



Raising Stag Beetles in the Classroom

Odontolabis dalmanni *intermedia*

By Phil Kahler

Introduction

As a science teacher I am always searching for unique creatures to keep in my classroom to capture the attention and imagination of my students. So about six years ago when my students and I received a pair of stag beetles (*Odontolabis dalmanni intermedia*) in a

P.K.

trade, we were very excited. This large Asian species is a beautiful glossy jet black, with the males sporting impressively large mandibles. They make great classroom pets and have provided my students with fun learning opportunities. We have been successful in getting them to breed in the classroom and are now on our third generation. The information that follows describes what we have learned about raising these amazing creatures.

General Housing & Feeding

Our adult stag beetles are kept in large plastic critter keepers and ten gallon aquariums with screened covers. One adult male is housed with one to three females in each enclosure. The adults will accept a variety of ripe and overripe fruits including banana, cantaloupe, pear, mango, and peach. They also like pure maple syrup. Banana seems to be their preferred fruit, but I like to keep trying different things to ensure they are getting proper nutrition. The temperature in my classroom is fairly constant at 70° F, but can range between 65° F to 90° F during seasonal extremes. The substrate fills the bottom of each enclosure from 1/2 to 2/3 full (5-7" deep) and is kept moist.

Preparing the Substrate

The substrate consists of store-bought garden compost (the kind without pumice, perlite, or fertilizers) and a mixture of hardwoods in various stages of decay. Both large (barely fitting the length of the enclosure) and small pieces of wood are buried throughout the substrate. The hardwoods that I use include oak, birch, and alder. Alder is readily available in the natural area behind my school, so it makes up about 90% of the wood. I select wood that is decaying to the point that it can be pulled apart from the log with some effort. Pieces that are somewhat hard to those that easily crumble in my hands are all included.

To prevent introducing any potential problems I sterilize all the hardwood material. Baking moist decaying hardwood in the oven can be a messy job and does take a few hours depending on the volume of wood being sterilized. I carefully select times in the schedule



when no one will be near the school kitchen to prevent surprising any of the kitchen staff. Chunks of moist wood are placed in deep metal pans and put in the oven turned up to 450° F. If the wood is a bit on the dry side I pour some water over it before placing it in the oven. After about an hour I begin checking the temperature of the wood with a soil thermometer. With the amount of wood I usually cook at one time it takes two to three hours to get up to temperature. Once the wood has reached sterilization temperature (180° F) I dump it into a large plastic bin, cover it with the lid, and let it cool over night. The garden compost soil is mixed into the plastic bin with the wood and I pour in some water from time to time to keep things moist. I can now pull substrate material out of the bin as needed.



Females are much smaller than major males. P.K.

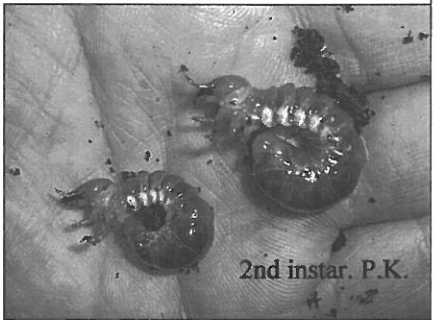
Larval Care

A month or two after the last adult has died I start to find small grubs. When the grubs are about the size of a nickel I sort them out into their own containers to prevent any possible cannibalism problems. They have an orange head with a large white bulbous rear end that is characteristic of *Odontolabis* species. Careful handling of small grubs provides opportunity to examine their growth and move them. Generally I try to keep handling

these soft bodied youngsters to a minimum but

occasionally the mid to large sized grubs will defecate in my hand signaling to me that I may have been too rough. As they get larger they get more defensive when you try to pick them up, tracking your movement and trying to position their now larger wood crunching mandibles where they can pinch your hand.

Individual plastic containers are prepared by melting a dozen or so air holes in the lid with a solder iron and then filling the container with moist substrate material. I use the largest plastic containers that will fit on the shelves in my classroom. Clear containers are preferred because they provide opportunities to inspect larval progress without taking off the lid and disturbing the contents. Larger containers keep moist longer, require less frequent addition



2nd instar. P.K.



3rd instar P.K.



of decaying wood, and promote the development of larger beetles. It is important to note that all of my biggest “major” males with long mandibles have come from grubs that were raised alone in 10 gallon tanks with access to large chunks of wood. Males raised in individual plastic containers tend to be smaller and have shorter mandibles. I have not noticed a size difference between females raised in the 10 gallon tank and those raised in smaller plastic containers.

The grubs take 14-15 months to mature. As they get larger they eat through an increasing volume of wood and need to be checked on weekly to make sure they are getting enough. There is increased tunneling activity and matting down of the substrate that begins to take on a peat-like consistency. Eventually the wood stops disappearing when the grub forms its pupal cell. During this time I continue to spray in some water to keep things from drying out. It will remain in the pupa state for three to five months. Adult females usually emerge from their pupal cells first, followed by the males a month or two later in late spring to summer.



Major male, R. Dryer

Adult Care

A few days to a week after the adult beetle emerges I begin offering small slices of banana. During regular checks I take out any rotting uneaten banana and replace it with a fresh ripe slice. After the males begin to emerge they are paired with the older females and placed into larger breeding enclosures. I avoid placing a younger female with an older male, especially when using a breeding enclosure that is smaller than a 10 gallon tank. If the younger female is not yet ready to mate the male may be rough on her, so it is important that she has room to get away and hide.

Handling adult beetles can be challenging. Some males can be rather skillful in keeping their large mandibles between themselves and your hand. The smaller mandibles of females are less intimidating but still require respect considering how effective they are at chewing through wood as they prepare places to lay eggs. We have had females do considerable damage to the air holes of plastic lids as they have tried to chew their way out of their containers. If this behavior is allowed to continue the female’s mandibles will begin to show signs of wear. My students and I have never been pinched, but then again we haven’t had any volunteers in class. The adult beetles have a rather strong grip with their legs that can be very difficult to release once it has a hold on



Minor male, R. Dryer



your finger. Our preferred method of handling an adult is to let it climb onto a piece of wood that is held in the hand. Both the beetle and student feel safer hanging onto the wood, allowing for close observation and photography.

Once adult females are ready to lay eggs they spend less time above ground, disappearing for days and coming out only to eat. Underground they chew places into the wood where they lay their eggs. Eventually they disappear because they have died under the

Book Review

Title: Scorpions of the World

Published: 2010 By Nap Editions

Author: Eric Xthier & Rolan Stockman

After hearing this book was being published I anxiously awaited seeing a copy. I had been using the Scorpio Fauna site as an aid for photographs and information for some time. The thought of it being compiled into a book filled with additional information was something I couldn't wait for.

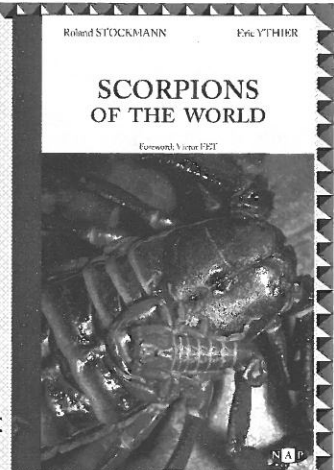
The book is 565 pages with 240 pages detailing 712 different scorpions and includes nice color photograph, descriptions, venom ratings, and habitat and distribution for each. The species list is split into seven sections by continent, making it a very useful book in the field as well. There are sections on biotopes and biology, both containing color images throughout.

Last, but not least, is an eleven page section of electron micrographs.

When I first opened the box containing the copy, I was surprised by its compact size. I immediately flipped to the picture section, knowing it would be filled with many new species I would love to add to my wish list. The first thing I noticed was they were not only listed alphabetically, but were separated by continents. Each species photograph was followed by detailed information often including physical characteristics that may be used to differentiate a species from others in the genus.

After spending quite some time just skimming the huge species section I figured I would take in the rest of the book. Immediately I noticed the color plates on the biotopes citing species collected in the area the photos were taken. I expected the reading to be slow and hard to follow like most of the other "notorious" scorpion books, well, I was half right. The science is there, with chapters containing everything from biology and ecology to envenomation and rearing, but surprisingly it was all very easy to comprehend and take in. It is filled with concise diagrams and very useful insights. The taxonomy section was enlightening and full of information that I am sure I have read before, only this time I understood.

After reading I can honestly say that if you have ever considered owning a scorpion, you should own this book. It is valuable to everyone from the first time owner to the professional. Not only is this the wish list book of spectacular photos, it is definitely the scorpion "Bible" of our time and no invert library should be without a copy. **Scorpions of the World** is a "homerun" of a book I could not recommend more highly.





soil. I have never successfully located the ova as I have taken a rather cautious non-invasive approach to this part of the rearing process, fearing that I might damage the fragile eggs. The female's remains are found months later as I carefully sift through the soil looking for grubs. Males usually die on the surface where I can find them. I've not really kept records, but it seems the adults live five to six months. By the end of November my females are usually gone. The males usually hang on as the lone sentinels through December. The circle of life is complete when the next generation of larvae appear.

Coloration, Subspecies, and Captive Hybridization of *Scolopendra heros* Girard 1853 Part I

By Orin McMonigle and David T. Anderson

Scolopendra heros is the largest North American centipede with three separate and spectacular color phases. Historically (specific dates below) the three have been considered subspecies though the geographic ranges are not well-known. These variants or races were referred to by Shelley 2002 as "color pattern traditionally assigned to the variant named..." which seems a roundabout way of recognizing the uniqueness in an attempt to avoid it. The stark contrast in forms without any seeming intermediate forms has brought some question that they might even prove to be different species were DNA analysis ever performed. This article provides information on subspecific color variation and ranges in the United States. The second part includes captive interbreeding results and coloration, conclusion, and resources.

Subspecies

Scolopendra heros arizonensis, Kraepelin 1903

Consistent coloration: last three tergites (dorsal body segments) black, bright orange terminals and antennae, head dark, legs whitish tan.

Common variations: two primary variations, unbanded or normal (figure 1) and banded (figure 3). 1st tergite is usually black on unbanded specimens, tan on banded. Body coloration ranges from tan to reddish orange, reddish orange coloration usually only on small, young specimens.

Range: Arizona except for northwestern and extreme western regions, southwestern "boot heel" of New Mexico (Animas and Peloncillo Mountains in Hidalgo County).

Scolopendra heros castaneiceps, Wood 1861

Consistent coloration: Orange head and first two tergites, dark body, light orange legs though the terminal pair is the color of the body and transitions to orange at the apex (tip).

Common variations: orange can vary from light orange to reddish orange. Adults are greenish to brownish black (figure 4). The bodies of some older specimens fade to greenish brown. Of many hundreds of 2nd instar specimens seen in captivity, the main body starts out bluish black (figure 5).

Range: northeastern New Mexico, all of Texas except the southwest (see map fig. 9), east through western Arkansas and Louisiana, north to Kansas, and southwestern Missouri.

Colorado is commonly listed and the southeastern tip follows the likely range but there aren't

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Cover photos: Fig. 1 *Scolopendra heros arizonensis*. Fig. 2 *S. h. heros* banded. Fig. 3 *S. h. arizonensis* banded. Fig. 4 *S. h. castaneiceps*. All photos by OM. (Figures 5-8 see back cover.)

Contributing editor this issue: Peter Clausen.

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Editor's Notes

This issue Al Milano introduces us to insect sound recordings used in identification with a strong bent towards the inaudible. I wrap up the 'secrets' of cracking the polydesmid code in the second installment. Phil Kahler teaches a successful methodology for rearing one of the largest of all stag beetles. Biology and subspecies ranges of *Scolopendra heros* are discussed by D. T. Anderson and myself in this first of two parts. Andy Daugherty reviews a monster-sized book on scorpions. Feeder Beetles 2, the Featured Invertebrate and the Allpet Roaches' roach are also included.

Although photographs and permission were acquired to translate and publish a German article on *Pandinus* scorpions this issue, the translation fell through. Although I translated the gigantic article on *Idolomantis diabolica* a number of issues ago I know not a single word of German and the time required would be too great for the timing of this issue. In its place, D. T. Anderson and I assembled the piece on *Scolopendra heros* we've been gathering information on for years but hadn't planned to even start on till later this year.

Times are tough, I know, so please don't let your membership expire. We need a minimum number of members to keep I-M afloat.

Sincerely,

Orin McMonigle