about forty native species have been collected. Apart from making native tree seedlings available to developers and researchers, KFBG will determine, experimentally, which native tree species are the most suitable for reforestation in Hong Kong. Rare and endangered plants will also be propagated for conservation. Germinated seedlings are now being transplanted into growth containers. In a few months time, we will know the exact number of seedlings available in our nursery, and the seedlings will be available for planting out in the field in the summer of 1999. Those who are interested in acquiring native tree seedlings for scientific research and reforestation purposes can contact Billy Hau at tel. 2483 9534 or e-mail billyhau@ibm.net.

Kadoorie botanist receives award

In February last year Mrs. Gloria d'Almada Barretto, long-time

botanist at Kadoorie Farm & Botanic Garden, was awarded the Gold Veitch Memorial Medal by the Royal Horticultural Society of Britain. The award is conferred on persons who have helped in the advancement and improvement of the science and practice of horticulture, and is a recognition of Mrs. Barretto's contribution to Hong Kong botany - in particular her work on Hong Kong orchids, of which she has discovered many botanically interesting, new and rare species.

Flora conservation

A recent survey of the wild native orchids growing in various different habitats in KFBG recorded 35 species and 2 varieties. We have attempted to pollinate orchid flowers in the wild and in our gardens as far as possible to facilitate fertilization and hence seed production. Suitable capsules are collected for tissue culturing, while some capsules are left on the plant to mature naturally. Seeds of mature and split capsules are often sown close to the parent plants, where symbiotic mycorrhiza are present, to ensure success in germination. These practices have proven quite effective; for example, the number of plants of the endemic *Peristylus spiranthes* var. *taipoensis* at KFBG was 48 in August 1996. With the above procedures of pollination and *in-situ* seed sowing, the number became 171 in 1997,

which represents a 2.5-fold increase.

KFBG's Fern Walk has been established beside a stream at an altitude of 380 metres at KFBG. Hong Kong has more than 200 species of ferns, occupying different habitats such as ravines, forest, grassland, river-banks, marshes, ponds and the seashore. About 140 species have been collected from across the territory and transplanted in appropriate locations along the Fern Walk.

Apart from orchids and ferns, the Flora Department is also interested in the conservation and propagation of other native plants, especially rare species. Due to human impacts, many of the 2,000-odd species of native plants are now locally at the verge of extinction. In addition to *in-situ* conservation, these species can be propagated and then either grown in a safe place such as KFBG (*ex-situ* conservation) or reintroduced back to the natural habitat. The propagation techniques we have applied are mainly seed-sowing, stem cuttings, layering, grafting and collecting saplings from the wild. A plant conservation laboratory was built in 1997. The major task of this laboratory is to carry out mass propagation of native rare plants by tissue culturing techniques. It also provides facilities for an experimental seedbank.

Animal rehabilitation

The construction of our veterinary hospital has been completed and the building is being equipped. We will now be able to react much more rapidly to the needs of seriously injured arrivals to the Rescue Centre. We have also modified two rooms which are now medical hot rooms for the purpose of housing animals that are recovering from operations, and of winter holding for tropical reptiles.

A policy concerning conditions for acceptance of animals for

rehabilitation and temporary holding was formulated between the Agriculture and Fisheries Department, the Society for the Prevention of Cruelty to Animals and KFBG during a meeting which took place in 1996. The Mammal Sanctuary has now been completed and we are presently holding twelve mammal species in captivity. KFBG can rehabilitate injured native wild mammals that have been brought to us by members of the public or the SPCA.

During summer 1997 we successfully reared three local squirrels which were handed to us as unweaned pups. One has since been released. We also successfully rehabilitated an injured Small Asian Mongoose and a Chinese Porcupine, releasing both back to the wild in 1997.

With the completion of Reptile Sanctuary Phase I, and the renovation of existing enclosures, we have been able to accommodate a wider range of animals. Obvious examples are three South American Spectacled Caimans and several Malaysian Giant Turtles, including one that weighed over 50kg. Many native reptiles have been rehabilitated and subsequently released into suitable areas around KFBG.

The Raptor Sanctuary has continued to expand to accommodate the increasing numbers of birds of prey admitted. On 3 October 1997 a suspected 'very pale' Eastern Grass Owl (*Tyto longimembris*) was admitted to the sanctuary. Upon close inspection it was determined that the bird was actually a Barn Owl (*Tyto alba*). The owl had been found by workers in a warehouse after it had attempted to fly out of a netted window. An inspection of its pellet regurgitated the following day showed that it had eaten a local rat species. This species of owl occurs in surrounding countries such as Vietnam, Malaysia, Western China and Nepal, but has never been recorded in Hong Kong before and

it is believed that its journey here may have been wind-assisted or ship-assisted.

Fauna at the Farm

The Butterfly Garden has been very successful with regular sightings of several rare species including Common Birdwing (*Troides helena*), Golden Birdwing (*Troides aeacus*) and Common Rose (*Pachliopta aristolochiae*). The larval food plant of these species - *Aristolochia tagala* - has now been planted at other sites around KFBG with the aim of widening their local distribution. Previously unrecorded at the Farm is the Orange Awlet (*Bibasis oedipodea*), of which large numbers were seen in 1997.

Two species not previously present on our hillside, the Hong Kong Lacewing (*Cethosia biblis*) and the Plain Tiger (*Danaus chrysippus*) have been introduced from Lung Kwu Tang and Lamma Island. We are trying to establish *Passiflora cochinchinensis*, the larval food plant for Hong Kong Lacewing, in the Butterfly Garden. Shortly after planting the food plant, *Asclepias curassavica*, of the Plain Tiger, and introducing caterpillars, adult females were observed laying eggs.

We now have 22 species of freshwater fish in our displays, all of which are native or naturalised species. The rare Black Paradise Fish (*Macropodus concolor*) bred in one of the display tanks in spring 1997.

A semi-captive population of the locally endangered Rough-skinned Floating Frog (*Occidozyga lima*) has been breeding successfully two years consecutively proving that it can survive in Hong Kong if suitable habitats are protected. The endemic Romer's Tree Frog (*Philautus romeri*) is still breeding on our hillside.

*Extracted from the
KFBG Report 1996-1997*

Feedback.....

Dear Feedback,

A recent article in *Porcupine!* (16: 12-13) by David Dudgeon is a critique of my previous article (*Porcupine!* 15: 7-8) and raises some interesting questions about the relationship between snails and crabs in Shap Sze Heung stream (hereafter referred to as SSHS). Normally, when a critique of a journal or newsletter article is written, the author of the original paper is sent a copy of the critique and invited to comment so that both the critique and the responses to it can be published together. Sadly, this did not occur and the reader must now go back to volume 16 of *Porcupine!* to read the comments by Dudgeon on the article by Dickman in volume 15.

To give a quick review of the situation, it went something like this. In the fall of 1995 about 180 first year Ecology and Evolution students at HKU spent one morning combing over a section of SSHS and the remarkable thing, in my opinion, was the absence of any snails in their collections of animals from the stream. They found crabs, fish, shrimps, caddisflies, mayflies, midge larvae and much more, but not a single snail. Their observations piqued my curiosity as to why this stream had no snails. There was periphyton growing on a number of the rocks in sunny stretches, so a few snails grazing on the attached algae might be expected, as they are found in most other streams in Hong Kong. So why are there no snails in Shap Sze Heung stream?

The first hypothesis was that the snails may be seasonal. To test this hypothesis I returned to the stream in the summer and spring and still found no snails. The second hypothesis was that the levels of calcium in the stream might be so low that snails would be unable to form functional shells. Atomic absorption analyses of the SSHS sediments that I sampled were carried out for numerous elements including calcium. These analyses revealed that calcium was low but not too low for thin-shelled snails to exist. The other elements tested did not appear to be unusually high or low

when compared to other streams in Hong Kong where snails were found.

I hypothesized that perhaps the crabs in the stream could consume thin-walled snails. To test this hypothesis a simple manipulative experiment was performed. Crabs from the stream were removed and placed in an aquarium containing commonly-occurring snails taken from the Pokfulam Reservoir stream. Within one day nearly all of the snails had been broken open and the contents consumed by the few crabs placed in the aquarium. This observation gave rise to the hypothesis put forward in my *Porcupine!* article, that low calcium means that only thin-shelled snails are likely to occur in SSHS and the crabs in SSHS were capable of consuming thin-shelled snails.

In his critique of this study David Dudgeon claims that other parameters might be responsible for the absence of snails in the stream. He suggested two possibilities: food was limiting and / or sodium or some other critical ion was limiting. As mentioned above, if food was limiting then why is periphyton growing on most of the stones in the many sunny reaches of the stream? If sodium or other elements were critical then why were they present at similar levels reported for streams containing snails? The fact that Dudgeon & Corlett stated in *Hills and Streams* (1994) that *Cryptopotamon* feeds on leaf litter was overridden by a simple manipulative experiment indicating that it may be an opportunist and it is certainly capable of feeding on thin-shelled snails (sorry David).

In 1996 K.T. Chan completed his M.Phil. thesis at HKU. According to David, Mr. Chan observed *Brotia hainanensis*, a thick-shelled snail, in streams with calcium of 1.2 mg per litre. This information was not available to me when I published the 1995 observations from SSHS. It is possible that under low calcium concentrations the shell of *Brotia hainanensis* might prove thin enough for *Cryptopotamon* to break open.

So what does all of this prove? Not that manipulative experiments were not carried out - they were carried out. It proves that manipulative experiments are difficult to construct in such a way that all the critical parameters are tested. For example, if sodium or some other ion is critical to snail egg development or larval development it may not be detected in standard cage experiments unless the entire snail life cycle was examined. What I think all of this proves is that science often progresses incrementally when testable hypotheses are published. Such hypotheses eventually are tested by others who are interested in using them or questioning them. This is as it should be. David provides a very interesting hypothesis - that food or some other critical ion is limiting and that is why there are few if any snails in SSHS. I hope that one or more *Porcupine!* readers will some day decide to answer the question: "Why are there no snails in Shap Sze Heung Stream?".

In the last issue of *Porcupine!* there is an article by Gray Williams which is well worth reading. He assures students that presenting their results at a departmental seminar is a worthwhile way to elicit critical comments by staff and students and that they should welcome such critical comments because they often improve the final product. I think the same can be said about publishing one's hypotheses. One takes a risk in publishing, as one does in presenting a seminar. But it's taking the risk that makes doing science exciting.

MIKE DICKMAN

Dear Feedback,

The bumblebee picture in *Porcupine!* number 16 is VERY misleading! Can we have a note in the next issue pointing out that the local one looks nothing like that?

RICHARD CORLETT

FLORA

Changing the names

*The naming of cats is a difficult matter,
It isn't just one of your holiday games ...*
T.S. Eliot, 1940

The same, unfortunately, applies to the naming of plants. According to the latest (1994) edition of the International Code of Botanical Nomenclature "the original spelling of a name or epithet is to be retained, except for" correction of errors and standardization of certain aspects of spelling. The standardizations specified in the Code are retrospective and compulsory, so unstandardized names are simply wrong. Two types of standardization affect a number of plant names used - or, currently, misused - in Hong Kong: the use of "compounding forms" and the use of terminations. Terminations are easier so I will start with them.

Many specific epithets (the second part of the Latin name) in Hong Kong are formed from the names of people. These names are usually given Latin endings ("terminations"): it is these endings which must be standardized. Epithets derived from personal names are of two types: "substantive" epithets, where the name is used as a noun (in English, "Fred's rhododendron") and "adjectival epithets", where it is used as an adjective ("the Fred rhododendron", which sounds odd in English!). Substantive epithets use the Latin genitive ending (the equivalent of the "s" in English), which is -i for a man and -ae for a woman, except after -a, when both the male and female ending is -e. The genitive ending is added directly to a vowel, including -y, and to -er (so Fortune becomes *fortunei*, Hance becomes *hancei*, Macartney becomes *macartneyi*, Balansa becomes *balansae*, Hooker becomes *hookeri*), but an extra -i must be added before the ending if the name ends in a consonant (so Tsang becomes *tsangii*, Edith becomes *edithiae*, Champion becomes *championii*, except for the Rhododendron named after his wife, which is *championiae!*). It is this extra -i- which has often been omitted in Hong Kong, necessitating recent changes.

For completeness: adjectival epithets are formed by adding -an- (or -ian- after a consonant, or just -n- after an -a) plus an ending which agrees in gender with the name of the genus rather than the person. So it is *Camellia crapnelliana* and *Illicium dunnianum*: Crapnell and Dunn were male but *Camellia* and *Illicium* are female and neuter, respectively.

Standardization of "compounding forms" is a very complex topic which I cannot cover fully here. It applies to adjectival epithets which combine bits of two or more Latin or Greek words. The Code is irritatingly vague on many aspects of this but one error which occurs in the

Hong Kong checklist is the use of -ae- rather than the correct -i- as a connection for Latin elements. Thus our *Quercus myrsinaefolia* has to be corrected to *Q. myrsinifolia* and *Ardisia primulaefolia* to *A. primulifolia*.

Correction of supposed errors has sometimes been taken too far and the Code makes clear that, apart from the above-mentioned cases, "the liberty of correcting a name is to be used with reserve". The tendency now is retain - or restore - the original spelling except for proven errors. Thus, the single -r- in *Bruguiera gymnorhiza* has usually been doubled ("*B. gymnorrhiza*") since this is now considered the best way of transliterating the Greek letter rho after a vowel. However, many reputable authors have not followed this practice and it cannot be considered an error. Thus the original form of the epithet must stand, contrary to common usage.

A final example for anyone who has got this far. When Blume described the genus *Aporosa* in 1825, he spelled it with an -o-. A year later he published it as *Aporusa*, with a -u-. If the latter spelling was a correction of an earlier slip of the pen, then it is the one we should use. However, there is no good evidence that the original spelling was a mistake - he used it on herbarium specimens - and recent authors have generally preferred *Aporosa*.

RICHARD CORLETT

Rescue of native orchids

In July 1997, the authors were informed by Dr. S.Y. Hu of the Chinese University that two species of orchids had been found at a landfill site in Lam Tin, Kowloon. Subsequently, Gloria Siu accompanied Dr. Hu to the landfill. She confirmed the identity of the orchids as *Eulophia graminea* and *Habenaria linguella*. She also discovered a third orchid species, *Spiranthes sinensis*. All three species are native to Hong Kong. Part of the original landfill had been developed as public tennis courts already. Works were about to start on the rest of the landfill. Therefore, in August 1997 a team of workers from KFBG dug up all the orchids (35 colonies of *E. graminea*, about 200 individuals of *S. sinensis* and one *H. linguella*) and transplanted them to KFBG for *ex-situ* conservation. The orchids grew well and flowered in 1998.

In February 1998 we checked the landfill site for the deciduous orchid *Zeuxine strateumatica*, and confirmed its presence. Some 500 individuals were transplanted to KFBG. We thank the EPD and Dr. S.Y. Hu for their help in making these *ex-situ* conservation operations possible.

Gloria Siu & Lawrence Chau

Orchid on ash

In February 1998, a team of biologists from the Chinese University (Dr. S.Y. Hu and colleagues) and the Polytechnic University (Dr. W.K. Chan) found an orchid in flower growing on the fly ash lagoon in China Light & Power's facility at Black Point, Castle Peak. The team was conducting a vegetation study on the lagoon. The orchid was later identified by Mrs. G. Barretto and Dr. Hu as *Zeuxine strateumatica* (Indian Orchid or Green Lip Orchid) - a native deciduous perennial herb about 10-15 cm tall (occasionally up to 25 cm).

Zeuxine strateumatica is an Asiatic orchid, ranging from Afghanistan to Japan and south to New Guinea. It has also been recorded in Florida and Bermuda, and very recently in the desert environment of Riyadh, Saudi Arabia. It is widespread in Hong Kong, where it is usually found in disturbed sites such as landfills, urban parks, cut slopes and open grassland. The fly ash itself is very loose and sandy and has a high salinity, since it was pumped with sea water into the lagoon from the power station nearby. It therefore supports very few weedy or opportunistic plants.

Subsequently, the authors visited the same site and conducted a quick count of the population of this weedy orchid. In an area of about 150 m by 20 m an estimated mean density of 10 individuals per m² was recorded. However, in patches that were more open and damp, population density could exceed 60 per m². A lower population density (3 per m²) was recorded in an adjacent area (150 m by 50 m) of thicker and taller (~ 1 m) vegetation cover.

This small opportunistic orchid will be displaced if the vegetation in the fly ash lagoon is allowed to pass through a natural process of succession. However, the tiny wind-dispersed seeds of this orchid will be carried long distances and will germinate if they land in a suitable habitat.

Lawrence Chau & Gloria Siu

Eria pusilla (Orchidaceae), a new record for Hong Kong

The number of known native orchid species in Hong Kong has been doubled, from about 60 in the early 1970s to about 120 to date, as a result of continued work by Mrs. G. Barretto, M.B.E., Dr. S.Y. Hu and the Hong Kong Wild Orchid Group. Even now, after more than 20 years of hard work on orchid research in Hong Kong, there are still new records, discovered by the orchid research team at KFBG over the last few years.

The latest addition to the Orchid Family in Hong Kong is *Eria pusilla*, which is very similar to and has been mixed with *Eria sinica*, the smallest orchid known locally. Apparently the species (*E. pusilla*) had been collected by Mr. Ruy Barretto some 20 years ago. However due to limited information and reference material available at that time it was regarded as *E. sinica*. The difference between the two species was first noticed when Mr. R. Leung and Mr. K.H. Choi of KFBG collected more specimens of the two species together in 1995. However no flower specimen was available for confirmation at that time. In autumn 1997, during the anticipated flowering period of this species, Gloria Siu made 7 trips to two of the three known sites in Hong Kong to check for flowers. Only two flowers were seen, of which one was collected for identification.

There are 3 known localities for *E. pusilla* in Hong Kong, all in high mountains, ranging from 600m to 800m in altitude. In the two sites visited by the first author, the plants were growing on steep sides of boulders together with mosses (e.g. *Leucobryum bowringii*), in and by partially shaded streams (30-60% shade). In one of the two localities, both species of *Eria* actually grow together. At a glance they are very much alike but the main difference in their vegetative part is that *E. pusilla* has conspicuous creeping rhizomes (usually 1-3 cm long) linking pairs of opposite pseudobulbs. There are no such rhizomes for *E. sinica*.

Gloria Siu & Lawrence Chau

Update on new records of vascular plants in Hong Kong

It was reported in *Porcupine!* No. 15 that 2 families, 20 genera and 52 species of vascular plants had been newly recorded for Hong Kong as a result of the Hong Kong Biodiversity Survey. This was updated to 4 families, 23 genera and 84 species last year (Xing *et al*, 1997). Since then, the following 4 genera and 12 species have been added to the Hong Kong list:

New genera: *Ampeloptis*, *Remirea* (Cyperaceae), *Trigonostemon* (Euphorbiaceae) and *Tournefortia* (Boraginaceae). New species: *Ampelopteris prolifera* (Retz.) Cop., *Arachniodes cavalerii* (Christ) Ching, *Ardisia sieboldii* Miq., *Borreria latifolia* K. Schum., *Cyclobalanopsis hui* (Chun) Chun, *Digitaria heterantha* (Hook. f.) Merr., *Drypetes arcuatineria* Merr. & Chun, *Pileostegia tomentella* Hand.-Mazz., *Remirea maritima* Aubl., *Sabia swinhoei* Hemsl., *Tournefortia montana* Lour., and *Trigonostemon chinensis* Merr.

William Xing, Richard Corlett and Lawrence Chau

DRAGONFLIES

New Hong Kong dragonfly

Macrodiplax cora, a dragonfly newly recorded for Hong Kong in May 1997 (see *Porcupine!* 16: 5), is a widespread species found in three zoogeographical areas - the Ethiopian, Oriental and Australasian regions. It is highly migratory with populations established on islands in the Indian and Pacific Oceans. The larvae are salt tolerant with populations occurring in lagoons and estuaries. The genus *Macrodiplax* is both tropical and neotropical and closely allied to *Pantala* which is also found throughout the tropics. *Macrodiplax cora* and *Pantala flavescens* are perhaps today's most successful dragonflies in terms of numbers and distribution.

Keith Wilson

BUTTERFLIES

Birdwing butterfly (*Troides helena*) established in Lantau

Further to the brief paper on the two Hong Kong Birdwing butterflies published in this issue of *Porcupine!* (page 10), a trip was made to Tung Chung from the Po Lin Monastery on 7 September, 1997.

Five *Troides helena* including 4 males and 1 female were observed within a period of twenty minutes along the footpath from Po Lin to the middle pagoda towards Tung Chung. A few *Pachliopta aristolochiae* (Common Rose butterfly) were also seen flying in the vicinity.

A type of *Aristolochia* vine was spotted alongside the footpath. On searching, many larvae of *P. aristolochiae* were found feeding on the vines. This vine was later confirmed by Prof. William Xing from Kadoorie Farm & Botanic Garden to be *Aristolochia fordiana*. It is suspected that this is also the host plant for *Troides helena* in Po Lin, as the normal host, *A. tagala* was not found at the site.

Aristolochia fordiana is common in this area, and if *Troides helena* is, like *Pachliopta aristolochiae*, making use of this species as a host plant, it suggests that the Birdwing population can become firmly established at this locality.

James J. Young

Butterfly status and flight periods - addenda

George Walthew's paper "The status and flight periods of Hong Kong butterflies" which appeared in the last issue of *Porcupine!* suffered some inadvertent truncation. Accidentally cut off the list was *Polygonia c-aureum*, a vagrant recorded once in November 1990.

Two further additions were made to the Hong Kong list in 1997; collected during the HKU Biodiversity Survey and subsequently identified by Dr. Mike Bascombe. They are *Aeromachus pygmaea* (Fabricius) (Hesperiidae: Hesperinae), recorded in April at Cheung Sheung, and *Euploea sylvester* (Fabricius) (Nymphalidae: Danainae), recorded in June on Kat O Chau. The status of both species may be defined as "rare" using Walthew's (1997) criteria. *Euploea sylvester* is already recorded from Guangdong Province. However, *Aeromachus pygmaea* had not been recorded from Chinese territory prior to April 1997. Nevertheless a small population seems to be established at Cheung Sheung: members of the Hong Kong Lepidoptera Group visited the site in April of this year, and were able to reconfirm the presence of this tiny skipper. Interestingly, this species was recorded at Gu Tian Nature Reserve, Guangdong, a few days before the first Hong Kong specimen was collected (Fellowes & Hau, 1997).

And there's more...

Two additional species of butterfly were discovered at Fung Yuen in May 1998, by Mr. Shingo Murakami. *Tagiades menaka* (Moore) (Hesperiidae: Pyrginae) was recorded for the first time on 2 May, and *Papilio dialis* Leech (Papilionidae: Papilioninae) was taken on 16 May, bringing to nine the number of *Papilio* species known from Hong Kong. Neither species has been recorded from Guangdong, but both are known from Guangxi. James Young reports that he has collected larvae of *Ampittia virgata*, which is already known from Guangdong and Guangxi, but is yet another new record for Hong Kong.

Graham Reels

Fellowes, J.R. & Hau, C. H. (1997). *A Faunal Survey of Nine Forest Reserves in Tropical South China, with a Review of Conservation Priorities in the Region*. Kadoorie Farm & Botanic Garden, Hong Kong. 151 pp.
Walthew, G. (1997). The status and flight periods of Hong Kong butterflies. *Porcupine!* 16: 34-37.

A brief note on the distribution and conservation of Birdwing butterflies in Hong Kong

Both *Troides helena* (Linnaeus) and *Troides aeacus* (C. & R. Felder) are large butterflies of the Papilionidae family. They are the only two representatives of the so called Birdwing butterflies in Hong Kong. *Troides helena* is the commoner of the two with *T. aeacus* having first been recorded only about 10 years ago.

These two species cover a vast area across Nepal, India, South China, Vietnam, Thailand, Malaysia and Indonesia. Though they have a wide distribution, they are not common in Hong Kong. The range of the two butterflies overlaps but *Troides helena* in Hong Kong is close to its northern limit. It is seldom found north of Guangdong Province. *Troides aeacus* on the other hand has a much wider distribution than *T. helena*. It is found as far north as Hubei, and in Taiwan as well.

The two species are found in various scattered locations throughout Hong Kong. Stable populations are known from three locations in the New Territories: one in Sai Kung peninsula near Po Lo Che, one at Shan Liu near Tai Po and one at Kadoorie Farm & Botanic Garden. Both species are found in Kadoorie Farm and at the Tai Po site, but *Troides aeacus* appears to be absent from the Sai Kung site. The butterflies are multivoltine and have many generations in a year. They are generally on the wing from March to November. Fung Yuen Village SSSI in Tai Po was in the past a sanctuary for Birdwings. Now they have almost gone as the formerly abundant foodplants of the butterflies (*Aristolochia tagala*) in Fung Yuen have all but disappeared. At the same time, the village has undergone increasing development. Other sightings of Birdwings have included Tai Po Kau Nature Reserve in Tai Po, Hok Tau Reservoir in Fanling, Tai Mei Tuk near Plover Cove, Sha Lo Tung, She Shan in Lam Tsuen, and Ho Chung and Wong Chuk Yeung in Sai Kung.

Birdwings also occur on Lantau Island. Many positive sightings have been made on the path from Po Lin Temple to Tung Chung (see page 9). *Troides helena* has been recorded on Sunset Peak and a *Troides* male has been spotted at Tong Fuk. One may even find Birdwings on Hong Kong Island as the foodplant appears to exist in the Tai Tam area surrounding Hong Kong Parkview. The Common Rose butterfly, *Pachliopta aricholochiae* (Fabricius), which has the same foodplant as *Troides*, was recorded in Tai Tam Country Park very near to Hong Kong Parkview in 1994.

Conservation

Birdwings are huge, spectacular butterflies, as a result of which they are very popular with collectors. Over-collecting has led to a decline in Birdwing numbers across much of their range. However, this situation does not seem to exist in Hong Kong, where Birdwing butterflies are protected by law. In fact, the Birdwings in Hong Kong appear to have increased in numbers. Any future depletion of the *Troides* species in Hong Kong will probably be caused by the ever increasing rural development, which threatens the breeding sites. The *Troides* in particular are very selective in their food source, feeding only on the fruits and leaves of *Aristolochia*, a climbing vine found scattered across the New Territories. This plant is also protected by law in Hong Kong. As their appetites are enormous, large numbers of foodplants are required to sustain a healthy Birdwing population. Efforts have thus been directed into conserving the populations at Kadoorie Farm and Shan Liu, where more *Aristolochia* vines have been planted to provide an ample food source for the butterflies. New breeding sites have been planned with the planting of the hostplants for the butterflies, which will at the same time be artificially reared and transferred to such sites for regeneration.



Conclusion

Birdwing butterflies have been recorded from various scattered locations in Hong Kong. However, only a handful of breeding sites are known to exist. Such sites could easily be destroyed either by further rural development or by natural causes. Attention should be drawn to the need to protect such breeding sites for the survival of the butterflies so that they can be preserved and flourish in the years to come.

JAMES J. YOUNG & G.T. REELS

Status of Hong Kong butterflies - an update

In the last issue of *Porcupine!* George Walthew published an article on the status and flight periods of Hong Kong butterflies. This was based on presence/absence data from 170 one-kilometre grid squares, surveyed from 1989 to 1996, for 225 butterfly species. Status was defined by a scale of six cohorts ranging from "vagrant" to "very common" (see Walthew (1997) for details.). During the course of the Hong Kong Biodiversity Survey (conducted by the DEB through 1996 and 1997), similar data were gathered from 70 sites, most of which were of approximately one square kilometre (some islands visited were of a smaller area). Applying Walthew's criteria to these data, the following results were obtained: rarer 17 spp.; commoner 94 spp.; unchanged 114 spp.

	Status 1996 - 1997 (Biodiversity survey data)	Status 1989 - 1996 (Walthew, 1997)	[Status according to Hill <i>et al</i> (1978)]	[Status according to Marsh (1968)]
Nymphalidae - Nymphalinae				
<i>Cyrestis thyodamas</i>	very common	uncommon	"rare"	not recorded in HK
Lycaenidae - Lycaeninae				
<i>Heliophorus epicles</i>	very common	uncommon	"uncommon"	"not common"
Lycaenidae - Polyommatainae				
<i>Jamides celeno</i>	very rare	uncommon	"rare"	"extremely rare"
<i>Zizina otis</i>	very common	uncommon	"uncommon"	"extremely common"
Pieridae - Coliadinae				
<i>Eurema blanda</i>	common	rare	"rare"	not common but possibly under-recorded
<i>Eurema brigitta</i>	very rare	uncommon	"rare"	"locally common"
Papilionidae				
<i>Pachliopta aristolochiae</i>	very rare	uncommon	"rare"	"common...but...restricted"
Hesperiidae - Coeliadinae				
<i>Hasora chromus</i>	uncommon	very rare	"rare"	status not indicated
Hesperiidae - Hesperinae				
<i>Baoris farri</i>	common	very rare	"uncommon"	"quite common"
<i>Pamara ganga</i>	common	rare	"rare"	uncommon/rare
<i>Pelopidas mathias</i>	common	rare	"rare"	rare
<i>Udaspes folus</i>	common	rare	"uncommon"	"quite common"

These discrepancies cannot be so easily dismissed, and suggest genuine shifts in status over time. Or do they? Butterfly recording can be a very hit-or-miss process, often governed by finding the right place (a particular host plant, for instance) at the right time (some butterflies are very active throughout the day; most are not. Many are strongly seasonal.), in the right weather conditions (butterflies abhor rain and cold), in the right year (some species may fluctuate in abundance from year to year; see for example *Butterfly populations at Kadoorie In October 1997* - this issue). Also, neither Marsh (1968) nor Hill *et al* (1978) give explanations of their status criteria, and their information can not be treated as directly comparable to that gathered by Walthew (1997) and the Biodiversity Survey. However, the element of chance can not be responsible for all the differences observed between these workers. The data for *Cyrestis thyodamas*, at least, suggest a real long term increase over the past three decades for this species, which was first recorded in Hong Kong in 1971. Given the environmental

The Biodiversity Survey findings were in agreement with Walthew (1997) for 114 of the 225 species, including all of those classified by Walthew as "very common" or "vagrant". The status of 99 species was different by one cohort (e.g. a shift from "uncommon" to "common", or from "rare" to "very rare", etc.), with 85 species slightly commoner and 14 species slightly rarer than recorded by Walthew (1997). Such relatively minor discrepancies are perhaps to be expected from results obtained by different recorders employing (presumably) different sampling effort. However, a more marked difference in status was recorded for 12 species, which are listed below (along with comments made by Marsh (1968) and Hill *et al* (1978) to give an historical perspective):

changes which Hong Kong is experiencing (increasing urbanisation, agricultural land falling to disuse, existing forests slowly maturing) it is hardly surprising that our butterfly fauna should change, too. (Note, also, that the number of butterfly species recorded in Hong Kong has risen by a remarkable 20% in the last 30 years.). Distinguishing short term fluctuations from long term trends is the real challenge. To do that, a continuous, coordinated approach to butterfly monitoring needs to be established. The recent creation of the Hong Kong Lepidoptera Group gives hope that such a monitoring programme could soon become a reality.

G.T. REELS & GEORGE WALTHER

- Hill, D.S., G. Johnston and M.J. Bascombe (1978). Annotated checklist of Hong Kong butterflies. *Mem. H.K. Nat. Hist. Soc.* 11.
 Marsh, J.C.S. (1968). *Hong Kong Butterflies*. (2nd edition). The Shell Company of Hong Kong Limited.
 Walthew, G. (1997). The status and flight periods of Hong Kong butterflies. *Porcupine!* 16: 34-37.

Butterfly Populations at Kadoorie in October 1997

During 1996 I conducted a survey of butterflies at KFBG and KARC. I revisited Kadoorie from 8 to 14 October in 1997 but on only two of the days was the weather suitable for gathering data comparable to that of October 1996. On the two days I walked a 3.5 km circular route starting between 09:00 hrs and 09:30 hrs as I had in 1996. From KARC at 200 m altitude, the walk took me up to Kwun Yam Shan at 546 m and back down to KARC. This was the same route walked in 1996 and a map of the route and explanation of the method can be found in Walthew, 1997 (The Butterflies of Kadoorie: A report on the butterflies at Kadoorie Farm & Botanic Gardens, and Kadoorie Agricultural Research Centre, Hong Kong, in 1996).

On the two visits, I saw 61 species on the first occasion and 60 on the second. This is very similar to my species counts from mid-October 1996 (the mean number of species for mid-October 1996 was 63.25). However, when it came to numbers of butterflies the situation was unexpectedly different. The mean count for mid-October 1997 was significantly greater than that of mid-October 1996. When the counts were broken down into family and sub-family I could see that the increase in numbers could be accounted for amongst the families Papilionidae and Pieridae, and the sub-family Danainae (and possibly the Satyrinae) from the Nymphalidae. There was no significant increase in the numbers of Nymphalinae, Charaxinae, Lycaenidae (including the Riodininae) or Hesperiiidae.

In all, 47 of the 73 butterfly species I saw on the two walks at Kadoorie in October 1997 showed an increase in numbers compared to 1996, but just 6 species accounted for 53% of the total increase. These were (in order of importance): *Euploea midamus*, *Papilio memnon*, *Eurema blanda*, *Papilio helenus*, *Delias pasithoe*, and *Eurema hecabe*. After removing those species I saw in 1996 but not in 1997 (to eliminate bias, as I only made two visits in 1997, and they were close together in time) a comparison of the counts showed:

Nymphalidae: 19 species increased, 14 species decreased, 3 species unchanged

Lycaenidae: 6 species increased, 2 species decreased

Pieridae: 8 species increased, 1 species unchanged

Papilionidae: 8 species increased, 3 species decreased

Hesperiiidae: 6 species increased, 2 species decreased, 1 species unchanged

Although it might be expected that the populations of butterfly species vary from year to year, with such a large fluctuation in numbers occurring simultaneously over a number of butterfly families, some broad mechanism is

likely to be involved. One such mechanism is weather, and the summer of 1997 was the wettest on record. Exactly how or why the families involved were affected is unknown but a number of mechanisms could be involved (e.g. an increase in larval food or its palatability; or a decrease in predation or parasitisation of eggs, larvae, pupae, or adults).

George Walthew

Wintering roosts of Danainae (Crow and Tiger butterflies)

The Hong Kong Lepidoptera Group is currently working on a survey of the roosts of Danainae butterflies in Hong Kong in view of conservation / increasing our knowledge of the natural history of these species.

Everyone who regularly spent time in the countryside in December / January will have seen these congregations of butterflies, yet despite the publicity given to the Monarch butterfly in North America, little is known about related species in Hong Kong.

The HKLG would be grateful for any information on the locations of wintering roosts of Crow and Tiger butterflies in Hong Kong. Please send such information to the HKLG, c/o Paul Lau, G.P.O. Box 4667, Central, Hong Kong, or E-mail plphotog@hk.gin.net.

MOTHS

Two new records of Hong Kong Sphingidae

On 3 March 1995 the author met Dr. Ian Kitching in the Natural History Museum (BMNH), London, to confirm the status of several doubtful Hong Kong *Macroglossum* species. The first specimen Dr. Kitching noted was *Macroglossum glaucoptera* Butler, which was previously misidentified as *M. bombylan* Boisduval (Li, 1992). This represents the first record for Hong Kong and southern China. The single specimen was collected on 22 June 1992 at Butterfly Beach Park, Tuen Mun, nectaring on flowers of *Durenta rupens*. The species' geographical range is from Sri Lanka to the Sundas, and thus Hong Kong is at the very northern limit.

The second new record is *Macroglossum poecilum* Rothschild and Jordan. This species was recorded from southern Guangdong more than seventy-five years ago (Mell, 1922), however the first recorded Hong Kong specimen was collected on 29 October 1992, ex. ova on *Lasianthus chinensis* (Rubiaceae) at Sha Lo Tung.

Identification of the food plant is useful because although Mell located the species and described it as "a large leaf with feathery veins" (Kitching, pers. comm.), it was never identified. The larvae pupated on 12 November and a total of 3 adults emerged, on 26 and 27 November and 5 December 1992. A second batch of two specimens (1 second and 1 mature instar) was collected from Kam Shan Tree Walk, Kam Shan Country Park. These emerged on 8 and 15 June, respectively. Identification has been confirmed by comparison of the prepared genitalia with material at BMNH, with the aid of Dr. Kitching.

The discoveries reported above bring to 17 the number of *Macroglossum* species recorded from Chinese territory, fifteen having been reported by Tennent (1992). With the additional discovery of *Daphnis nerii* (Linnaeus) in Hong Kong by Aston and Kendrick (see below), of which the author has also recorded one specimen at Tin Shui Wai (6 December 1997), the total number of Hong Kong Sphingidae now stands at at least 67 species [see Kendrick, page 15].

Kent H. K. Li

Li, K. H. K. (1992). Notes on a collection of *Macroglossum* and other species (Lepidoptera, Sphingidae) in Hong Kong. *Mem.H.K. Nat. Hist. Soc.* 19: 1-3.

Mell, R. (1922). Beitrage zur Faun Sinica (II) Biologie und Systematik der sudchinesischen Sphingiden. *Zugleich ein Versuch einer Biologie tropischer Lepidopteren uberhaupt.* Berlin.

Tennant, W. J. (1992). The hawk moths (Lepidoptera: Sphingidae) of Hong Kong and South-east China. *Entomologist's Record & Journal of Variation* 104: 88-112.

The Oleander Hawk Moth *Daphnis nerii* (Linnaeus) (Lep.; Sphingidae) in Hong Kong

Tennant (1992) lists the Oleander Hawk Moth *Daphnis nerii* (Linnaeus, 1758) as an erroneous record for Hong Kong. He noted the record (as *Daphnis neu* (sic.) in Hill, Hore & Thornton, (1982) was based on a single specimen, determined and labelled *D. nerii* by D.S.Hill, in the Hong Kong University Collection, was actually a specimen of the similar Oriental Oleander Hawk Moth *D. hypothous* (Cramer, 1780).

D. hypothous occurs from the Indo-Australian tropics to Vanuatu (Holloway, 1987), within China from Yunnan, Sichuan and Hainan (Zhu & Wang, 1997, as *Deilephila hypothous*) and has been recorded several times in Hong Kong (Kendrick, pers. obs.; Kent Li, pers. comm.; Tennant, loc. cit.) whereas *D. nerii* ranges from Africa through to east Asia (D'Abbrera, 1986), within China from Yunnan (Zhu & Wang loc. cit., as *Deilephila nerii*)

and Taiwan (Wang, 1995), also from Thailand (Inoue et al., 1997) and was recently recorded in Macau (Easton & Pun, 1996). It should therefore be expected to occur in Hong Kong. It is not surprising that *D. nerii* has not been recorded by light trapping in Hong Kong before, as Inoue et. al. (loc. cit.) comment that although *D. hypothous* commonly comes to light, *D. nerii* seldom does so.

Recent observations by Paul Aston have resulted in *D. nerii* being recorded in Shau Ki Wan, Hong Kong Island on 12 Nov. 96 (1), 18 Nov. 96 (2), 14 Feb. 97 (1), 22 Oct. 97 (1), 22 Nov. 97 (1) & 15 Dec. 97 (1) and at Tseun Wan taxi station, New Territories on 19 Oct. 97 (1). All these specimens were settled on walls in well lit open areas, but none were close to the lights. In addition to these records, singletons of *D. nerii* have recently been recorded by Roger Kendrick at the Kadoorie Agricultural Research Centre, Shek Kong, New Territories on 22 Oct. 97 (at mercury vapour light trap) and by Kent Li on a basement wall in Tin Shui Wai, Yuen Long, New Territories on 6 Dec. 97.

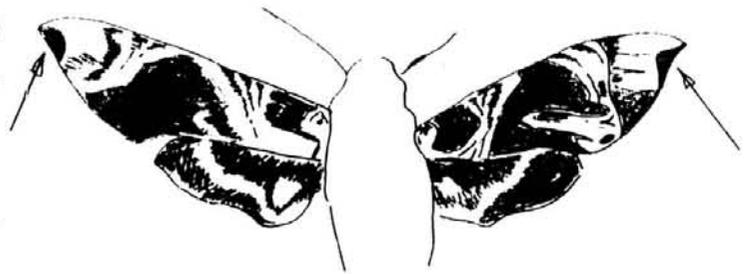


Figure 1: *D. nerii* (L., 1758) (left), *D. hypothous* (Cr., 1780)

The two species of *Daphnis* found in Hong Kong (Figure 1) can be easily separated by forewing patterning, specifically the different shapes of the submedial and postmedial fascia (curved towards the forewing base on the costa of *D. hypothous*, away from the base on the costa of *D. nerii*) and the apical end of the terminal fascia (Figure 2).



Figure 2: distinguishing forewing markings of *D. nerii* (left), *D. hypothous*

D. nerii can be expected to breed in Hong Kong, as Easton & Pun (loc. cit.) noted that it bred in Macau on Oleander *Nerium* sp. (Apocynaceae) and *Gardenia* sp.

New moth species for Hong Kong; 1997 records

The following incomplete list is of species knowingly recorded for the first time in Hong Kong during research undertaken for my PhD. Unless stated, records are of species seen at mercury vapour light trap and the locality is Kadoorie Agricultural Research Centre, Shek Kong, N.T. Further new records will be reported at a later date for species whose identity to species group level has yet to be established, and for the majority of the "micro" moth families (especially Pyralidae, Gelechiidae, Oecophoridae and Tortricidae).

I express my gratitude to Tony Galsworthy, who determined the identifications (undertaking dissection of the genitalia where necessary) for many of the species listed by comparison with material at the Natural History Museum, London.

Yponomeutidae

Comocritis taiwanensis Moriuti 24 May 1997

Lacturidae

Anticrates species, probably undescribed 11 Jun. 1997

Thyrididae: Strigilinae

Banisia lobata Moore 24 May 1997

Geometridae: Oenochrominae

Sarcinodes restituta Walker 11 Jun. 1997

Geometridae: Geometrinae

Maxates quadripunctata Inoue 28 Dec. 1996

Spaniocentra kuniyukii Yazaki 8 Mar. 1997

Eucyclodes albisparsa Warren 26 Apr. 1997 Shan Liu Road, Plover Cove (at the edge of Pat Sin Leng Country Park)

Geometridae: Sterrhinae

Scopula mecyasma (Swinhoe, 1894) 5 Feb. 1997

Problepsis eucircota Prout 26 Mar. 1997

Geometridae: Larentiinae

Ecliptopera defecta (Butler, 1880) 6 Mar. 1997

Chloroclystis conversa Warren 22 Mar. 1997 Tai Po Kau Special Area

Chloroclystis admixtaria Walker 15 Jan. 1997

Glaucoclystis griseorufa (Hampson, 1898) 28 Dec. 1996

Eupithecia species near *ustata* Moore, possibly undescribed 1 Jan. 1997

Eupithecia species near *costalis* Walker 5 Apr. 1997

Eupithecia rigida Swinhoe, 1892 26 Mar. 1997

Sauris interruptata (Moore, 1888) 10 Mar. 1997

Sauris species, probably undescribed 28 Apr. 1997

Geometridae: Ennominae

Entomopteryx obliquilinea Moore

Myrtetea sericea Butler 8 Mar. 1997

Epiplemidae

Epiplema moza Butler 8 Mar. 1997

Notodontidae

Hyperaeschra pallida Butler, 1880 10 May 1997

Arctiidae: Syntominiinae

Syntomis germana Felder, 1862 26 Apr. 1997
Shan Liu Road, Plover Cove

Noctuidae: Rivulinae

Rivula sasaphila Sugi 28 Feb. 1997

Noctuidae: Hypeninae

Hypena albisigna Moore, 1885 10 May 1997

Hypena iconicalis Walker, [1859] 1 Jan. 1997

Hypena jocosalis Walker 12 Jan. 1997

Hypena labatalis Walker, [1859] 5 Apr. 1997

Hypena nocturnalis Swinhoe 16 Jan. 1997

Hypena occata Hampson, 1882 24 Feb. 1997

(specimens in collection of K.Li have earlier dates but remained unidentified until viewed by R.C.K.; dates from 1989 onwards, localities throughout the New Territories)

Hypena species near *umbripennis* Moore 10 Feb. 1997

Noctuidae: Euteliinae

Eutelia favillatrix Walker 22 Mar. 1997 Tai Po Kau Special Area

Noctuidae: Sarothripinae

Characoma ruficirra (Hampson, 1905) 28 Dec. 1996

Nyctea sinuosa Moore 25 Feb. 1997

Noctuidae: Acontiinae

Naranga marginata Walker 26 Apr. 1997 Shan Liu Road, Plover Cove

Noctuidae: Ipimorphinae

Chasmina judicata (Walker, 1858) 30 May 1997

Other species of note

Drepanidae: Thyatirinae

Thyatira batis (Linnaeus, 1758) is recorded from a second locality (Tai Po Kau Special Area; 9 May 1998). This late date and the freshness of the individual seen suggest this species has at least two broods a year; earlier records at KARC for March 1997, one worn individual, (Kendrick, 1997) and January 1998, several fresh males and one female, would fit this pattern well.

Noctuidae: Cuculliinae

Sugitania species, probably undescribed. Previously reported (Kendrick, 1997) as *Sugitania lepida* (Butler, 1879); further research (Sugi, 1990; Owada, 1995) suggests this is an undescribed species. Only one female specimen is known, so a male is awaited before an identification can be ascertained (Galsworthy, pers. comm.).

ROGER KENDRICK

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Owada, M. (1995). A new cuculline moth of the genus *Sugitania* (Lepidoptera, Noctuidae) from Taiwan. *Spec. Bull. Jpn. Soc. Coleopterol., Tokyo* 4: 221-226.
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(Rubiaceae). Bell & Scott (1937) recorded it in India breeding on *Ervatamia* sp. (Apocynaceae), a species of which (Cape Jasmine *Ervatamia divaricata* Burk.) is common in Hong Kong (Anon., 1971). Another species it can be expected on is Grape-vine *Vitis vinifera* (Vitaceae) which Gilchrist (1979) records *D. nerii* using as a hostplant in southern Europe.

Inoue *et al.* (loc. cit.) give the flight period for *D. nerii* in Thailand as from May to June and again from September to February. All Hong Kong's records so far seem to fit in the winter flight time. Maybe we can also expect to see these moths in May / June in Hong Kong?

Paul Aston & Roger Kendrick

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Macroglossum saga (Butler, 1878) (Lepidoptera: Sphingidae) finally found in Hong Kong

Tennant (1992) noted that a specimen of *Macroglossum corythus* Walker housed in the HKU collection was labelled "*Macroglossum saga* D.S. Hill det. 1976" and thus listed *M. saga* as an erroneous record, with no specimens known from Hong Kong. However, Tennant saw no reason as to why it should not occur due to its widespread distribution from northern India, through Nepal, Thailand and southern China to Taiwan and Japan (D'Abbrera, 1986; Inoue *et al.*, 1997).

On 1 February 1998 an unidentified, robust *Macroglossum* species was taken at light during survey

work at the Kadoorie Agricultural Research Centre. A tentative identification, using Inoue *et al.* (loc cit.), of *M. saga* was made once the specimen was preserved, on account of the narrow band on the hindwing and the extreme robustness of the body. The identification was subsequently determined by Ian Kitching of the Natural History Museum, London, to whom I extend my thanks. The specimen is illustrated below.



Macroglossum saga (dorsal surface)

This finding, together with two other *Macroglossum* species new to Hong Kong (see above) brings the number of *Macroglossum* species found in Hong Kong to 18 and the number of Sphingidae to 69.

Roger Kendrick

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 Tennant, W.J. (1992). The Hawk Moths (Lep.: Sphingidae) of Hong Kong and South-east China. *The Entomologist's Record & Journal of Variation* 104: 88-112.

Endoclita species (Lepidoptera: Hepialidae) newly recorded in Hong Kong
 Lee & Winney (1981) do not list any Hepialidae for Hong Kong. Hill *et al.* (1982) note "no Swift Moths (Hepialidae) have been collected here, either as the low-flying crepuscular adults or as the long white (black-headed) soil inhabiting caterpillars." Galsworthy's list of Hong Kong moths (in prep.) has one species of hepialid, but no species of *Endoclita* Felder & Rogenhofer, 1874. During recent survey work at Kadoorie Agricultural Research Centre single individuals of two species of *Endoclita* have been recorded, both at rest under outdoor light sources (fluorescent and sodium vapour) about an hour after sunset. Identification to genus was made using Barlow (1982).

Photographs of the specimens were sent to Gaden Robinson (Natural History Museum, London) for determination and were identified as follows:

Endoclita davidi Poujade; leg. R.C. Kendrick, KARC, Hong Kong, 3rd November 1997; det. G.S. Robinson.



Endoclita davidi female (dorsal surface)

Endoclita sinensis (Moore, 1877); leg. R.C. Kendrick, KARC, Hong Kong, 10th April 1997; det. G.S. Robinson.



Endoclita sinensis female (dorsal surface)

E. davidi is a large species; the specimen illustrated (a female) has a wingspan of some 120 mm. It is known from several provinces in southern and eastern China (Robinson, *pers. comm.*). *E. sinensis* is more widespread, being known from China, Taiwan, Japan and Korea (Wang, 1996). Both records are firsts for Hong Kong. Barlow (1982) reports one species of *Endoclita* from Malaysia as a potential pest on Teak, being an internal stem borer.

I would like to thank Gaden Robinson for identifying the species. I should also like to ask for any records of these two species to be forwarded to me at KARC, with specimens being retained (best kept frozen) if at all possible.

Roger Kendrick
(tel. 2488 6499; fax 2488 5000; e-mail
kendrick@hkusua.hku.hk)

Barlow, H.S. (1982). *An Introduction to the Moths of South East*

Asia. Published by the author, distr. Malayan Nature Society, Kuala Lumpur and E.W. Classey, Faringdon, U.K.
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Lee, L.H.Y. & Winney, R. (1981). Check List of Agricultural Insects of Hong Kong 1981. *Agriculture and Fisheries Department Bulletin No. 2*. 164 pp.
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FISH

Two new freshwater fish for Hong Kong

Specimens of freshwater fish were collected by our Field Officer Darwin Cheung during surveys of freshwater wetlands in the Sai Kung peninsula in the summer of 1997. Two species were found to be new records for Hong Kong.

Bagridae: *Pseudobagrus trilineatus*

One adult (length 7 cm; height 2 cm) and one juvenile (length 3 cm; height 0.5 cm) were caught in a pond in eastern Sai Kung. The pond was overgrown with the hydrophytes *Ludwigia adscendens* and *Eichhornia crassipes*. A site visit in winter found that the pond was drying up but the bottom was still wet and muddy.

Pseudobagrus trilineatus is a brownish fish with a smooth body and 4 pairs of barbels. The adult specimen has a bulky body and a large depressed head. The species can be easily identified by its three distinct yellow stripes along the trunk with the middle one, along the lateral line, being broken. The specimens also have a yellow C-shaped stripe at the 'neck'.

P. trilineatus is endemic to Guangdong and has previously only been recorded in streams of the Dongjiang (East River) catchment (Pan, 1990). The present discovery represents a first record of the species and the Family Bagridae in Hong Kong, and indicates that this species can also survive in pond habitats.

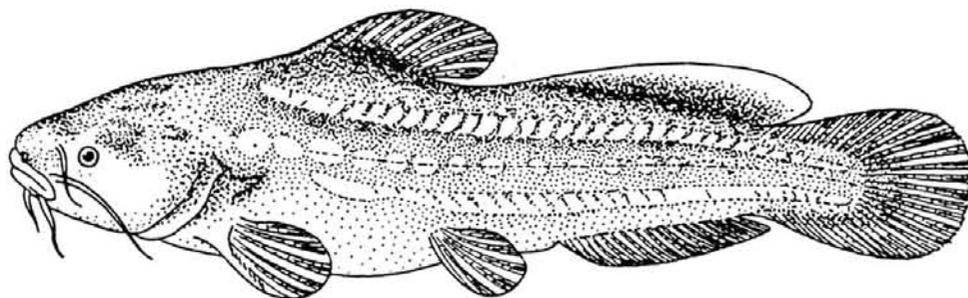
Eleotridae: *Eleotris* species (?)

A juvenile specimen (length 4 cm) was caught in an abandoned agricultural field near an estuary in west Sai Kung. The field was waterlogged with a thick layer of mud at the bottom, and was overgrown with grasses. The Black Paradise Fish (*Macropodus concolor*) was also found in similar habitats in the area.

The fish has a roughly fusiform body with a slightly depressed head. It has two separated dorsal fins with the second one being larger. The anal fin resembles the second dorsal fin in size and position. The pectoral fins are rather large and the pelvic fins are close to each other but not joined. The fins and other features indicate the fish is a member of the Eleotridae. However, it is not

possible to identify the fish accurately as there is only one juvenile specimen. It is tentatively being identified as an *Eleotris* species.

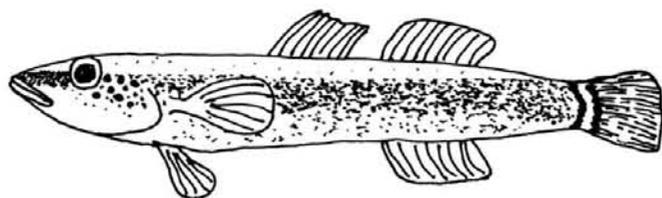
The fish has a distinct colour pattern: it is brownish in colour with numerous small black dots laterally which make the fish look dark-coloured. However, the fish can turn paler when placed in a different environment. The dorsal surface of the body is paler in colour and has a pale brown stripe at the back. Such a colour pattern is not found in the members of the Eleotridae recorded in Hong Kong (Chong & Dudgeon, 1992) or Guangdong (Pan, 1990). It is not certain whether the colour pattern is simply a juvenile character. The identity of the species can only be determined when adult specimens are available. However, it is highly likely that the species is a new record for Hong Kong.



Pseudobagrus trilineatus
(from Pang, 1990)

common in freshwater habitats in Sai Kung.

Studies of freshwater habitats often focus on sites which are easily accessible (e.g. near to roads or paths), or look "good" (e.g. a clean stream with riffles and pools). Sites which are inconspicuous, difficult to access or do not look "good" are often neglected (a common phenomenon in the field surveys of EIA studies). It is possible that some interesting species may dwell in such sites. The discovery of *Pseudobagrus trilineatus* in this case is an example. On the other hand, some "good" looking sites may not necessarily have a diverse community or rare species. Caution should be exercised in assessing the ecological value (no matter whether high or low) of a site without a detailed field investigation.



Eleotris sp.
(not to scale)

I would like to thank my colleagues Mr. Simon Chan, Mr. Darwin Cheung and Dr. P.M. So for allowing me to examine the fish specimens and providing useful information.

K.W. CHEUNG
Agriculture and Fisheries Department

Discussion

The number of freshwater fish species recorded in Hong Kong is increasing due to fish introductions (e.g. Wilson *et al.* 1997, Chong & Dudgeon, 1992), and there may be more new discoveries when further studies of freshwater habitats are carried out. Moreover, our understanding of the distribution and abundance of Hong Kong freshwater fish will be increased by such studies. For example, our surveys also found that *Yaoshanicus arcus* is more widespread than previously thought. The fish is rather

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MAMMALS

There are three shrews in South China

A number of naturalists have long suspected that the situation with respect to shrews, Order Insectivora, Family Soricidae, is more complex in our region than acknowledged in the standard texts. The problems begin with Glover Morrill Allen's classic "...Mammals of China...", published in 1938. Allen saw no specimens of any shrews from Guangdong, Guangxi, or Hong Kong. He included these parts of South China in the overall ranges of two species: the large *Suncus murinus* and the smaller *Crocidura attenuata*. This is the standard arrangement followed by Marshall (1967), Hill and Phillips (1981), and Dudgeon and Corlett (1994).

There are immediate problems, however. Allen gives measurements for 10 specimens of *S. murinus*, all from Fukien (Fujian), as far north in China as he had records. His specimens had much smaller feet, about 14 mm, and much larger ears, about 20 mm, than in Hong Kong or Guangdong specimens. Further, Allen describes these shrews as "brownish gray" and "hardly different" from *Crocidura attenuata*. Allen's description of *C. attenuata* fits our smaller species quite nicely in size and color: "...brownish gray above, and a paler, clearer gray below...."

Our *Suncus murinus* are typically much darker than our *Crocidura*, being sooty gray above and below. The name "*Crocidura microtus*" is based on a Hong Kong shrew assumed (by Allen) to be a juvenile *S. murinus*. Its measurements are equivocal, but the upper tooth row, given as 13 mm, fits this species. It was described by Wilhelm Peters of Berlin in 1870; it is doubtful if the specimen still exists, but possible. That name is potentially available for our large shrew.

In July 1997 we collected a series of a third kind of shrew on the island of Nan Ao, on the Tropic of Cancer at the extreme east of Guangdong Province. These look like miniature *S. murinus* at first glance: sooty above and below - even blacker than most *Suncus* - with stout, conically tapering tails and large, conspicuous lateral glands. However, their ears are very reduced. Like *Suncus*, they have a diastema, or gap in the tooth row. They are not juveniles. Males had enormous testes (proportional to their small overall size) and one female contained two embryos. These specimens were deposited with the Department of Biology, Shantou University, which sponsored our trip. Subsequently, some were exchanged with the Peabody Museum of Natural History, Yale University (YPM). I have long deposited my Hong Kong specimens there, as have other collectors (Fred Sibley, Numi Goodyear Mitchell). Having all three kinds together enables me to boldly state my conclusion: three species (see box).

Nowak, (1991) lists three species of *Crocidura* in addition to *C. attenuata* that might occur in our region: *C. fuliginosa*, "Southern China," *C. gueldenstaedti*, "...China, Taiwan," and *C. horsfieldi*, "...China..., Taiwan, Hainan." He does not provide details or descriptions and I know nothing about these species.

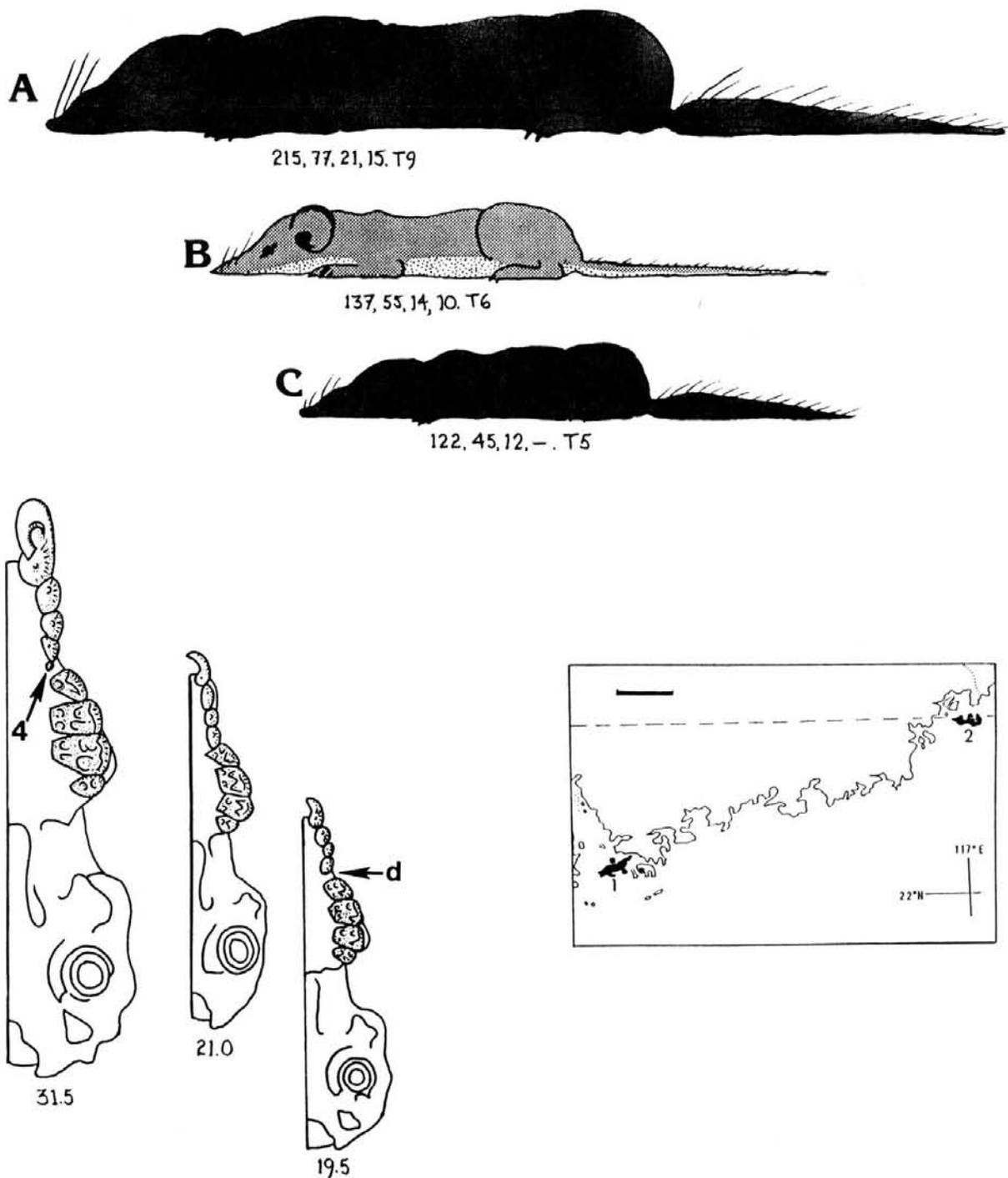
Nan Ao is very distinct geologically. It is a remnant of the Zhe-Min Island Arc which developed in the early Cambrian, ca 600 million years ago, and became the Zhe-Min Oldland of the Permian, ca 230 million years ago. Nan Ao was submerged around the Triassic-Jurassic boundary, ca 195 million years ago, but has been above water since the early Jurassic (Wang 1985), unlike the adjacent mainland, which has been repeatedly inundated, as recently as 100 thousand years ago. Nan Ao's geological history does not, however, mean a distinctive species should be confined to that Island. It is on the continental shelf, and was united with the mainland by glacial sea level lowering a mere ten thousand years ago.

As noted by Nowak (1991), the genus "*Suncus*" is probably invalid, a junior synonym of *Crocidura* - the largest genus of mammals. The tooth character that separates our species - presence or absence of the "fourth" upper unicuspid - is compromised by variation in species of *Crocidura* outside of China. In our species there may be two or three larger unicuspid, so the "fourth" might only appear to be number three.

Sorting out South China's shrews would, I believe, make an excellent dissertation topic for the enterprising field biologist. Initially, one would have to build up collections and elucidate distribution. These shrews, despite their probable and often apparent abundance, remain extremely little-known. For example, there appear to have been no specimen records for *Crocidura attenuata* on great Lantau - Tai Yue Shan - until 1996 when Dr. Ron Pine collected some for the Field Museum of Natural History in Chicago. All three of these shrews, and perhaps others, may occur throughout South China, and one or more may occur on any of the hundreds of islands along this coast. We should find out.

SKIP LAZELL

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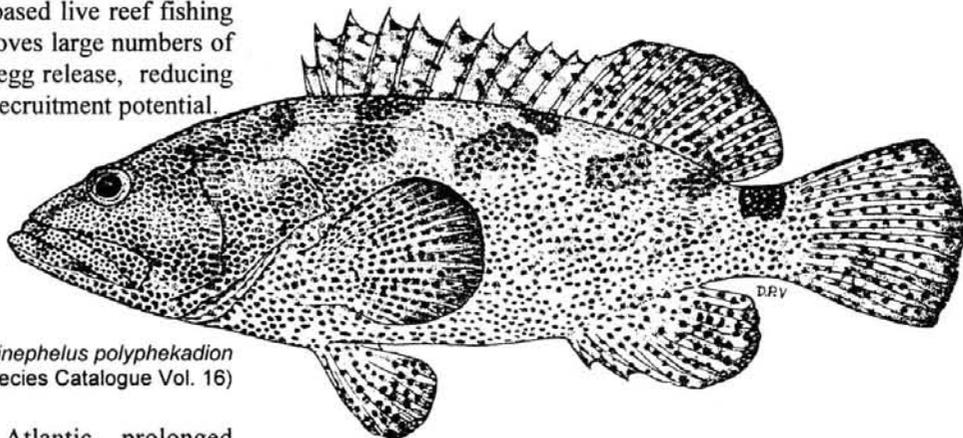
South China's three shrews. Palatal views of half skulls showing proportions and dentition. 4 is the distinctive fourth unicuspid of *Suncus murinus*; d is the diastema. The number under each skull is its greatest length (all measurements are mm). All specimens are adult males: A, *Suncus murinus*, Shui Hau, Lantau (YPM 5089). B, *Crocidura attenuata*, Shui Hau, Lantau (YPM 5090). C, the Nan Ao shrew, Tai Zhu Ao (YPM 5091). The numbers beneath the animals are flesh measurements: respectively, total length, tail length, hindfoot, and ear; T is greatest diameter of testes.

The map shows South China from the Pearl River to extreme Western Fujian. 1 is Lantau. 2 is Nan Ao. Stars indicate where *Suncus murinus* I have examined were collected: Aberdeen and the former Chek Lap Kok. I have also examined series from Xi Qiao, Zhao Qing, and Dinghushan, west of Guangzhou in Guangdong. The dashed line is the Tropic of Cancer. Bar indicates 50 km.

DEB RESEARCH

Group(er) sex in the central Pacificby *Kevin L. Rhodes*

The Marbled Grouper *Epinephelus polyphkadion* (Bleeker) is one of the most widely-distributed and heavily targeted of all Indo-Pacific groupers. It inhabits tropical and subtropical reef and lagoonal habitats from Africa to Japan, extending into the eastern Pacific. Large aggregations (100s to 1000s of individuals) gather for a few days at specific locations and during certain lunar phases to spawn, usually restricted to two or three months during the year. This type of reproductive behaviour makes these fish especially vulnerable to fishermen who know the timing and location of such events. Groupers are particularly susceptible to 'aggregation fishing', which is used and promoted by Hong Kong-based live reef fishing operations. This form of fishing removes large numbers of spawning individuals, often prior to egg release, reducing reproductive output and subsequent recruitment potential.



Epinephelus polyphkadion
(from FAO Species Catalogue Vol. 16)

In the Caribbean and western Atlantic, prolonged aggregation fishing has frequently led to a complete disappearance of aggregations. Within the central Pacific, grouper have recently disappeared from areas of the Marshall Islands after just three years of intensive fishing pressure. In Palau, unrestricted aggregation fishing by a Hong Kong-based live reef fish trader decimated one of two aggregations in only three years. Other negative effects include changes in aggregation sex ratios, decreased effective population size and a rapid reduction in genetic diversity, which could profoundly effect local and regional population genetic structure.

The objectives of my research are to characterize for Marbled Grouper two interrelated aspects of fish biology: (1) population genetic structure and (2) reproduction. My findings will not only expand present knowledge of grouper genetics and reproduction, but will provide useful information and practical guidelines for management and conservation of Marbled Grouper stocks. Currently I am using microsatellite techniques to analyze population genetic structure on various spatial scales: local (inter-island ranges of only a few kms), regional (100s of kms, e.g., Micronesia and the Marshall Islands), and inter-regional (several 1000 kms, e.g., the Maldives in the Indian Ocean to the Marshall Islands in the central Pacific). To date, tissues have been collected on >600 individuals from a variety of locations: Micronesia, the Marshall Islands, Palau, New Caledonia and the Great Barrier Reef,

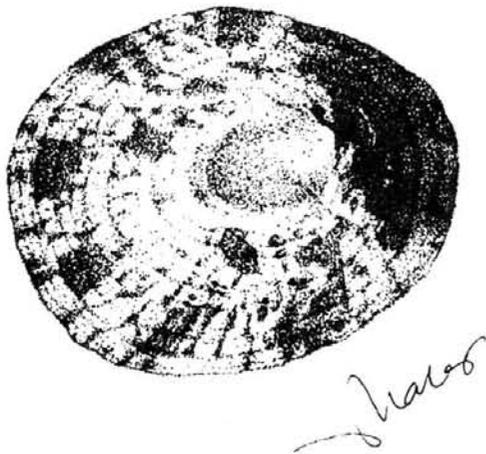
Australia. Samples are now being collected from the Maldives to further investigate inter-regional variation.

Reproductive assessment combines histological techniques with field-based observation of spawning aggregations to examine (a) mode of reproduction, (b) size at sexual maturity, (c) timing and periodicity of spawning (annual, lunar, and diurnal), (d) fecundity, (e) aggregation size and dynamics, and if possible (f) spawning. To meet the objectives of the reproductive aspect of the research, fish gonads have been collected and are currently being examined from Yap and Pohnpei State, Micronesia, the Marshall Islands, the Republic of Palau, and New Caledonia. These materials are being used in combination with dive observations to detail reproductive patterns during the spawning period.

Observations from Pohnpei in 1998 have already produced some exciting results. An aggregation of several hundred to >1,000 Marbled Grouper was observed over several days around full moon during both March and April. The aggregation "core" covered 100-150 m of reef wall at a depth of 25-55 m. Aggregations formed and persisted over less than one week and reached a peak density of 20-25 fish / 10 m². Over 300 individuals were collected for histological examination and fecundity analysis. Preliminary analysis suggests that spawning occurred in the evening two days prior to full moon. The observations and collections from Pohnpei have already provided insights into variation in reproductive ecology between locales. Full moon spawning in March and April, contrasts sharply with new moon spawning observed in Palau in June-August and in the Marshall Islands from December-February. Additionally, aggregations in Pohnpei formed not at the channel aprons, as in Palau, but along the outer reef wall far away from the channel. These results pose a number of vital questions: What implications do these temporal variations have for the reproductive ecology and genetic separation of the species? What are the factors causing variations in annual and lunar cycles for Marbled Grouper? Do different stocks of Marbled Grouper spawn within the same month but at different lunar cycles at the same locale? Does this pattern repeat itself in other locales? Stay tuned for answers to these and other exciting questions.

What causes variation in limpet population structure between sites? A result of food availability and primary production?

by **Richard Huang**



Today I am going to tell you a story about a limpet, *Cellana grata*, which is common on Hong Kong exposed shores. *C. grata* is a dominant intertidal herbivore. During low tide, it rests in cracks or crevices often associated with the barnacle *Tetraclita squamosa*. As the tide comes in *C. grata* moves upshore and feeds whilst awash, retreating downshore with the ebbing tide.

I am studying the feeding ecology of *Cellana grata* as no one else has investigated this subject, and my supervisor suggested it! At the beginning of my study, during summer, I visited many sites around Hong Kong to make myself familiar with this animal and to look for good survey sites. I observed that the population structure of *C. grata* varied greatly from site to site; some sites have low-densities of large limpets whilst some have high-densities of small limpets. The cover of algae also varies between sites and shore levels; some sites have high cover of cyanobacterial films (e.g., *Kyrtuthrix maculans*) in the high shore and some have encrusting algae (e.g., *Pseudulvella applanata*) in mid shore whilst other shores have no visible algal growth. Sites with *Kyrtuthrix* or *Pseudulvella* have higher chlorophyll levels than sites without visible algal growth. Regression analysis reveals a strong positive relationship between chlorophyll levels and limpet size, and a negative relationship between density and limpet size. I thus proposed that there was competition for food at 'high-density-small-limpet' sites which may cause slow growth rates and eventually result in small limpets. In contrast, at 'low-density-big-limpet' sites, food is unlikely to be a limiting factor due to the high algal growth, which allows limpets to grow at a fast rate and eventually, results in bigger limpet size.

This proposition, however, assumes that the limpets show no food selection and feed on *Kyrtuthrix* or *Pseudulvella* in

proportion to their availability on the shores. In order to justify these assumptions, I examined limpet gut contents

in tandem with life history patterns at two sites, Heng Fa Chuen (HFC) and Shek O (SO). In brief, HFC has a low density of big limpets and a high cover of *Pseudulvella*; whereas SO has a high density of small limpets and no visible algal growth. Gut content analysis reveals that limpets feed on *Pseudulvella* and cyanobacteria at HFC, and mainly on cyanobacteria at SO. The population at HFC is stable; mortality is low and both adult and juveniles grow fast. In contrast, the population at SO is unstable; adults grow more slowly than juveniles and die after the reproductive season. From these results, it appears that life history parameters such as growth rate and mortality could be controlled by food abundance and competition does act on high-density populations.

I cannot understand, however, why low densities of limpets are found at sites with a good food supply and high densities of limpets are found at seemingly food limited sites. I have some clues, though, from examining recruitment at the sites. I found that HFC has relatively poor recruitment when compared to SO. Thus it seems that different population densities could be due to variation in recruitment. But why does recruitment vary between sites? I am not satisfied with the simple argument of "natural variation", however, an answer may be provided by my investigations of primary production rates around Hong Kong. I found that SO has higher primary production during the recruitment period than HFC. I think, therefore, that there maybe a relationship between recruitment and primary production (benthic and planktonic food supply). *Cellana grata* is an external fertilizer with planktonic larvae and may be stimulated to settle where production rates are high.

Production rates do vary greatly between sites, but so do recruitment rates, for example at Cape d'Aguilar (CDA), primary production was as high as SO but recruitment was comparatively less; but greater than at HFC. What is causing this? I suggest that the large limpets at CDA are likely to have an effect on recruitment due to their bulldozing effect (scraping and eating new settlers), therefore reducing recruitment.

From a variety of observations (gut content analysis, life history patterns and primary production rates), it seems that I may have uncovered the reason for variation in *Cellana grata* populations on Hong Kong rocky shores. My logical proposition is, so far, only supported by observations and measurements, not manipulative experiments. In order to draw more firm conclusions I am going to manipulate food abundance as well as limpet density to test my ideas. I have a question, however: Are my results from mensurative experiments enough to justify my conclusions?

I hope you enjoyed this story.....

A new site for the seagrass *Halophila beccarii* in Hong Kong, and some notes on the ecology of Starling Inlet

by Captain Wong

In May 1997, a 1m² patch of seagrass was spotted by accident, when I was using a telescope to observe the feeding behaviour of Little Egrets at Nam Chung, southern Starling Inlet. A sample was brought to the laboratory at Hong Kong University and identified by Ng Sai Chit as *Halophila beccarii*. However, the seagrass on the Nam Chung mudflat died out subsequently. From telescope observations, I suspect that a larger patch of seagrass (probably also *H. beccarii*) is present on the mudflat between A Chau and Luk Keng Road.

In 1998, a new seagrass site was discovered in southern Starling Inlet. Four patches, from 1.0 x 1.0 to 1.5 x 2.0 m², are present on the mudflat off Yim Tso Ha mangrove. Unfortunately, judging by the colour of the leaves, the seagrass is not very healthy. I think that the seagrasses have been present there since the beginning of this year.

Halophila beccarii was reported from Deep Bay in 1978 (Morton & Morton, 1983), and recently at Black Point (Prof. William Xing, pers. comm.), as well as at Tai Ho (Ng and Ecosystems Ltd., pers. comms.). It apparently occurs seasonally in these areas. *H. beccarii* is relatively rare in Hong Kong in comparison with the three other seagrass species - *Zostera japonica*, *Ruppia maritima* and *Halophila ovata* - which occur locally (Lee, 1997). All four species have fairly wide distributions along the coast of China.

Ecology of Starling Inlet, northeast New Territories

Apart from seagrass, waterbirds are another important ecological component at Starling Inlet. Egrets and herons forage in the shallow waters of the inlet, especially between A Chau and Nam Chung, where most of the nesting Great Egrets and Little Egrets feed during low tide. The waterbirds also utilize feeding areas outside of the inlet, such as fishponds at Lai Chi Wo (some 8 km away).

The egretty on A Chau is the biggest colony in Hong Kong, in terms of number of breeding pairs and period. Night Herons are the dominant breeders but Great Egrets, Little Egrets, Cattle Egrets and Chinese Pond Herons also nest there. In 1997, Night Herons

started to breed in mid-January and finished by the end of October. This long breeding period probably indicates that food supply is adequate in the nearby Yim Tso Ha mangrove and the Nam Chung fish ponds.

Being terrestrial feeders, nesting Cattle Egrets visit the Luk Keng freshwater marsh (where I also frequently saw two juvenile Wild Boar foraging during daytime in April and May 1998). Cattle Egrets also feed in abandoned fields at Luk Keng and Lai Chi Wo, where feral cattle are common. Agricultural fields at Dameisha, Shenzhen (15 km away), the northeast New Territories landfill (7 km away) and lawns of military camps near Fanling (8 km away) are also visited by nesting Cattle Egrets, so the A Chau egretty is located near the centre of their feeding sites.

My survey of waterbirds at Starling Inlet reveals that two coastal flats at Sha Tau Kok, which were saltpans in the 1930s, are attractive to waders such as Grey Plovers and Sandplovers. Up to 40 individuals and 14 species have been regularly seen there during low tide.

Wetland habitats at Starling Inlet are locally important. Mangroves and reedbeds at Yim Tso Ha are the second largest in Hong Kong, the reedbed at Kuk Po is probably the third largest in Hong Kong, and the freshwater marsh at Luk Keng attracts not only waterbirds but also macroinvertebrates such as dragonflies. Estuarine fish at the Inlet support more than 500 wading birds in winter and the biggest breeding wading bird population in Hong Kong. Of these habitats, the Luk Keng freshwater marsh is regarded by the Freshwater Wetland Survey (Dudgeon & Chan, 1996) as having the highest conservation value among freshwater wetlands in Hong Kong. Although these wetlands are ecologically important to local wildlife, they generally receive very little attention from local naturalists and conservationists, probably because this area is not immediately threatened by development. It is hoped that more visits and research can be carried out at Starling Inlet, so that its importance can be better understood.

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