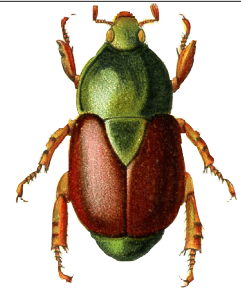


SCARABS



“Hvisdet Lugter, Vil De Komme”

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Scarabs is Back!!!

As If Life Wasn't Bad Enough....Now This!

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Okay, so we haven't published a *Scarabs* newsletter since Occasional Issue 14, dated October, 1998. We apologize, but we have been busy. Editor Rich has been busy chasing *Phobetus panamintensis* and planning construction of his basement bug room. His stint at a pro wrestling ("El Mierdo") proved to be short-lived when "The Next Big Thing" threw Rich into the crowd, wrenching Rich's back. Editor Barney was tied up for awhile in a house-building project, and is building up a huge supply of his "special bait" while praying that airport security does not decide to open all containers. Editor Bill has been busy on the scarab speaking circuit. It was standing room only at the recent meeting of the Ajo Entomological Society, where Bill spoke on "The Aquatic Scarab Fauna of the Sonoran Desert Above the Timberline." The Lep people loved it.

It has been so long since the last issue that we have decided printing copies, stuffing them into envelopes and snail mailing them to hapless scarab enthusiasts would be improper, if not downright rude. Just imagine a serious scarab taxonomist opening an envelope

and coming face to face with the drivel and forced humor within these pages. By posting *Scarabs* on the web, distribution is much more efficient. Only those foolish enough to tempt fate would dare to click on our file. The PDF file containing each issue can be printed at will, if desired.

Thanks go to Scarab Central at University of Nebraska for hosting *Scarabs* on their web page.

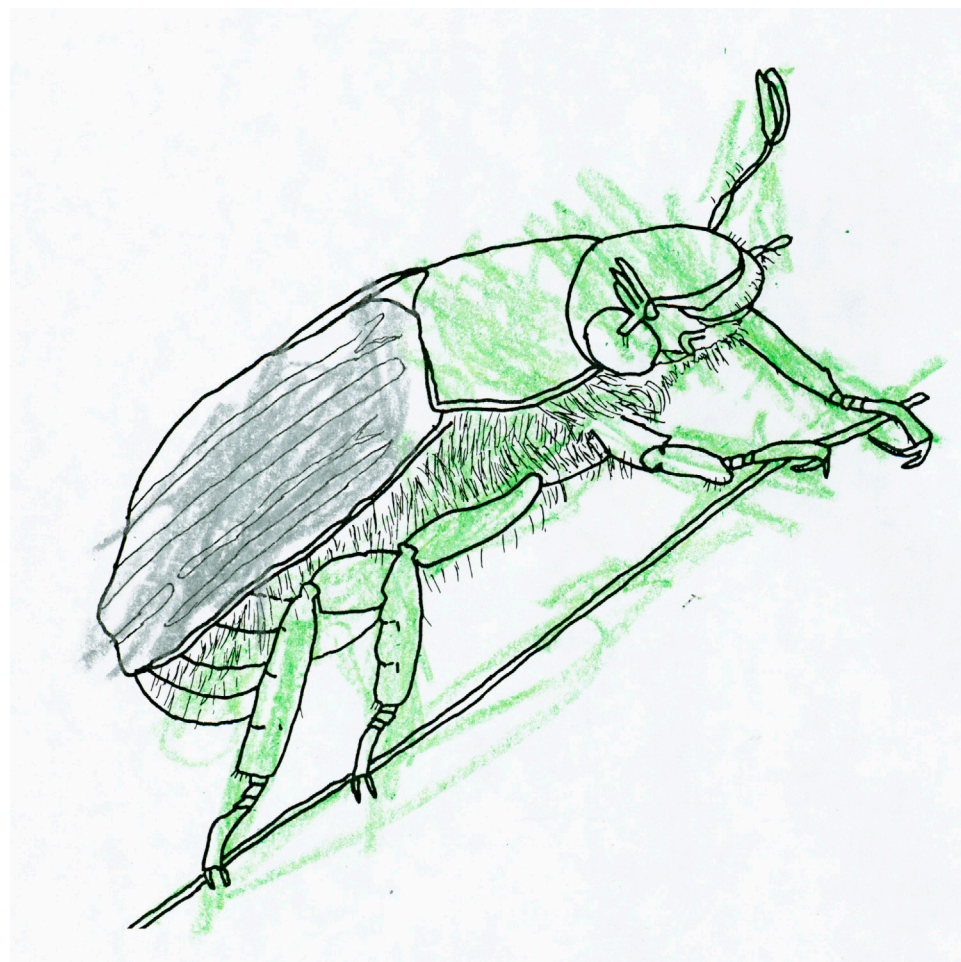
Another change is that *Scarabs* is now in color. To celebrate our first color issue, we are including artwork of arguably one of the most beautiful scarab beetles on the planet: *Chrysina gloriosa*. Now, any slob can photograph this wonderful beast and thereby reproduce its iridescent green body and flashing silver stripes. But to capture its essence in artwork takes real talent — and was superbly handled by a most gifted and longtime *Scarabs* subscriber. The Editors remain in his debt for his contribution. It not only spruces *Scarabs* up, but gives it an air of legitimacy at long last.

Kindly flip the page (or scroll, as the case may be) to see our first color submission.....



“Love art. Of all lies, it is the least untrue.”

Gustave Flaubert



“Plusiotis Gloriosa”

Submitted by David Hawks

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Bug-Proof Clothes

“Clothes make the man. Naked people have little or no influence in society.”

Mark Twain

Two sister companies, Orvis (a fly-fishing and sporting attire specialist) and Ex Officio (a travel clothing company) have introduced insect-repellent clothing that has passed muster with the Environmental Protection Agency. These garments are treated to repel mosquitoes, ticks (Lyme disease!), ants, flies, chiggers and midges. The active ingredient, permethrin (a synthetic analog of pyrethins, natural insecticides derived from a chrysanthemum flower) is bonded to the garment fibers and is good for 25 washings, with no dry

cleaning allowed.

Orvis' BUZZ OFF garments, mostly all-cotton, include shirts, pants, socks, and hats for men and women (\$45 to \$169, orvis.com). Ex Officio's BUZZ OFF gear for men, women, and kids, includes tops, pants, and accessories for street or trail in polyester and poly-cotton blends, some with moisture-wicking properties and added sun protection (\$9 to \$84, <http://exofficio.com>).

adapted from *BusinessWeek*

The Revised Classification for Scarabaeoidea: What the Hell is Going On?

by Brett C. Ratcliffe and Mary Liz Jameson

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Considering the turmoil and vast changes in the classification of the superfamily Scarabaeoidea during the last 20 years, particularly in North America, we were asked to provide an update for the readers of *Scarabs* wherein we offer our perspectives. Much of what follows is extracted from our scarabaeoid introduction in *American Beetles* (Jameson and Ratcliffe 2002). By the time this overview is printed, there may have been more changes in the classification because of the rapidly accumulating evidence supporting new hypotheses.

These rapid changes are a result of intensified study of the family groups using both traditional morphological evidence combined with increasingly insightful molecular studies. While possibly disruptive now, these new studies are exciting because, for the first time, we are establishing the higher classification of the Scarabaeoidea based on evidence and facts rather than intuition. This research confirms many of our hypotheses of classification but also clearly refutes others. Be on the lookout for future publications by Team Scarab and David Hawks!



Brett and Mary Liz

The superfamily Scarabaeoidea is a large, diverse, cosmopolitan group of beetles. As a personal aside (and, of course, with no bias), these are probably the finest beetles in the world. Scarabaeoids are adapted to most habitats, and they can be fungivores, herbivores, necrophages, coprophages, saprophages, and sometimes carnivores. They are widely distributed around the globe, even living in the Arctic in animal burrows. Some scarabs exhibit parental care and sociality.

Ed. Note: Dave Hawks is conducting DNA studies on the Scarabaeoidea



Jean-Henri Fabre

Some are myrmecophilous, termitophilous, or ectoparasitic. Many possess extravagant horns, others are able to roll into a compact ball, and still others are highly armored for inquiline life. A very few are occasionally agricultural pests that may destroy crops (even beetles have to eat!) while others are used in the biological control of dung and dung flies. Scarabaeoids are popular beetles due to their large size, bright colors, and interesting natural histories. Early Egyptians revered the scarab as a god, Jean-Henri Fabre studied their behavior, and Charles Darwin used observations of scarabs in his theory of sexual selection.

What characterizes a scarabaeoid?

The antennal club is lamellate, the prothorax is often highly modified for burrowing (with large coxae, usually with concealed trochantins and closed cavities), the protibia is usually dentate with a single spur, the wing venation is reduced and with a strong intrinsic spring mechanism for folding, tergite 8 forms a true pygidium and is not concealed by tergite 7, there are four Malpighian tubules, and larvae are scarabaeiform (cylindrical, c-shaped).

What is the current status of the classification?

Monophyly of the superfamily Scarabaeoidea is well-founded and undisputed (Lawrence and Britton 1991). The sister group for the Scarabaeoidea, however,

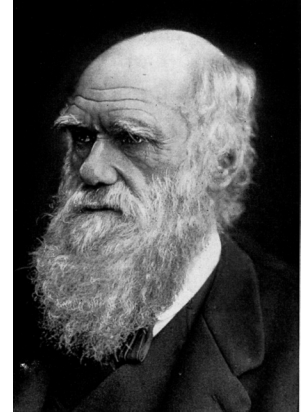
is not resolved and continues to be debated. The hierarchical level of families and subfamilies within the Scarabaeoidea is in disarray and remains unresolved. In most U.S. literature prior to the 1970s (*e.g.*, Arnett 1968), the Scarabaeoidea included three families: Passalidae, Lucanidae, and Scarabaeidae. This three-family system of classification was the “traditional” North American system and had several practical and conceptual advantages. First, it recognized the shared, derived characters that unite subfamilies within the family Scarabaeidae. Second, it provided a classification system that allowed easy retrieval of hierarchical information based on the fact that subfamilies were part of the family Scarabaeidae (*e.g.*, life history, morphology, larval type). Phylogenetic research indicates, however, that the family Scarabaeidae (in the traditional sense) is not a monophyletic group. Accordingly, most workers now follow the 12-family system established by Browne and Scholtz (1995, 1999) and Lawrence and Newton (1995). This system places emphasis on the differences that separate taxa rather than the similarities that unite them. Whereas families, subfamilies, and tribes in the staphylinoids and curculionoids are being combined because of shared characters (thus increasing efficient data retrieval), the scarabaeoids are being split into numerous families because of supposed differences (thus, in our view, decreasing information retrieval, at least in the short term). The debate concerning scarabaeoid classification systems illustrates the

weak phylogenetic foundation of the superfamily. This problem is the result of a number of factors including (1) lack of thorough study of all scarabaeoid taxa, (2) lack of diagnostic characters for all taxa, (3) lack of phylogenetic study of all taxa, (4) prevailing philosophies regarding categorical levels, and (5) emphasis in research on the less speciose groups of scarabaeoids and lack of research on the more speciose groups (such as the subfamilies of Scarabaeidae including the Melolonthinae, Rutelinae, Dynastinae, Aphodiinae, and Cetoniinae).

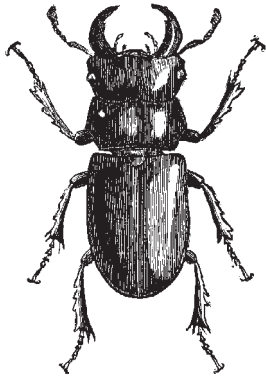
Within the Scarabaeoidea there is a disparity in the knowledge between less speciose basal lineages and the more speciose groups of “higher” Scarabaeidae. For example, the family Trogidae includes approximately 300 species in four genera. Excellent revisionary, larval, and phylogenetic studies are available for this group (Baker 1968; Scholtz 1982, 1986, 1990, 1991, 1993; Scholtz and Peck 1990). Excellent monographs are also available for the approximately 600 species of Geotrupidae (Howden 1955, 1964, 1979, 1985a-b, 1992; Howden and Cooper 1977; Howden and Martínez 1978) and the Trogidae (Vaurie 1955), and these provide the foundation for addressing relationships within this group. In comparison, the family Scarabaeidae (*sensu* Lawrence and Newton 1995) includes approximately 91% of the species (*ca* 27,800) of Scarabaeoidea. Within the Scarabaeidae,

approximately 21,000 species are in the subfamilies Melolonthinae, Dynastinae, Rutelinae, and Cetoniinae (the “higher” scarabs). Only a few phylogenetic analyses have addressed relationships of pleurostict subtribes, genera, or species (Ratcliffe 1976; Ratcliffe and Deloya 1992; Jameson 1990, 1996, 1998; Jameson *et al.* 1994; Krell 1993; Montreuil 2000; Paucar 2003; Smith 2003), and only one analysis has been conducted to address tribal or subfamilial relationships (Browne and Scholtz 1999).

Historically, the superfamily Scarabaeoidea was divided into two generalized groups based on the position of the abdominal spiracles; the Laparosticti and Pleurosticti. Pleurostict scarabs were characterized by having most of the abdominal spiracles situated on the upper portion of the sternites (Ritcher 1969; Woodruff 1973) and included taxa whose adults feed on leaves, flowers and pollen, and whose larvae feed primarily on roots and decaying wood. Laparostict scarabs, on the other hand, were characterized by having most of the abdominal spiracles located on the pleural membrane between the tergites and sternites (Ritcher 1969) and included taxa whose adults and larvae feed on dung, carrion, hides, and feathers. The position of the spiracles, however, is not a consistent character (Ritcher 1969), and, in recent years, subfamilies and tribes that were once included in the Laparosticti have been raised to higher taxonomic status (family and subfamily, respectively).



Charles Darwin



A “New” Scarab

The composition of the Scarabaeoidea remains a topic of debate. Lawrence and Newton (1995) proposed 13 families (12 found in the Nearctic, Belohinidae is Madagascan), and Scholtz and Browne (1996) and Browne and Scholtz (1995, 1998, 1999) proposed 13 families (all Nearctic, including Bolboceratidae; Belohinidae was not addressed). We follow, with some hesitation, the system of Lawrence and Newton (1995) and treat the Scarabaeoidea as including 12 Nearctic families (11 of which were previously considered subfamilies of the family Scarabaeidae, and one of which was previously considered a subfamily of the Lucanidae). Our reluctance to accept elevation of some new families within the Scarabaeoidea stems from the fact that: 1) there have been no comprehensive taxonomic treatments of all higher categories of scarabaeoids (families and subfamilies) and, 2) there are few comprehensive, rigorous, phylogenetic analyses of higher scarabaeoid groups and, thus, a lack of synapomorphic characters that establish a basis for uniform familial and subfamilial levels. We prefer to see clades delimited by shared derived characters before the elevation of certain taxa to family level. Despite our reluctance to accept this classification system, we have little basis for disputing the validity of current taxonomic conclusions other than the fact that some of these taxonomic conclusions have been based on narrow taxonomic frameworks (only scarab taxa from certain geographic regions rather than all scarab groups) or based on few

characters or suites of characters.

Underlying the classification problem is, of course, the fact that we are dealing with constructs that are 200 years old and that pre-date evolutionary theory. Linnaean classifications were based on overall morphological similarity rather than shared, derived characters. Thus, some groups within the scarabaeoids are not monophyletic lineages; instead, they are groups that were created historically because they superficially resembled each other. Our system of classification needs to convey information and concepts and allow for easy retrieval of information. Whether a certain taxon is classified at the level of family or subfamily may be trivial if we can continue to convey the needed information. We remain apprehensive that the trend of elevation to many families within the Scarabaeoidea will result, at least in the short term, in a net loss in retrievability of information.

Despite the considerable debate, phylogenetic analyses of scarabaeoid higher categories are on-going and their results bring us closer to understanding relationships of the groups. A preliminary “total evidence” phylogenetic analysis of 13 families of Scarabaeoidea (excluding Belohinidae, including Bolboceratidae) and most of the subfamilies was conducted using 134 adult and larval characters (Brown and Scholtz 1999). Results of this analysis showed that the superfamily Scarabaeoidea is comprised of three major

lineages: the glaresid lineage that consists of only the family Glaresidae; the passalid lineage that consists of two major lines - a glaphyrid line (containing Glaphyridae, Passalidae, Lucanidae, Diphylostomatidae, Trogidae, Bolboceratidae, and Pleocomidae), and a geotrupid line (containing Geotrupidae, Ochodaeidae, Ceratocanthidae, and Hybosoridae); and the scarab lineage (containing Aphodiinae, Scarabaeinae, Orphninae, Melolonthinae (*sensu lato*), Rutelinae, Dynastinae, and Cetoniinae).

The past thirty years have seen many changes and debates in the classification of the family Scarabaeidae. In the “traditional” North American system, the category Scarabaeidae has been treated as including the all scarabaeoid families except the Passalidae and Lucanidae. Old World scarab workers have tended to split the Scarabaeidae into several families.

While the debate continues, we follow Lawrence and Newton (1995) and consider the family Scarabaeidae to include the subfamilies Aphodiinae, Scarabaeinae, Melolonthinae, Dynastinae, Rutelinae, and Cetoniinae. Several smaller subfamilies that are not present in the Nearctic region are also included in the Scarabaeidae: Orphninae, Phaenomeridinae, Pachypodinae, Allidiostomatinae, Dynamopodinae, Aclopininae, and Euchirinae. No phylogenetic analyses have addressed the

relationships of all of these taxa. However, most hypotheses generally consider the Aphodiinae and Scarabaeinae as the sister group to the Melolonthinae, Dynastinae, Rutelinae, and Cetoniinae. The former Trichiinae and Valginae are now considered tribes of the Cetoniinae.

The family Scarabaeidae is sometimes referred to as the family Melolonthidae, especially by some of the Latin American workers. In this usage, the family includes the subfamilies Melolonthinae, Euchirinae, Phaenomeridinae, Dynastinae, Cetoniinae, Glaphyrinae, and Systellopodinae (Endrödi 1966) whereas the Scarabaeidae refers to everything else except Passalidae, Lucanidae, and Trogidae. This classification is not in wide use today and is incorrect. The family group names Rutelinae and Dynastinae were established by MacLeay in 1819, and the family group name Melolonthinae was established by Samouelle in 1819. However, the family group name Cetoniinae was established a few years earlier in 1815 by Leach. Thus, the family group name Cetoniidae has priority over Melolonthidae. Therefore, if one wants to consider all of these subfamilies in the same family (exclusive of Scarabaeinae, which was established by Latreille in 1802), then the valid name would be Cetoniidae! Accordingly, the family name Scarabaeidae (including Melolonthinae, Scarabaeinae, Dynastinae, Cetoniinae, etc.) is the correct family group name for these taxa and not Melolonthidae.



And Another...

At the family level, classification of the world Scarabaeidae is variably known. The classification of the world Dynastinae is fairly well established due to the work of Endrödi (1985). Most Melolonthinae, Rutelinae, and Cetoniinae remain poorly known taxonomically, and many New World genera cannot be reliably identified. Classification of the Scarabaeinae (Hanski and Cambefort 1991) and Aphodiinae (Dellacasa 1987, 1988a, 1988b, 1991, 1995) are fairly well established. The taxonomy of the North American scarab beetles is relatively stable although no one volume is available for identification. Regional works are sometimes the best sources for identification of Nearctic scarab beetles. The family Scarabaeidae includes about 91% of all scarabaeoids and includes about 27,800 species worldwide. Within the Scarabaeidae, the Aphodiinae and Scarabaeinae include approximately 6,850 species worldwide (about 22% of scarabaeoids and 25% of Scarabaeidae). The subfamilies Orphninae, Melolonthinae, Dynastinae, Rutelinae, and Cetoniinae include approximately 20,950 species (about 69% of scarabaeoids and 75% of Scarabaeidae).

Summary of the Families and Subfamilies of Scarabaeoidea of the United States, Canada, and Neartic Mexico

Lucanidae: Lucaninae, Nicaginae, Syndesinae
Diphyllostomatidae
Passalidae
Glaresidae
Trogidae
Pleocomidae
Geotrupidae: Bolboceratinae, Geotrupinae
Ochodaeidae: Ochodaeinae, Chaetocanthinae
Hybosoridae
Ceratocanthidae
Glaphyridae
Scarabaeidae: Aphodiinae, Scarabaeinae, Melolonthinae, Rutelinae, Dynastinae, Cetoniinae

Acknowledgment

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Larval Taxonomy of the
Troginae in North America
with Notes on Biologies
and Life Histories
(Coleoptera: Scarabaeidae)

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SMITHSONIAN INSTITUTION PRESS
WASHINGTON, D.C.
1968

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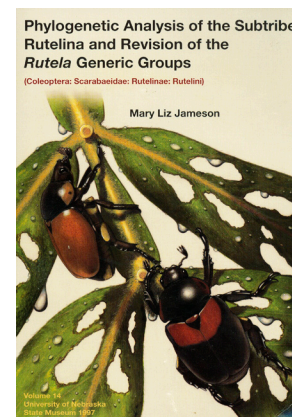
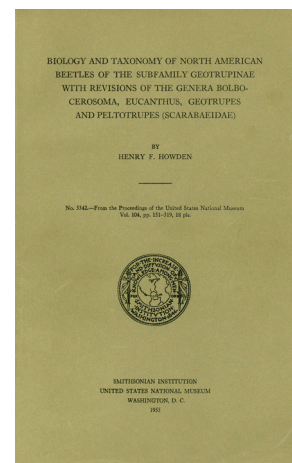
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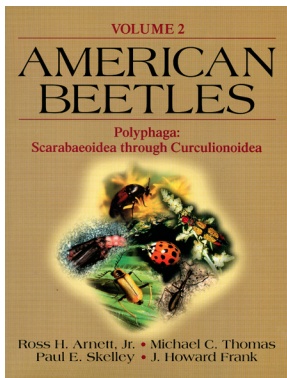
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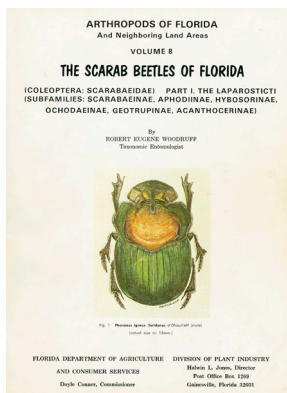
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Scatological Ramblings II

By Barney D. (Dead-inside) Streit

Since Editor Bill's classic exposé on trapping for dung beetles (*Scarabs*, Occasional Issue #2), quite a few modifications of Bill's classic technique have been attempted. Some of the more worthwhile items are reported here.

Trap Location – Is It Such A Big Deal?

For some species of *Phanaeus*, such as the newly named *P. yecoraensis*, trap location seems to be vitally important. A difference of a few feet or so can matter, with one trap consistently attracting 1-5 specimens, and a nearby (30 feet away) trap consistently getting nothing. In this instance, no differences in the habitat could be discerned, so no advice can be given for the placement of traps, except for one. When dealing with a rare species with an unknown biology, set a good number of traps: the more the stinkier.

It is not known why this (and various other) *Phanaeus* is so particular and so uncommon. I suspect that its flight period, which is in the morning, is very short - this may be the reason for the paucity of specimens. Further study is needed to understand why it is so localized, and why it flies only in the morning, but not at dusk. *Phanaeus yecoraensis* (see Edmonds, W. D., in *The Coleopterists Bulletin*, vol. 58, no. 1, March, 2004, pp.119-124) and *P. alvarengai* (see Vulinec, K. et

al in *The Coleopterists Bulletin*, vol. 57, no. 3, September, 2003, pp. 353-357) share early morning flight times.

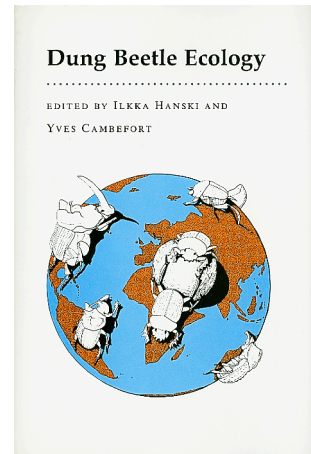
Bruce Gill's paper "Dung Beetles In Tropical American Forests" (in *Dung Beetle Ecology*, edited by Ilkka Hanski and Yves Cambefort, Princeton University Press, 1991, page 215), may yield a clue. Bruce states, "Dawn and dusk are the two periods when the defecation rate of mammals might be expected to peak due to the change in activity in both diurnal and nocturnal species." It is as yet unknown why these species have no dusk flights.

Coleoptera like to fly against the wind, so it is usually a good idea to place traps in draws and gullies, if you are in a hilly area. Editor Rich says my stuff has no upwind side, but for the rest of you, this is good advice.

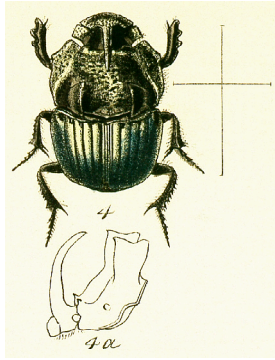
For common species of dung beetles, set traps adjacent to pastures with grazing cows. Under barbed-wire fences is usually the safest spot.

Does Diet of the Dung Donor Matter?

I think it does. There have been instances where Rich and I had 19 traps active. We needed high-quality dung (called gourmet dung in France) and lots of it (yes, size does matter!). Here are what I consider key items on the menu.



Highly Recommended



Eat Right, and They Shall Be Yours...

Definitions:

Winner: Got Dung
Loser: No Got Dung

For breakfast, stick with a cereal consisting of milk and granola. Milk gives your feces a complexity that I feel is irresistible to many species. Milk intake may well be the reason calf dung is more attractive than cattle dung. Astute readers will recall “Wirth”Less Tip #3 in *Scarabs Occasional Issue Number 8*, which noted that calf dung seems more attractive to *Phanaeus* than cow dung. It seems logical to conclude that the calves’ milk intake is the difference. So, have plenty of milk with your cereal. The granola is great roughage because it is high in fiber. High fiber foods pull water from your gut, resulting in a moist stool. Dry stools are not as odiferous or beautiful as shimmering, glistening stools. Moist stools give off a nice, rank scent due to the evaporative effect. Please remember that salads, while possibly adding complexity, offer very little fiber. Grains and nuts are your best bet. As an aside, trail mix is a great snack, especially the variety with the chocolate candy. Editor Bill thinks “Carnivore Crap” is best. Having a pickled egg, milk, bratwurst, and beer makes great bait if you don’t die first.

Lunch can consist of anything you desire. This food will become the primary bolus or “bulk” of your sacred offering to the dung beetles.

Up to this point, we have a complex, high-fiber breakfast pulling a big lunch through the digestive tract. What we need now is an afternoon snack to add more richness, yet with enough fiber to push that lunch along. The answer is almond or peanut

clusters. Chocolate consists of over 400 chemicals - egads! - now that’s complex! The peanuts are an extremely high source of fiber.

In summary, the concept is very simple: a big lunch is both pushed and pulled through the scarabaeologist’s (or the scarabaeologist’s significant other’s) digestive tract by a high-fiber breakfast and afternoon snack. The food intake is high in fiber yet rich in milk and chocolate.

What Else Can I Do To Enhance Attractiveness?

While scouring the collection at Gainesville, I noted several specimens of *Phanaeus* that had been collected with only water and yeast as bait. I verified this with Mike Thomas, who collected the specimens. It was interesting listening to two other members of the Gainesville Hordes, Paul Skelley and Bob Woodruff, discussing the merits of the explosive local swine dung, affectionately called “Gainesville Gold.” They think there is a high concentration of yeast (or something like it) in these feces that make it more attractive. Of course, the downside is that this concoction is “explosive” if kept in a tightly-closed container. This was mentioned by Editor Bill in his aforementioned exposé in *Occasional Issue Number 2*.

Although I do not think this has been tested, perhaps a “Super Bait” could be concocted at the time the trap is placed. A two- or three-day old blend of water and yeast could be mixed into your dung. Better,

put it in the main cup instead of plain water.

How to Protect Your Trap

Falling leaves from tropical downpours wreck havoc on dung traps by giving beetles a platform to crawl onto and then fly away. Moreover, the trap itself can float out of its hole if the downpour is severe. In arid areas, the problem is that direct sunlight will dry out the dung source, diminishing its effectiveness. Another problem can occur if you get a lot of beetles in the trap; latecomers can land on the backs of early arrivals and fly away. What to do?

Alex Reifschneider came up with a nice and easy solution. We have coined the term Lower Reifschneider Rain Shield in honor of its creator. Place a paper plate, with a 2" hole cut into the center, over the trap. Place two or three rocks on the edges of the plate to hold it (and the trap beneath) in place. This plate does not need to be raised above the ground because the beetles will crawl through the hole in the plate.

In such a trap, the bait is placed in a 1-ounce portion cup, available at Costco. Pre-punch a hole near the rim of the cup. Editor Rich found that a small soldering iron works well for making this hole. A small wire, perhaps 5-inches long, can be impaled into the dirt adjacent to the main cup and bent to hold the bait cup. Coat hanger wire will suffice, but is stiff and difficult to work with. A nice, inexpensive wire can be found at Home Depot.

It is called aluminum electric fence wire, 17 gauge, made by Fi-Shock Inc., and comes on a small spool of 250 feet. Bailing wire is also good.

Thusly set, the entire trap is flat and level with the ground, so that a plate can be placed over it. The nice thing about this design is that the



wire and bait can easily be pulled up and out of the way, so that the cup containing the beetles can be pulled out, and the catch dumped into a strainer. Sticks smeared with bait can still be, and should be, stuck into the ground to "add to the aroma," as Editor Bill has stated.

The photos herein depict the trap setup. Please note that these are posed studio shots - not the real thing. Chocolate pudding has been substituted for the actual bait in an attempt to not offend any Melolonthine or Cetonid enthusiasts who stumbled across these photos by mistake. To enhance realism, a few corn kernels were artfully placed in the pudding by our art director and stylist.

The Lower Reifschneider Rain Shield in place. Is that really his dung? See text!



Alex "Rain Shield" Reifschneider
Quote: "The affinity for cerambycids can now be surgically corrected."



Once the Reifschneider Rain Shield is removed, the wire loop allows the dung cup to be swung out of the way, for easy - and clean - retrieval of specimens.



The Upper Reifschneider Rain Shield shown protecting (well, kind of) the bait in the upper cup.

Further, the corn can be thought of as a small tribute to Team Scarab, located at University of Nebraska.

How to Make Your Trap More Attractive

While in French Guiana, Alex and I did a bit of experimenting. We were in a forest with some great scarabs: *Sulcophaneus faunus* and *Oxysternon festivum* among them. We remembered Henry Howden's classic article on perching behavior of dung beetles (Howden, H. F. and Nealis, V. G., Observations on Height of Perching in Some Tropical Dung Beetles (Scarabaeidae), *Biotropica*, 10:43-46, 1978). It stated that some dung beetles are selective perchers, with larger species perching higher than smaller species, so that they would not be tempted by wafts from dung resources too small for their needs.

To test this, we hung a second portion cup on a branch directly above the trap, as high as we could reach. These traps did indeed seem more successful at attracting larger specimens in greater numbers. However, our experience was limited. More testing is needed! This high cup can also be protected from rain by using the Upper Reifschneider Rain Shield (see photo).

Transporting Dung

The ideal container, as Editor Bill has mentioned, is a wide-mouthed, screw-top plastic jar. Before you leave on a trip, freeze a jar of bait. I do not think it compromises its attractiveness at all. In fact, if your

diet has been low-fiber, and the bait is a bit “stiff,” freezing and then letting the stuff warm up seems to enhance its consistency. If you decide to haul your bait (as some enterprising souls have done) be prepared to provide an explanation at customs. My fellow editors have not had this problem, as they are not Dung Terrorists, but “full of bait.”

More than once Mr. Pleocoma (Frank Hovore) has tried to get under my skin by uttering foul words and holding his nose when I opened my jar 200 feet away. I just smile at him, and thank him for the compliment.

Transporting and Storing Your Trophies

After drying out your washed and cleaned specimens, place them in a small Zip-Loc bag. Then take a clean paper towel, fold it and impregnate it with ethyl acetate. These bags can be transported inside the type of plastic box used for storing food in the refrigerator. Once you are home, the bugs can be pinned or placed in the refrigerator. Either way, your catch will be pliable and mold free.

A Note About Labeling

I have never done this, nor seen it done. Several times, when going through collections and looking at seldom-collected scarabaeines, I have wondered if the beetle before me was common or not at the time of collection. Perhaps a notation such as “39 specimens/5 traps/3 days” should be added to the label,

to contrast it with a notation such as “86 specimens/1 trap/8-12 AM.”

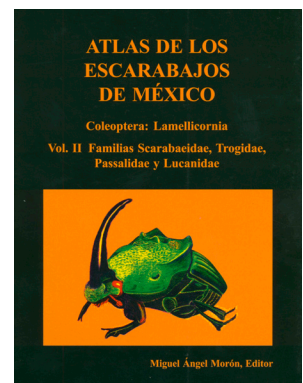
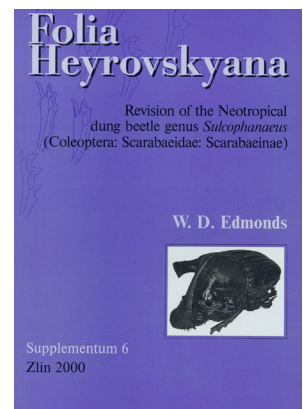
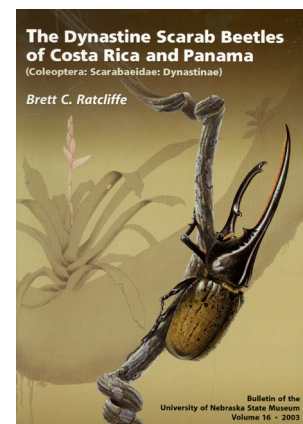
Indeed, should you run a trap for successive days, all the dates the trap was running could be listed in addition to the total specimens collected each day. This could be useful information, especially for rare species.

Notable Publications

So many notable publications have emerged since our last issue we cannot comment on them all. Scarab Central at University of Nebraska has emerged as the source of several important Scarab works. The latest is Brett Ratcliffe's *The Dynastine Scarab Beetles of Costa Rica and Panama*. This along with Andrew Smith's *A Monographic Revision of the Genus Platycolia Dejean* and Mary Liz Jameson's *Phylogenetic Analysis of the Subtribe Rutelina and Revision of the Rutela Generic Groups* belong in every scarab enthusiast's library. Order them from the Publications Secretary, W436 Nebraska Hall, University of Nebraska State Museum, Lincoln, NE 68588-0514.

Dave Edmonds has revised *Sulcophanaeus* and *Oxysternon*. These are published by *Folia Heyrovskyana*, and can be ordered online from various sources.

The second volume of *Atlas de los Escarabajos de Mexico* is out, and available through BioQuip. It covers the Scarabaeidae, Trogidae, Passalidae and Lucanidae.



A Collecting Tip for *Bradycinetulus*

by Barney D. (Dufus) Streit

The Monahans sand dunes in Texas offer a rich palette of scarab fauna, including two species of *Polyphylla*, *Glaresis*, and the large Geotrupine *Bradycinetulus fossatus* (Haldeman). Editor Rich and I set up two mercury vapor lamps and assorted blacklights. I placed two blacklight lanterns on ground sheets. Unbeknownst to me, these two units had weak batteries. In my defense, and in an effort not to look utterly stupid to you, our readers, I must state that I was, after all, with Rich, and little Cunninghaming can rub off on anybody!



Not to be outdone by other contributors, here is a photo of Editor Barney with a couple of the ladies from work: Sue and Charissa.

Later in the evening, I walked to one of these units, and the blacklight was out entirely. However, sitting on the sheet was a nice male *Bradycinetulus*. I took the light back to the truck — it was done for the night as I had no spare D-cell batteries. At that moment I knew what it was like to be Rich. I felt his pain...and though we were alone, I could hear people

snickering at me — and I vowed not to poke fun at him ever again. I then checked the second light. This one also was almost out; it had the dull luminescence of a flashlight. The laughter grew louder in my ears. I sat there maybe 15 minutes and no new scarabs flew in. I watched the light go out, and as it did, a female *Bradycinetulus* flew in. Only then did the laughter stop.

The notion that *Bolbos* prefer dim light is not a new one. I remember Doctor Art Evans, Ph.D. spinning a yarn that a *Bolbocerastes regalis* flew into his flashlight as he was walking in the desert. We need to test this, by perhaps covering our blacklight lamps with cloth in order to dim them. Maybe even those blue light sticks (available at Camphor) would be a good attractant. Note that at Monahans, no *Bradycinetulus* were found at the mercury vapor lamps. We did collect another specimen at the park entrance. It was found in the parking lot, some distance from the nearest mercury vapor light, sitting in the shadow created by the curb.

If anyone has similar experiences with beetles of this tribe, please contact us.

Pin Labels, Macs and Microsoft Word

A lot of coleopterists use the Apple McIntosh computer. We do not know why that is - perhaps we are cutting-edge people. Editor Barney used the Mac, tried Windows, but went back to the Mac after a worm wiped out the hard drive on the Windows machine. Tip: there are no known viruses for Mac OS X, there may be but one single Trojan Horse. This is a great reason to use the Mac.

A problem occurs when using Microsoft Word to make a strip of pin labels. A commonly used font is Arial Narrow. The label is composed in 9-point sized letters. Under Page Setup, you tell the system to print at 40% reduction.

About *Scarabs*...

The scarabs on the masthead are *Chalcentis victima* Germ. and *Calomacropsis haroldi* Cand. Both graphics are from Plate 4 of *Genera Insectorum*, Coleoptera Lamellicorna, Fam. Scarabaeidae, Subfam. Rutelinae, by F. Ohaus, 1934. The images were scanned by a Microtek 9800XL flatbed scanner using SilverFast software, then they were tweaked in Adobe Photoshop CS. Using Adobe InDesign CS, a clipping path was created to remove the background of the two beetles. The title is in 60-point Capitals; the letters were manually kerned in Adobe Illustrator CS. The newsletter itself was assembled in Adobe InDesign CS using an 8-column grid and the Warnock Pro family of typefaces. All software is for the Mac OS X.

A bug in Word then changes the shape of your paper from 8.5" x 11" to something shaped more like a square. You can see the effect on Print Preview. When the labels are copied, pasted into a vertical strip and then printed, Word only prints the top 3/4 of the page.

Try switching to Mariner Write (www.marinersoftware.com) which will open and allow you to edit Microsoft Word files. This is a small, elegant word processor that will allow you to use all of that paper.

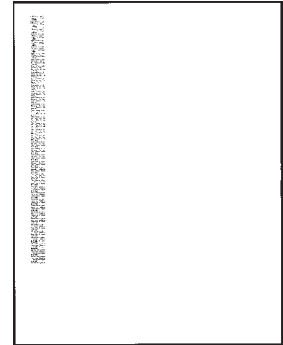
Acid-free, 57 pound paper made for laser printers is ideal.

Insect Pins

The original Elephant brand of insect pins were made in Austria. Since the demise of this fine pin, collectors have been searching for a suitable replacement.

Mr. Pleocoma recommended the Kostal brand from the Czech Republic. These pins cost \$4.00 per 100, and can be ordered online from Ianni Butterfly Enterprises at <http://iannibutterfly.net/>

These too are very nice pins: sharp, well coated (japanned) and with nylon heads that stay on.



An Undesired Bug!



A Request for *Phanaeus* Specimens

by Dana L. Price

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New Brunswick, NJ 08904
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Lab: 732-932-8872

I am currently a graduate student at Rutgers University in New Jersey. My Ph.D. work is titled “Phylogenetic analysis of the dung beetle genus *Phanaeus* (Scarabaeidae: Scarabaeinae) using morphological and molecular data”.



Dana L. Price

While I have only been working with dung beetles for four years now, I am very enthusiastic about the many great projects that can be done with dung beetles. Not only are they great for studies dealing with biocontrol, behavior, and sexual selection, they are also important to understanding tropical rainforest diversity and they are of general interest to most

that have been fortunate enough to watch them in their back yard, on the trail, or on television.

Though my future plans are to travel to far-away places for the collection of dung beetles, my own experiences thus far have been within the United States. Yes, I have used my own dung. And yes, I do believe that human dung is the worst smelling; no wonder it attracts so many different species of beetles.

While I am gaining experience here in the U.S., I wish to ask all of you kind dung-beetle enthusiasts if you would send me *Phanaeus* species. All species are welcome. I am especially interested in those species of which there are currently only a few sitting in museums. These specimens will be useful for both internal and external morphological studies. In addition to morphological data, these specimens will be used for the extraction of DNA. The importance of fresh specimens for molecular work cannot be stressed enough. Any specimens or assistance would be greatly appreciated.

Ed. Note: Specimens that have come in contact with ethyl acetate are unusable for DNA analysis. Drowned or live beetles should be stored in 95% ethyl alcohol, which Dana will gladly supply. Dana's web page is: www.rci.rutgers.edu/~struwe/price/