

Department of Biological Sciences East Tennessee State University

Departmental Newsletter

January 2015

Note from the Chair

The 2014 fall semester was another busy one for the department. In addition to our normal teaching, research, and service, we collectively worked on a "self-study" document in preparation for an external program review that will take place in March of 2015. This document summarizes our activities over the last seven years and highlights major achievements, challenges, and plans for the future. As a relative newcomer to ETSU, I was impressed by the level of productivity my colleagues have maintained and am proud that Biological Sciences consistently ranks high in the College with respect to research funds generated and papers published.

Congratulations are in order for the undergraduate and graduate students who had their degrees in biology conferred during the 2014 Fall commencement- we wish you all the best in your future endeavors!

Finally, Dr. Foster Levy recently announced that he would be retiring after 25 years as a faculty member in Biological Sciences. Dr. Levy has had a distinguished career at ETSU and in recent years has held a split position as a full professor in Biological Sciences and Director of Undergraduate Research & Creative Activities for the Honors College. Dr. Levy was quickly granted Emeritus status in the department and plans to remain research active. We wish him all the best in his retirement but are also pleased he will have a continued presence in Brown Hall.

Wishing all the very best for 2015!

*Joe Bidwell
Chair of BISC*



Photo: ETSU Photographic Services

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Photo: ETSU Photo Lab

Note from the Chair of the Research Development Committee

It is a real pleasure for me to contribute to the Department of Biological Sciences newsletter from my post as Chair of the Research Development Committee (RDC). I am currently a Professor in the Gatton College of Pharmacy, but my first faculty position was in the Dept. of Cell & Molecular Biology at Tulane University, so I feel a great familiarity for the projects and members of the department. I have been fortunately enough to serve on student committees at a variety of levels and always look forward to losing my way among the rooms in Brown Hall trying to find committee meetings.

First and foremost, I would like to acknowledge the major contribution made to the RDC by the editor of this publication, Dr. Istvan "Steve" Karsai. Serving as Co-Chair for the RDC Major Grants program, Steve led the way in the implementation of the electronic grant submission system that the RDC is now using for all three of grant programs. Designing and posting all of these templates was no small task, and has provided the university with a state of the art system for both submissions and record-keeping. Therefore, many thanks to Steve for his substantial and continuing efforts.

Next, I would like to thank all of the members of the Department of Biological Sciences for their efforts in contributing to the RDC. These have come in the form of Small, Major and Interdisciplinary applications, both successful and not so much. In the recent past, RDC awards have been to faculty members in the department including Fred Alsop, Joe Bidwell, Karl Joplin, Steve Karsai, Aruna Kilaru, Dharendra Kumar, Tim McDowell, Celia McIntosh, Hugh Miller and Lev Yampolsky.

Many of these awards resulted in exactly what the RDC intends: the funds were used for collecting the data that fueled successful external grant applications. At this time of reduced funding paylines, the Department of Biological Sciences faculty have been excellent stewards of these funds. A recent survey of Major Awardees for a five year period showed that the return on investment for RDC funds was \$24 for every \$1 awarded. In other words, for every \$10,000 Major Grant, nearly \$240,000 came back to the university in external grant awards and indirect costs. This is an outstanding figure, is derived in large part from the efforts of Biological Sciences faculty, and shows that despite the lean times, there is great success to be gained from modest internal support.

Finally, I would like to close by saying that the RDC will work even more actively to develop the culture of research at ETSU in the next year. With the data shown above, I will be using the proper channels to seek further increased funding for RDC awards. Additionally, with the recent completion of the report of the Strategic Research Committee (SRC) that has been sent to President Noland, there is further momentum behind the need for increasing infrastructure for research and scholarship programs. I encourage you to read the report (ask Dr. Kilaru for a copy; she was on the SRC), and then send any addenda and implementations that you think would be important to me at hurleyd@etsu.edu. I will be sure that both the RDC and the SRC work to incorporate these in a brighter future for the university and for your department.

David Hurley



Confessions of a first-year faculty member

The I've spent the last few days reflecting on my experience this past semester, my first, at ETSU. Of the many things I have learned over the past few months none stands out more than trying to understand our students. As a whole, nearly half of the student body are the first of their families to seek a college education, more than a third come from families living below the poverty level, many are considered non-traditional students, and we provide several hundred veterans with higher education opportunities each year. Before coming to ETSU, I spent the majority of my time working with "traditional" true college freshmen on large flagship university campuses. It has been a demanding semester trying to wrap my head around how to best influence and push my students to bring out the best in them, but one thing has become abundantly clear: Our students are no strangers to struggle and sacrifice.

I'd like to share a story about one of my students from this past semester that I feel represents our every-student: She is a military wife, mother of two, works a part-time retail job, and is taking a few courses at a time to fulfill pre-requisites for a health-related graduate program—oh and because of her husband's career and frequent moving she's taken classes at four different colleges in the last three years. She visited my office for the first time just after her first exam and was feeling rather hopeless. After a few minutes we discussed new strategies and just a few weeks later, after the second exam, she came back by my office with excitement: "You're such a great teacher! I did so much better and all I did differently was come to the review session!" I quickly responded with a smile.

"I haven't really changed anything about my teaching methods since the first exam and I'm not the one who got the good grade. You're the one who did all the heavy lifting and I'm sure you did a little more than just show up to a review session to get that grade."

She gave me a bemused look and then a large smile. It was a complete transformation from the hopeless young woman who had visited my office just a few weeks earlier to now one beaming with confidence. Her grades, and self-confidence, continued to grow over the course of the semester and she became much more proactive about asking questions in class, via email, or over the phone. Just a few days after the final exam she would be moving once again with her family to a new location and on to another string of courses.

I've spent much of my time this semester thinking about this student and the many others just like her. I wonder how many more of our students are blind to the role they play in their own success. As faculty, we may tend to see the other side of this coin more frequently; students who are unable and unwilling to accept responsibility for failures in their education. From this experience, I know that I now need to spend less time concerned about how many lectures I spend on the respiratory system and more time concerned with how our students perceive their role in their education. In closing this semester has been both challenging and rewarding while working with our students. I am excited for what the future holds for our students and I am looking forward to seeing the long-term success of our biology majors and getting to see first-hand the progress they make from freshman year to graduation.

Anna Hiatt



Photo: ETSU Photo Lab

Coastal Biology Field Trip

Professor Fred Alsop and his wife Jo Ann, in the company of Biological Sciences Departmental Chairman, Joe Bidwell, took 8 senior biology students enrolled in the Coastal Biology Field Trip class on their annual trip to the Outer Banks of North Carolina. The 6 day trip, October 9-14, is an extended field trip exploring the flora, fauna, ecology and dynamics of the National Seashore and surrounding environs that has been the highlight of this fall semester class that has introduced hundreds of biology students to this complex ecosystem annually since the class was instituted in 1980.

The class's lecture component is similar to that of many other biology courses meeting throughout the semester, but its focus is on the dynamics of barrier island formation and the ecological succession that builds from the sand deposits on the beach through the progression of events that eventually lead to the climax community of a maritime forest. Students learn through the lectures what geological elements build barrier islands such as the Atlantic coastal Outer Banks. Students will also learn what plants and animals occur there and how to identify them. Our students pay additional fees that partially defray the costs of this field trip with the Department of Biological Sciences paying for their university motor pool transportation.

In mid-October, just preceding the university's fall break, the pedagogy of the class changes dramatically as the class with its professors packs scientific gear and personal items, along with enough rations to sustain the group for almost a week, into university vans and drive the 500 miles to the Atlantic Coast of North Carolina. The group is headquartered at Avon with easy access along historic highway 12 to the wildlife refuges of Pea Island to the north and Ocracoke Island to the southeast. The class resides in beach houses just behind the barrier dunes within sight of the ocean but little time is spent on the beach as this is a field biology class, not a beach vacation. The class begins with an early breakfast at the beach house and then we hit the field with a packed lunch. Daily activities include a trip to Ocracoke Island via a NC DOT ferry boat, beach combing for shells, mermaid purses, shore birds and other biological finds, exploration of primary dunes and their indicator vegetation of beach grass and sea oats, and seining tidal pools for marine fishes and invertebrates. All species are identified and some of their ecology is discussed with the students. We are constantly on the lookout for birds and associating them with particular habitats and life styles. Approximately 100 species of land and seabirds will be tallied on the trip



Additional outings will include the exploration of a maritime forest, back dune areas, seining activities in the sounds and visiting historic sites such as the lighthouses. The students engage in a field study of predator prey relationships using two species of shorebirds as the predators and coquina clams and mole crabs as the prey species. The class makes observations of the foraging of the predators at the same beach location during high tides and low tides for behavioral comparisons. The collected data will be taken back to the classroom at ETSU and will be the basis for the students to analyze and build a report around that they will later present in class.

Perhaps the highlight of the 6-day trip is a day at sea on the 55 foot headboat Stormy Petrel II berthed at Hatteras Village. The boat provides an all-day adventure sailing out 35-45 miles to the blue warm waters of the Gulf Stream in search of pelagic species of seabirds such as petrels, shearwaters, jaegers and others. The class also collects samples of the algae mats of Sargasso to observe the associated vertebrates and invertebrates that comprise this floating marine community. For many students this will be their first trip at sea and for some it will be an exciting biological experience; for others who succumb to the malady of seasickness it may be one of the longest days of their life until their feet are firmly planted once more on terra firma.

The class will complete the semester with reviews of their experience, exams and their presentation of the data they collected in their predator/prey experiment.

Having the opportunity to take students to the seashore hundreds of miles from the university and to practice biology in such an historic place as the Outer Banks of North Carolina with its many lighthouses, barrier dunes, and the site where the Wright brothers first gave wings to man is a most rewarding experience for me as a professor and for the students in this unique biology class. These students will never visit a beach community again and see it in the same way they did prior to the class.

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Photo report of Kevin Brooks graduate student on the Coastal Trip



Professor Emerita

Dr. Diane Nelson, who joined the ETSU faculty in 1968, is retired from teaching but remains engaged in department activities and in research on tardigrades and behaviors of marine fishes. An avid scuba diver, she and her husband Jack continue to dive in the tropical Pacific and Caribbean, leading dive trips on underwater marine adventures and photographing marine life. They will celebrate their 50th wedding anniversary underwater in Indonesia in June 2016! Dr. Eugenie Clark, National Geographic's "Shark Lady" and Senior Scientist at Mote Marine Lab, and Dr. Nelson are publishing an article entitled "Nesting sites and behavior of the deep water triggerfish *Canthidermis maculata* (Balistidae) in the Solomon Islands and Thailand" in the upcoming issue (January 2015) of *aqua*, the International Journal of Ichthyology. Dr. Clark was 92 in May 2014 and will be retiring in the next year due to advanced lung cancer.

In June Dr. Nelson will be attending the 13th International Symposium on Tardigrada in Modena, Italy. She and the host, Dr. Roberto Bertolani, are the only two people who have attended all of the symposia, first held in 1973. She is a member of the Organizing Committee and the Scientific Committee of the symposium and again will be co-editor of the symposium proceedings. Dr. Nelson's "inside story" of her life with tardigrades will be published in the upcoming 2015 issue of the journal *Southeastern Biologist*.

For the last 12 years, Dr. Nelson has been working with Dr. Paul Bartels and his students at Warren Wilson College, Asheville, NC, publishing numerous journal articles on tardigrades in the Great Smoky Mountains National Park. Her latest chapter on tardigrade ecology and general biology (with Roberto Guidetti and Lorena Rebecchi) in Thorp and Covich's *Freshwater Invertebrates*, Fourth Edition, will be published in early 2015, but the pdf is now available.

In addition to her research, Dr. Nelson enjoys visiting area schools and civic groups and sharing her love of tardigrades and marine life. Her 7' stuffed animal shark ("Sally") complete with internal organs that can be "dissected" is a big hit with students of all ages. These opportunities allow her to continue teaching in an informal setting, interacting with people in the community, and advising young people interested in marine biology. Although she is currently not teaching her Marine Biology course at ETSU, she remains open to the possibility!

"I plan to keep on following my passions in teaching and research as long as I can," says Dr. Nelson. Being "retired" just gives her more flexibility with her time.

Diane Nelson



Photo: Jann Rosen-Queralt

About our graduate students

Phil Klahs

Phil Klahs completed his masters thesis “The Vascular Flora of Steele Creek Park and a Quantitative Study of Vegetation Patterns in Canopy Gaps, Sullivan County, Tennessee” and graduated in December 2014. Phil’s research involved the collection and identification of 1,120 plant specimens, which included 547 species belonging to 322 genera and 101 families. Two hundred and sixteen taxa were newly reported for Sullivan County. Phil’s collections, which he labeled and mounted, are deposited in the Department of Biological Science’s John C. Warden Herbarium. Phil worked closely with the “Friends of Steele Creek Park” group, and presented his research at the Park in November 2014. Mr. Larry McDaniel, Park Naturalist, provided the following comments on Phil’s presentation and research:

“Phil,

Your presentation to the Friends of Steele Creek Park was awesome. They were very impressed with the work you did and the presentation you gave. I am extremely grateful for your accomplishments and so glad that Dr. McDowell arranged the project. ... There is much need for research on the flora and fauna of the park. Your project should serve as an example and model of how it can be done.

Thanks, Larry McDaniel “

Phil’s committee included Dr. Foster Levy, Dr. Tom Laughlin, James Donaldson, and Dr. Tim McDowell (chair).

Tim McDowell



Photo: Mary Clark

Joseph Kusi



Photo: Joseph Kusi

Joseph Kusi with his beloved Oak trees. I miss his quiet dedication and his exemplary work ethic. He did an excellent job as a master student here at BISC and now he continues his postgraduate studies at the Department of Environmental Health of the College of Public Health. <http://www.etsu.edu/cph/academics/graduate/DrPHBios.aspx>

I confident that he will excel there and I wish happy and fruitful PhD years for him. And of course, we are still working together on the oak tree project.

Istvan Karsai

Phil Klahs presented his MS thesis research to the Friends of Steele Creek Park Board of Directors and the public at the Steele Creek Park Lodge on Nov. 17, 2014.”



Reports from the labs

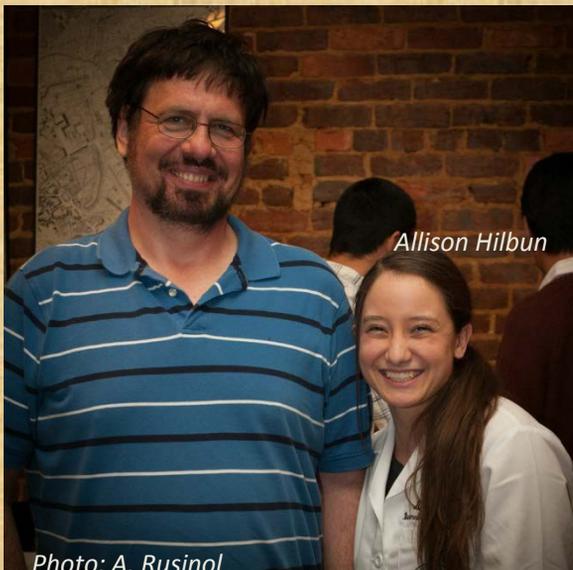
Karsai's Lab

This fall semester was very exciting for us in lot of ways. First of all I received many good news from my students. **Xiaohui Guo** visited us from Arizona State University for his graduation. Congratulations!



Photo: X. Guo

Allison Hilbun received a Sigma Zi grant entitled Balance Data as a Diagnostic Tool. She also obtained IRB protocol for our next step of research and we are ready to move into the physicians office to continue our research on patients.



Allison Hilbun

Photo: A. Rusinol

Thomas Schmickl, our ex-Basler chair and I published a long paper on the regulation via common stomach idea on ants: *Sting, Carry and Stock: How Corpse Availability Can Regulate De-Centralized Task Allocation in a Ponerine Ant Colony* illustrated by **Phil Klahs** in PlosOne <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0114611>

I have been invited to serve as one of the Board of directors for the *Institute for Computation and Data Science*, and the member of the *Center for Inflammation, Infectious Disease and Immunity*. Both the Institute and the Center aim to increase interdisciplinary research on campus.

I was also invited to give two talks at The Seventh International Symposium on Biomathematics and Ecology: Education and Research-2014, shortly BEER 2014: <https://about.illinoisstate.edu/biomath/beer/Pages/default.aspx>

The conference was very interesting, because its main theme was Math-Biology education and it also had a special symposium on modeling insect societies. However the high point of the conference was meeting with **Mr. Guo** (my ex-MS student) and his two advisors, Professors **Jennifer Fewell** and **Yun Kang** from Arizona State University. **Mr. Guo** continues his postgraduate studies in one of the best lab on social insects. Congratulations!

<http://fewell.lab.asu.edu/people/>

Istvan Karsai



Photo: Istvan Karsai

Reports from the labs

Kilaru's Lab

Grants Funded:

- Mohseni K# and Kilaru A (2014) Characterization of fatty acid composition in *Physcomitrella patens*. Student-Faculty Collaborative Research Grant, Honors College, ETSU (\$1,000; #Undergraduate Student)
- Campbell A# and Kilaru A (2014) Functional analysis of diacylglycerol acyltransferase gene from avocado. Student-Faculty Collaborative Research Grant, Honors College, ETSU (\$1,000; #Undergraduate Student)

Conferences:

- Kilaru A, Sante R*, and Welti R (2014) Discovery of a mammalian endocannabinoid ligand and its metabolites in early land plants. Oral Presentation. Phytochemical Society of North America Annual Meeting, Raleigh, NC, 9-13 August, 2014 (Speaker; * Graduate Student, #Undergraduate Student)
- Swati S*, Sante R*, and Kilaru A (2014) Characterization of arachidonylethanolamide metabolic pathway in moss. Poster Presentation. Phytochemical Society of North America Annual Meeting, Raleigh, NC, 9-13 August, 2014 (Poster; * Graduate Student, #Undergraduate Student)

Dr. Aruna Kilaru with her students

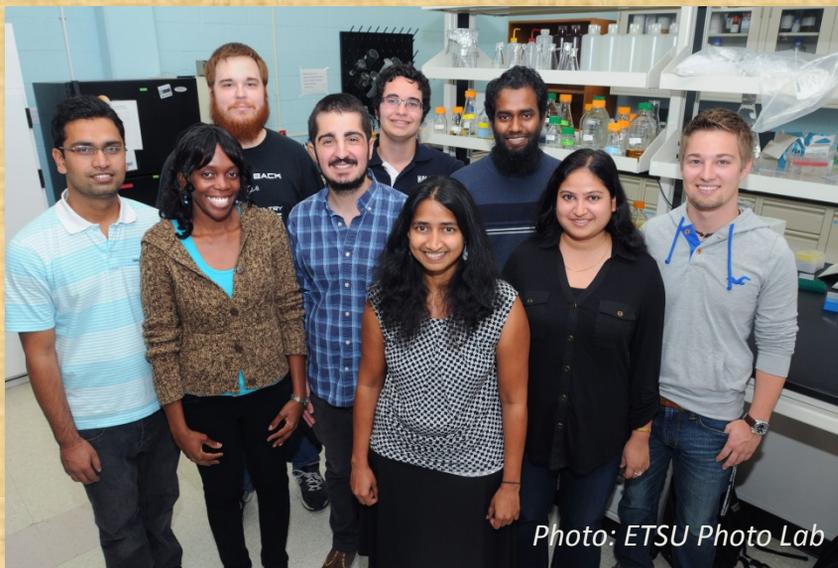


Photo: ETSU Photo Lab

Dr. Aruna Kilaru carried the College of Arts and Sciences banner at the 2014 New Student Convocation



Photo: ETSU Photo Lab

Illustration of Phil Klahs has been published!

Istvan Karsai and Thomas Schmickl are grateful for Phil Klahs illustrating their paper entitled. *Sting, Carry and Stock: How Corpse Availability Can Regulate De-Centralized Task Allocation in a Ponerine Ant Colony* published in PlosOne <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0114611>
The illustration served as Figure 1 and the Striking Image of the scientific article that provides a new explanation on regulation of hunting behavior of *Ectatomma ruidum*.

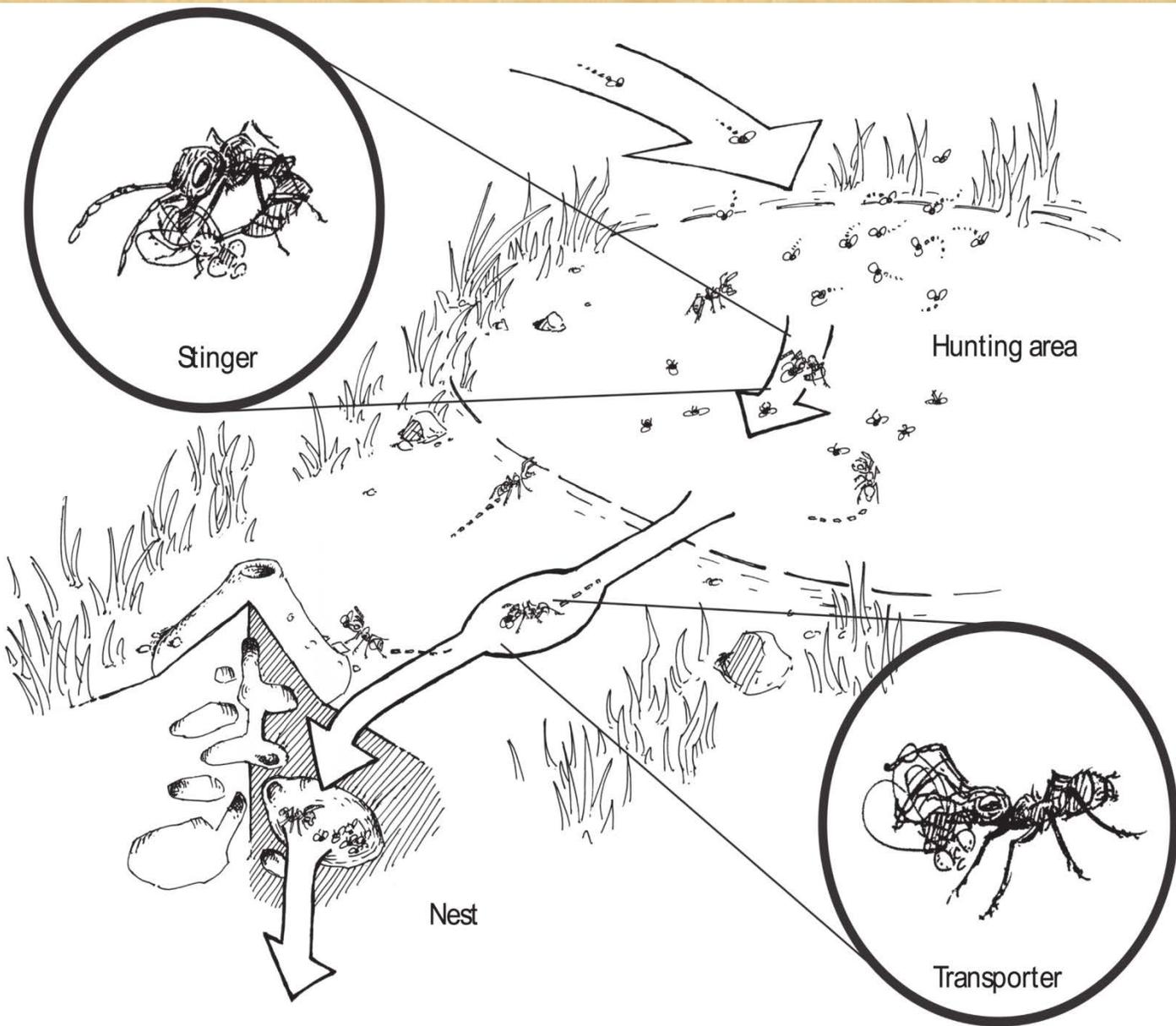


FIGURE 1: Artistic representation of the collective foraging system established by a colony of *Ectatomma ruidum*.
doi:10.1371/journal.pone.0114611.g001