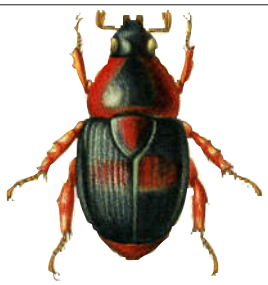

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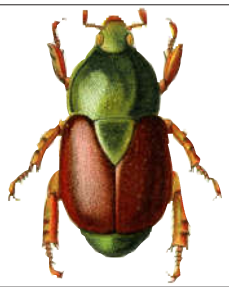

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Occasional Issue Number 84 Print ISSN 1937-8343 Online ISSN 1937-8351 September, 2017

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Notes on the Genus *Pachypus* (Coleoptera: Scarabaeidae: Melolonthinae: Pachypodini)

by Stéphane Le Tirant & René Limoges

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Introduction

To date, no article or photograph of the Pachypodini tribe has ever been published in *Scarabs*. We thought it would be interesting to present an overview of genus *Pachypus*, along with a few spectacular photographs of these fascinating beetles.

History

The Pachypodini tribe was created by Erichson in 1840 and contains a single genus: *Pachypus* (Dejean 1821). Five species have been described thus far:

Pachypus caesus Erichson, 1840 - (Italy. Sicily - endemic).
P. candidae (Petagna, 1787) - (France (Corsica - Italy (Petagna)).
P. demoflysi Normand, 1936 (Tunisia).
P. melloni Sparacio, 2008 - (Sardinia - endemic).
P. sardiniensis Guerlach, Bazzato, Cillo, 2013 - (Sardinia - endemic).

The species are very similar, making identification difficult. There is also wide variability within each species.

Genus *Pachypus* has antennae with eight segments, five of them comprising the club. These beetles are usually 12 to 16 mm long. The males have a deeply excavated pronotum on the disk. The females, few of which are found in collections, have no scutellum, wings or elytra whatsoever.

Mysterious Biology

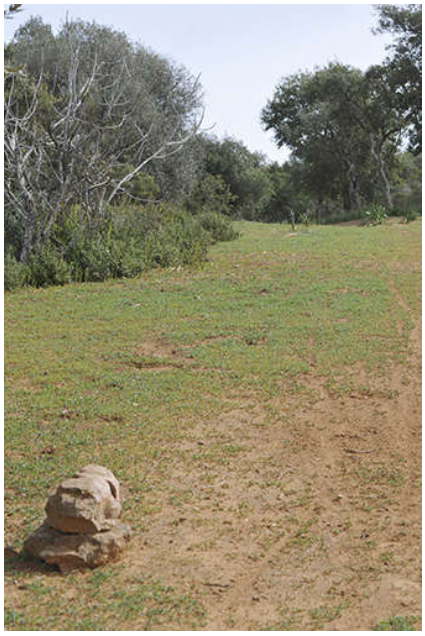
The male and female biology is fascinating. The male spends much of the day perched head down. The female remains inside a burrow with the larva until it becomes a nymph. The female's abdomen sometimes barely emerges from the burrow, emitting pheromones

Male *Pachypus caesus* Erichson.

Female *Pachypus caesus* Erichson.

Habitat of *Pachypus caesus*: Valle Terrana, Sicily, Italy.

that attract males. They appear to be able to locate a female across vast distances. In his book *Biologie des Coléoptères*, Dr. Paulian reports that an unfertilized female *Pachypus* deposited some liquid on an entomologist's clothing that then attracted a number of males of the species for several days.



Habitat of *Pachypus caesus*: Sughereta, Sicily, Italy.

Habitat of *Pachypus caesus*: Contrata Arcia, Sicily, Italy.

Female *Pachypus caesus* Erichson with a male.

Female *Pachypus caesus* Erichson.

Acknowledgments

We wish to thank Manuel Zafarna and Daniel Sechi for their photographs of *Pachypus* in the wild and of their habitats. Our thanks also to P. Moretto, R. Minetti and M. Chaminade for providing us with some remarkable specimens and to Dr. Andrew B.T. Smith for his expertise regarding the nomenclature of these fascinating beetles.

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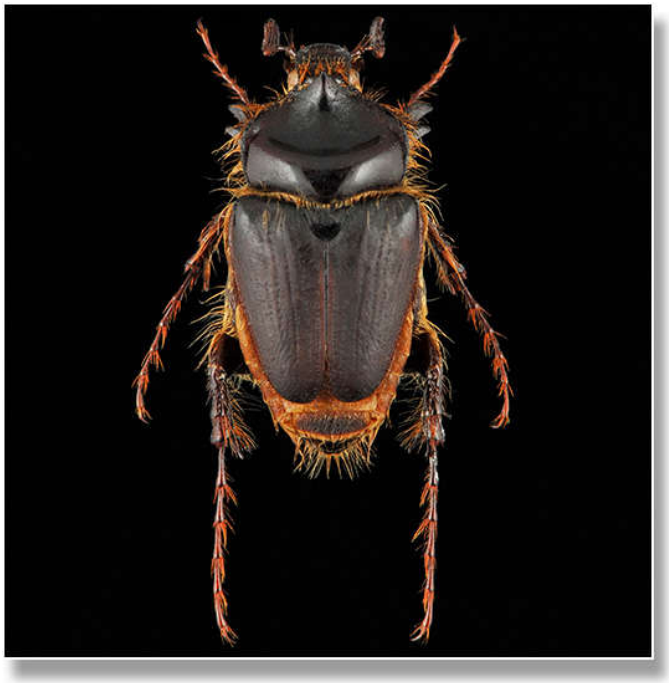
Male *Pachypus candidae*.



Male *Pachypus candidae*, black form.

Patrice Bouchard, Yves Bousquet, Anthony E. Davies, Miguel A. Alonso-Zarazaga, John F. Lawrence, Chris H.C. Lyal, Alfred F. Newton, Chris A.M. Reid, Michael Schmitt, S. Adam Ślipiński, Andrew B.T. Smith: Family-group names in Coleoptera (Insecta), *Zookeys*. 2011; (88): 1–972.

Introduction

La tribu des Pachypodinini n'a jamais fait l'objet d'un article et aucune photographie n'a été présentée jusqu'à maintenant dans la revue *Scarabs*. Nous pensions qu'il serait intéressant de faire un survol du genre *Pachypus* et de montrer quelques spectaculaires photographies de ces fascinants scarabées.

Historique

La tribu des Pachypodini a été créée par Erichson en 1840 et ne comprend qu'un seul genre : *Pachypus* (Dejean 1821). Cinq espèces ont été décrites à ce jour:

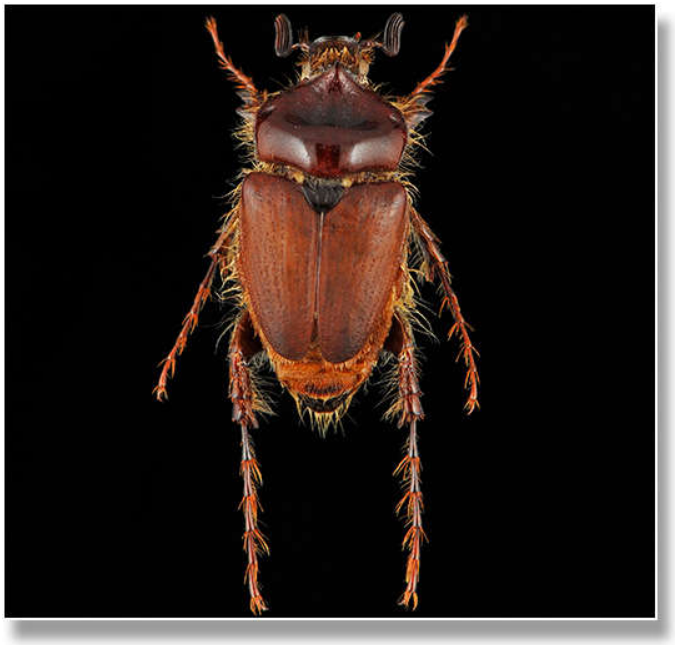
Pachypus caesus Erichson, 1840 - (Italie. Sicile-endémique).
P. candidae (Petagna, 1787) - (France (Corse- Italie (Petagna)).
P. demoflysi Normand, 1936 (Tunisie).
P. melloni Sparacio, 2008 - (Sardaigne-endémique).
P. sardiniensis Guerlach, Bazzato, Cillo, 2013 - (Sardaigne-endémique).

Elles sont très semblables et l'identification n'est pas facile. De plus, Il existe une grande variabilité pour une même espèce.

Le genre *Pachypus* est caractérisé par des antennes de huit articles dont cinq sur la massue. Ces coléoptères mesurent généralement de 12 à 16 mm. Les mâles ont un pronotum profondément excavé sur le disque. Les femelles, rares en collection, sont complètement dépourvues de scutellum, d'ailes et d'élytres.

Une Biologie Encore Méconnue

La biologie des mâles et femelles est fascinante. Le mâle reste perché la tête en bas pendant une bonne partie de la journée. La femelle reste dans un terrier avec la larve jusqu'à ce qu'elle se nymphose. Parfois l'abdomen de la femelle sort à peine du terrier et émet alors des phéromones qui attirent les mâles. Ils seraient en mesure de repérer une femelle à de grandes distances. Le Dr Paulian, dans son livre *Biologie des Coléoptères*, rapporte qu'une femelle *Pachypus* non fécondée avait déposé un liquide sur les vêtements d'un entomologiste et que ce dernier avait ensuite attiré pendant plusieurs jours des mâles de l'espèce.

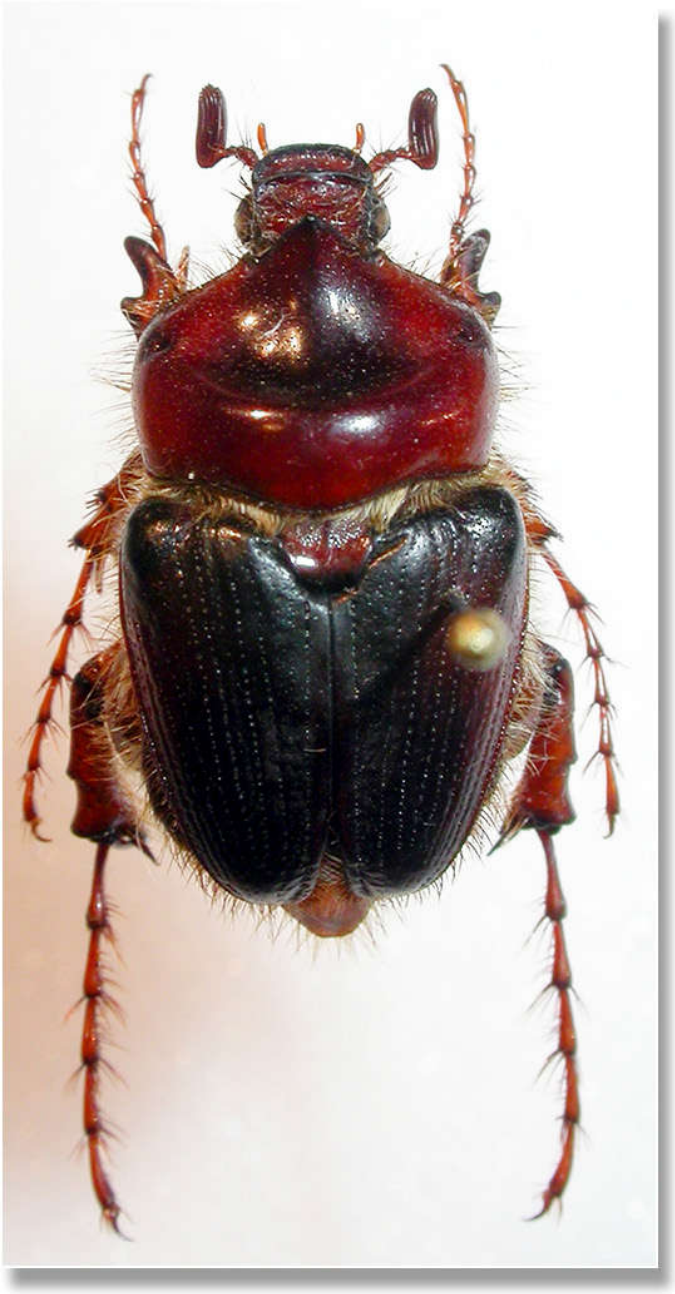


Paratype male *Pachypus meloni*.

Male *Pachypus demoflysi*.

Remerciements

Les auteurs tiennent à remercier M. Manuel Zafarna, M. Guy Guerlach et M. Daniel Sechi pour les photographies de *Pachypus* dans la nature ainsi que celles de leurs habitats. Merci aussi à Messieurs P. Moretto, R. Minetti et M. Chaminade pour l'obtention de remarquables spécimens et au Dr Andrew B.T. Smith pour des précisions au sujet de la nomenclature.



Male *Pachypus sardiniensis*, alternate form.

Male *Pachypus sardiniensis*.

Delbert Aaron La Rue June 8, 1956 – April 13, 2017

by Rich Cunningham

It is with deep sadness we at *Scarabs* announce the passing of our friend and colleague Delbert La Rue. Delbert died in the evening of Wednesday April 13, 2017. He leaves behind a son Casey, three grandsons, Avery, Orion, Henri and many of us who will remember and miss him.

Delbert was born in San Bernardino, California and spent much of his life in the Southern California, living in Riverside, Wrightwood, Indio, then Quartzite and Pearce, Arizona. He had a daughter, Ashley, who succumbed to leukemia at the age of 23. Delbert named the Ruteline *Cotalpa ashleyae* after her. Delbert was very proud of his son Casey, and of course his grandchildren. His son Casey recently landed a job as chef in a four-star hotel in Boston, Massachusetts.

Besides his entomological interests, Delbert had a variety of endeavors. As an artist he produced many fine pieces that he sold and would also give to friends. The works he made using dried native gourds as a medium were very nice. Most were painted with flower and insect themes in beautiful colors. He even sold mailboxes painted in mostly nature themes that the buyer requested. Every time we visit Fred Skillman in Pearce, Arizona we will think of Delbert as he painted the large "Longhorn Ranch" sign at the entrance to Fred's property.

Delbert's website "Crooked Beak Workshop…musings from an entomological gadabout" was filled with blogs of various interesting topics, collecting reports, techniques and discussions.

Delbert's scientific interests were also varied. As evidenced from his publications, he researched bionomics, ecology, systematics, conservation biology, botany, glacial and geological distribution of species, palaeogeology, and paleoclimatology. He made sure to include these areas of research in his publications wherever he found appropriate. These topics made his publications more complete and interesting and added greatly to the systematics and taxonomy.

Delbert's interest in entomology was mostly with Coleoptera. He worked with Cicindelidae and Buprestidae (*Acmaeodera* plant host records). He also worked with *Pleocoma* but his main interest in Scarabaeidae was the Melolonthine genera *Polyphylla* and *Dinacoma*.

Scientific Publications

1986. A new species of *Cotalpa* from Western Arizona (Coleoptera:Scarabaeidae: Rutelinae). *The Coleopterists' Bulletin* 40(2):145-147.

Photo 1:

1990. New California distribution records for two species of *Cicindela* Linnaeus (Coleoptera: Cicindelidae). *Cicindela* 22(4):49-52.

1992. Food plant associations for *Paracotalpa* and *Phobetus* LeConte from southern California (Coleoptera: Scarabaeidae: Rutelinae & Melolonthinae). *The Coleopterists' Bulletin* 46(1):28.

1994. Tiger beetles of the Algodones Sand Dunes, Imperial County, California (Coleoptera: Cicindelidae) *Cicindela* 26(1):1-8.

1994. Additional distribution records for *Cicindela* (Cicindelidia) *nigrocoerulea nigrocoerulea* in California (Coleoptera: Cicindelidae) *Cicindela* 26(2):25-26.

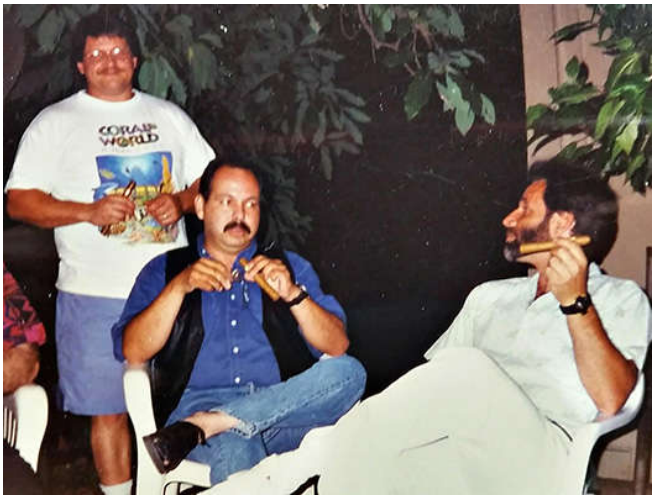
1998. Notes on *Polyphylla* Harris with a description of a new species. (Coleoptera: Scarabaeidae: Melolonthinae: Melolonthini). *Insecta Mundi* 12(1/2):23-37. pdf available

2007. A new species of *Pleocoma* LeConte from California (Coleoptera: Scarabaeoidea: Pleocomidae). *The Coleopterists' Bulletin* 61(2):149-158. pdf available

(2016). Natural history, ecology, and conservation of the genus *Polyphylla* Harris, 1841. 1. New species from the southwestern United States and Baja California, Mexico, with notes on distribution and synonomy (Coleoptera: Scarabaeidae: Melolonthinae).

At the time of his illness Delbert was working with a revision of *Dinacoma* (Scarabaeidae) which will be completed by this author, a joint paper on host plants with Rick Westcott for *Acmaeodera* (Buprestidae) and a revision of the *Polyphylla diffracta* group.

Rest in peace Del, you will be remembered and missed.



Alex Reifschneider, Delbert LaRue and Ron Alten.

Entrance to the residence of Fred Skillman. Sign by Delbert.

Elephant Poo: A Dream for a Dung Beetle Lover

by Jorge Ari Noriega

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When you typically work with dung beetles in the Neotropics, and especially with cow pads in grasslands, you are used to collecting a few individuals (~100-300) of 5 to 10 species at most. When you are working in tropical rain forests, it could be that you find a larger species richness and even more individuals if you check primate droppings. However, the biggest possible poo that you could find inside a Neotropical forest is the dung of a danta (*Tapirus* spp.), which weighs could be around 300-500 g (about the size of a typical horse excrement), but the problem here is that these animals frequently evacuate in water.

Figure: 1. A large male elephant of the Mkuze reserve.

Without any doubt, one of the biggest dung piles on earth is the excrement of an adult African elephant (*Loxodonta africana* Blumenbach). An average elephant dropping can have a diameter of up to 60 cm and weight ~5 kg (or more). It is of no surprise that many individuals of different species of dung beetles are attracted to this massive amount of dung. Anderson & Coe (1974) in Tsavo National Park (Kenya) counted 16,000 dung beetles in an elephant poo that weighed 1.5 kg. Cambefort & Walter (1991) performed a study in Ivory Coast that estimated that 2,500 g of

Figure: 2. A group of elephants crossing one of the roads of the reserve.

Figure: 3. A fresh elephant poo in the middle of one of the roads of the Mkuze reserve.

Figure: 4. A large elephant poo after numerous dung beetles had been working on it for several hours.

elephant droppings attracts 3-7 g of dung beetles. Similarly, Clarke Scholtz counted 7,000 individuals and ~120 species of dung beetles in a single pile (~25 kg) of elephant dung in Kruger Park, South Africa (Scholtz et al. 2009). And Sylvia, Frank Krell's wife, found 13,699 individuals in 1 kg of elephant dung in Central Kenya (Krell & Stephenson 2011).

Elephant dung piles typically consist of 5-7 massive balls (approx. 15-20 cm in diameter each) instead of a single pasty mass. Also, elephant dung has a large amount of vegetable matter and is one of the most fibrous excrements of the African savannah. On average, one adult elephant produces approximately 50 kg of dung every day. It is evident that many beetles are necessary in order to remove such massive amount of dung every day, 365 days a year.

Also, these enormous and complex (in terms of the 3D structure) dung piles allow several beetle species to work simultaneously on different parts of the pile without interacting with each other. However, elephant dung has an important disadvantage for roller species (i.e. telecoprids) since making a ball with fibrous material is more difficult and more demanding in terms of handling time, which may expose them more to potential predators. Nonetheless, there are several species (e.g. *Aptychonitis anomalus*, *Catharsius calaharicus*, *Copris cornifrons*, *Heliocopris colossus*, *H. dilloni*, *Kheper platynotus*, *Oniticellus formosus*, *Onitis inversidens*, *Onthophagus nigricornis*, *O.*

probus or *O. verticalis*) that have specialized or have a significant tendency to exploit exclusively elephant dung (Kingston & Coe 1977, Doube 1991, Gordon & Barbero 2009, Davis et al. 2010). The idea of all these big numbers brings forward a common "dream" for a dung beetle lover (like me), and that is to travel to Africa to contemplate and study a dung beetle "party" in a fresh elephant poo. In my case, this had been my dream since I began working with this group. Without any doubt, in this case, size matters! Cow pads are 5 to 10 times smaller than the excrement of an average elephant, but the most amazing difference is in beetle activity. It is difficult to describe with words the experience of watching a fresh elephant pile because the most incredible thing is not just the enormous amount of individuals or the huge variety of different species, but the frenetic activity of all those beetles trying to get a part of it. It's a massive feast! Also, as a personal comment, the smell of an elephant poo is not as bad if you compare it with the disgusting smell of pig or human dung, which is the most common bait that we use in the Neotropics.

I had the amazing opportunity during part of the PhD thesis of Gimo Daniel to travel for a field expedition to Mkhuze Game Reserve, one of the Nature Reserves of KwaZulu Natal, in South Africa. The reserve covers an area of 40,000 hectares with flat landscapes, sand forests, riverine forests, swamps, mountains, and grasslands. This reserve is one of the most important birding spots in South

Figure: 5. The author with an elephant poo in the Mkuze reserve.

Figure: 6. A fresh poo attacked by an enormous group of *Allogymnopleurus thalassinus* (Klug, 1855).

Figure: 7. An elephant poo disintegrated by different dung beetles: *Drepanocerus kirbyi* (Kirbyi, 1828), *Garreta wahlbergi* (Fahraeus, 1857), *Kheper nigroaeneus* (Boheman, 1857), *Neosisyphus mirabilis* (Arrow, 1927), *Pachylomera femoralis* Kirby, 1828, and some *Onthophagus* and *Caccobius* species.

Figure: 8. A close up to a fragment of elephant poo broken by: *Garreta wahlbergi* (Fahraeus, 1857), *Gymnopleurus virens* Erichson, 1843, and *Kheper nigroaeneus* (Boheman, 1857).

Africa, containing more than 400 species. You can also spot the big five (lion, elephant, buffalo, leopard, and rhino) and other animals like wild dog, hippo, blue wildebeest, giraffe, cheetah, hyena, and others. In terms of the dung beetle species, Doube (1991) listed 120 species in 28 genera for the reserve.

Our "safari" guide, and without any doubt, an expert driver for this great field trip was Christian Deschodt, who also saved us on many occasions of angry male elephants. We stayed four nights inside the reserve, camping with our own tents and listening to the wild animals during the night. We collected dung beetles in many different areas and types of forest in the park using the "big pitfall trap model" of Adrian Davis (In the Neotropics, I'm used to working with small pitfall traps and with less than 50 g of bait). I also had the incredible opportunity of putting my own pitfall traps and catching some nice beetles. Working in the field with a living legend of dung beetle research like Adrian Davis was a unique experience. He is like the *Encyclopaedia Britannica* of the dung beetles of South Africa. He knows everything about the taxonomy, biogeography, natural history, and also physiology of every dung beetle species.

South Africa is an amazing country for studying dung beetles, you can find them everywhere. The many different landscapes, ecosystems, and climates make this country one of the most diverse places on Earth for this animal group. Even as

part of a dung removal worldwide project that I was doing in South Africa, I had the chance to perform a collection in some grasslands near Pretoria where I found 48 species of dung beetles. Something like this would be impossible to beat in other places of the world, especially in comparison to the grasslands of the Neotropical region.

It is important to acknowledge the crucial role that the Scarab Research Group led by Clarke Scholtz (with Adrian, Christian, Werner, and Catherine Sole) plays in terms of dung beetle research in this part of the world. They have an enormous responsibility in training a new generation of researchers (like Gimo, Jessica, Gustav, Alex and Ishtiag) interested in dung beetle ecology, distribution, taxonomy, and conservation that is decisive for the future of our knowledge of dung beetles in Africa.

Finally, I also had the opportunity to travel and collect dung beetles in other regions of South Africa, and in other Natural Reserves in additional African countries like: Zimbabwe (Hwange National Park), Tanzania (Udzungwa Mountains National Park), Kenya (Maasai Mara National Park), and Ethiopia (Kafta Sheraro National Park), discovering amazing places, people, and more beautiful dung beetles.

Figure 9: Collecting pitfall traps used by Adrian Davis with 500g of fresh cow dung in sand forests.

Figure: 10. The whole dung beetle team (Adrian Davis, Gimo Daniel, the author, our ranger, and Christian Deschodt) in the Mkuze Reserve with our exclusive "ranger" in case of any close encounter with one of the big five.

Acknowledgements

To professor Clarke H. Scholtz, Adrian Davis, Christian Deschodt, Gimo Mazembe Daniel, Werner Strümpher, Catherine L. Sole, Carmen Jacobs, Jessica Badenhorst, and Ishtiag H. Abdalla for their valuable support and friendship during my field trip to South Africa. To Christian Deschodt to check a first draft of this note.

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Figure: 11. *Garreta wahlbergi* (Fahraeus, 1857).

Figure: 12. A pair of *Kheper* sp. rolling a ball.

Figure: 13. Very localized *Kheper clericus* (Boheman, 1857) on a road outside the Mkuze reserve.

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Figure 14: "Braai" dinner and some beers with Adrian Davis at Christian Deschodt's house after a successful field trip.

David Marqua October 30, 1930 – January 29, 2017

by Barney Streit

Dave Marqua.

David G. Marqua, 86, entomologist, passed away January 29, 2017 in Tulsa, Oklahoma. David was born October 30, 1930 in Oklahoma City, Oklahoma to parents Harold Gobrecht Marqua and Clephane Wertzberger Marqua. David earned his degree from UCLA as an Entomologist and worked as a Director of the Los Angeles County Parks and Recreation. He was directly responsible for starting up the Nature Center Program. David retired in 1985 but, he never slowed down. He started construction on a house at Ft. Davis Mountain Resort in Ft. Davis, Texas. David also owned his own Cessna airplane and would travel all over the west coast. Always a favorite destination, he would often fly over Catalina Island. In his retirement, David collected insects from all over the world but mostly Latin America. He donated his world class collection to Texas A&M University which included many undiscovered beetles.

It was Dave who urged me to give my first, and, as it turned out, only, collecting report at a meeting of the Lorquin Entomological Society at the Los Angeles County Museum. It was about collecting the rain beetle *Pleocoma australis* in the San Jacinto Mountains of Southern California. This led to my meeting Frank Hovore, who introduced himself, became my friend, and eventually took me on my first collecting trip to the tropics: Panama. Frank later named a new species of rain beetle after Dave: *Pleocoma marquai*. The area Dave discovered, the Glennville-Posey area, is amazing for having three species of *Pleocoma* that emerge one after the other.

Dave printed a flyer depicting rain beetles, posted it on bulletin boards and handed it out to residents of California's Greenhorn Mountains. After getting several responses, Dave began collecting in the area. After *P. marquai* was discovered, two more new species were found: *P. hirticollis reflexa* and *P. rubiginosa*. All were described by Frank.