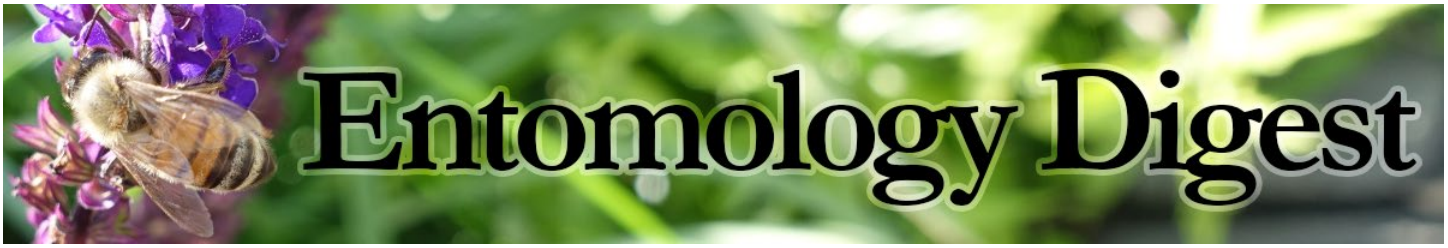


Entomology Digest – Spring 2022

Letter from the Chair

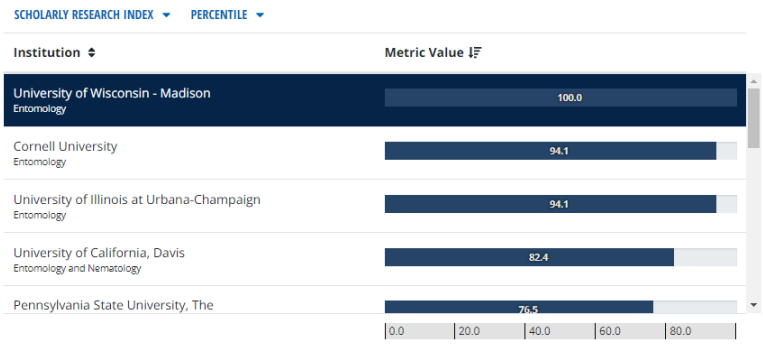
Entomology Community and Friends of the Department, "*A return to normal?*"

We are fortunate to be in the process of recruiting two new faculty to the Department this Spring, 2022. The first of these is our Vector Biologist/Ecologist position (https://jobs.hr.wisc.edu/en-us/job/509678/assistant-or-associate-professor-vector-biology-or-ecology) advertised in the Fall, 2021. A core strength of the Department is in public and global health entomology. Since 2020, we are home to the new Global Health undergraduate major and certificate, as well as the Midwest Center of Excellence for Vector-Borne Disease (MCE-VBD). The MCE is our regional hub for training and research related to vector-borne diseases of humans, and we seek to further develop these strengths with this new faculty position in vector biology and disease ecology. This new faculty person will serve in a leadership role in the Global Health major, and with the desire to participate in, and contribute to, the research and outreach mission of the Midwest Center of Excellence.

Our next position, reauthorized for release in Fall 2021 and opened in October is our new Precision Pest Ecologist & Field Crops Entomology position (https://jobs.hr.wisc.edu/en-us/job/510660/precision-pest-ecologist-field-crops-entomologist). Another core direction of the Department centers on agroecosystems ecology and applied pest management. We seek to further develop this strength by appointing a new faculty member whose program can emphasize novel approaches to integrated insect pest management through the use of predictive approaches to sustainable pest management. The data science revolution in agriculture will enable us to integrate agronomic management, climate, and pest and beneficial insect biology to develop forward-thinking pest management strategies. We expect this new laboratory will depend heavily on data-driven techniques and approaches that integrate field, climate/weather and landscape data toward the development of proactive, precision pest management.

The Global Health undergraduate program (https://guide.wisc.edu/undergraduate/agricultural-life-sciences/entomology/global-health-bs/) continues to grow in popularity and enrollment. Beginning this Spring (2022), enrollments have grown rapidly in one academic year and Global Health posted the 4th largest number of undergraduates declaring Student Orientation, Advising, and Registration (SOAR) program in CALS. Students in the major study human health and well-being through population-level and planetary health perspectives. The major provides students with a foundation in disease biology and epidemiology, food systems, environmental health, and public health and policy. Global health is about improving health equitably for all people worldwide.

Entomology continued its #1 national ranking (2020-2021) for the discipline according to Academic Analytics (https://academicanalytics.com/), Scholarly Research Index, and ranked among 42 peer institutions. Faculty in the Department remain strong participants in the CALS strategic planning priorities, and are adept at integrating across these themes wherever arthropods play critical roles. We have experienced steady to modestly increasing enrollment in graduate research assistants



Academic Analytics. sourced 13 February, 2022.

(Spr 22, https://entomology.wisc.edu/people/graduate-students/), with 33 graduate research assistants (21 PhD, 12 MS), 7 of whom are administered in other academic programs and Departments. Undergraduate enrollment in Entomology continues to be stable over 2021 with 19 students currently enrolled.

As we progress through the pandemic, our academic and instructional lives continue largely as in-person formats. This Spring 2022, our coursework in the UW CALS is approximately 85% in-person and larger enrollment courses (e.g. > 250) continue to offer blended formats with a mix of in-person and online materials. - *Russ Groves*

Colloquium

Upcoming Friday colloquia and a Zoom link to join virtually can be found on the Departmental website here: https://entomology.wisc.edu/department-news/seminars/. Recordings of past seminars are available to members of the Department on the Google Shared Drive. If you need access to the shared drive contact Ben Bradford (bbradford@wisc.edu).

Entomology Graduate Student Association

The Entomology Graduate Student Association is the group that represents graduate students in the Entomology Department, including those in other programs with advisors in Entomology. Since December, the President of the Undergraduate Entomology Club has been attending our meetings to extend communication to the undergraduates. During our monthly meetings, we discuss issues relevant to students in our department, hear updates from our representatives on all the department committees, and plan events. Our meetings are open to the whole Entomology community, as are many of our events. **Our spring semester meetings will be Wednesdays February 23rd, March 16th, April 20th, May 18th at 12-1pm in Russell Labs 216 or on Zoom.** Please join us if you're interested in staying updated on the Entomology Department committee happenings, our event planning, and more!

We have been busy this semester organizing events and building community and support among students. We have held a couple of in person events and will continue to look for ways to bring our community together throughout the spring. If you're a grad student, check out our new EGSA Outlook Calendar to stay updated on all our events (you should have already been invited)!

In December, **PJ Liesch** led a workshop on the topic of talking to the media. As usual, Hanna forgot to record the workshop, but you can see PJ's very informative slides here. Matt also hosted a department-wide Game Night in December. In February, **Jade Kochanski** hosted Bug Valentine making. It was so fun to take a break from our work to craft together, catch up in person, and connect over entomological valentine puns! We're looking forward to more ento-crafting together soon. A few more events for spring are in the works, so stay tuned!

EGSA is excited to introduce you to a new mentoring program for our department called **Bug Buddies!** We heard a lot of feedback from students about the need for more formalized mentoring, so the EGSA President and Student Services Coordinator will work together to pair larvae (undergraduates or first year-graduates) and pupae (older graduate students or post-docs). Nobody's an adult yet because we always have a lot more growing and developing to do! Larvae and pupae will be paired by shared entomological interests and shared identities (when possible). The goal of Bug Buddies is to provide mentoring, community, and belonging within the Entomology Department. Anyone who is an undergraduate, graduate student, or post-doc in Entomology or other labs studying insects can join. **Fill out this form by February 21 if you're interested in being paired with a mentee / mentor.**

In February we also launched the new **Entomology Slack**. EGSA has had a Slack channel for a few years, but we've felt that it would also be helpful to have a community-wide Slack channel for matters that aren't suitable for email. Everyone in the community (that includes undergrads!) is welcome and encouraged to join our Slack channel here. If you're new to Slack, it's a platform that allows for communication through "channels" for specific purposes. You can post messages to everyone in the channel and start conversation threads. You can customize your own notification settings, so you can get notified selectively or turn off notifications and check Slack whenever you feel like it. Here's a quick start guide!

What is the purpose of our #general-ento channel? We do not intend this to change how our department communicates by email. If you don't join Slack, you won't miss out on anything critical since email communication will continue as usual. Instead, this is another way to communicate about things we aren't using email for, especially when we're not all in Russell in person, such as:

- Asking questions ("has anyone heard about cool seminars in other departments?", "has anyone taken this class?", "does anyone have a colleague who is an expert on X taxon?", "does anyone have a colleague at X institution, I'm applying for a job there")
- Looking for help with things like statistical analysis, protocols, looking for someone who has used a method you're learning, etc. ("how do I do this in R?", "does anyone know how to do zero-inflated models?")
- Looking for supplies or finding things in Russell Labs ("does anyone have ice packs I can use right now?")
- Sharing cool events, papers, workshops, etc.

We're looking forward to connecting with you all soon via Slack, Zoom, or in person! - *Hanna McIntosh*

Insect Diagnostic Lab update

Whew! What a year 2021 was. I wrapped up the calendar year with just over 2,500 ID requests and June of 2021 stood out with close to 550 cases that month alone. As is typical, there were plenty of "regulars" seen at the lab, but also plenty of surprises—not limited to elusive bot flies, new state records I found while drinking beer in my backyard, and more. If you're on the edge of your seat waiting for more, fret not—I'll be giving a departmental seminar on **Friday, March 25th**.

Also, a quick shout-out to the department about a revival of the Wisconsin Insect Fest (last held in 2019). Recently, an ad hoc group of us met to discuss the possibility of hosting an event this summer at the Kemp Station in northern Wisconsin (pending the COVID situation, of course). Dates have been set for the **weekend of July 29th – 31st, 2022**. You'll be hearing more from myself, Dan Young and others in the future as we plan for the event. - *PJ Liesch*

Lab updates

Crall Lab

We're excited to welcome **Acacia Tang** and **Grace VanDerhei** to the lab! Acacia recently finished their Master's degree in Computational Methods in Ecology and Evolution at Imperial College London, and is joining the lab as a staff researcher. Grace is an undergraduate researcher working with Dr. Olivia Bernauer on the impacts of elevated CO_2 on floral rewards.

The lab has also recently received generous support from the USDA AFRI for using computer vision to study pollinator behavior and health. The project will focus on using automated behavioral tracking and deep learning to better understand the direct impacts of pesticides on bumble bees. The project will investigate how several different neuroactive insecticides interact with secondary stressors like temperature and nutrition to impact colony health and the delivery of pollination services in agroecosystems. More info on the award here.

Finally, **James** and grad student **August Easton-Calabria** are excited to be traveling this week to Chiapas, Mexico, for pilot research on a local bumble bee species (*Bombus epphippiatus*) in collaboration with researchers in the lab of Dr. Rémy Vandame at El Colegio de la Frontera Sur. This pilot research is supported by a CALS Global grant, and you can see James talking a bit more about this project here.

Gratton Lab

A few updates from the Gratton Lab. New manuscript from former MS student **Taylor Tai**:

- Tai TM, Kaldor A, Urbina D, Gratton C. Within-Year Effects of Prescribed Fire on Bumble Bees (Hymenoptera: Apidae) and Floral Resources. Simone-Finstrom M, editor. Journal of Insect Science. 2022;22: 7. doi:10.1093/jisesa/ieab107

Recent student awards:

- **Ben Iuliano**: Dorothy Powelson TA Award winner, which recognizes outstanding performances by TAs in the natural sciences.
- **Jade Kochanksi**: Runner-up best poster at conference. British Ecological Society, Ecology Across Borders Conference.

Notable: **Skye Bruce (Harnsberger)** was interviewed in article in Popular Science on her monarch work: https://www.popsci.com/animals/monarch-butterfly-population-counts/?amp

Paskewitz Lab

New papers from the lab:

- Foster E., Burtis J., Tsao J., Sidge J. Tsao J., Bjork J, Liu G., Neitzel D.F., Lee X., Paskewitz S., Caporale D., Eisen R.J. Inter-annual variation in prevalence of Borrelia burgdorferi sensu stricto and *Anaplasma phagocytophilum* in host-seeking Ixodes scapularis (Acari: Ixodidae) at long-term surveillance sites in the upper midwestern United States: Implications for public health practice. Ticks and Tick-borne Disease. 13: 101886. 2022. https://doi.org/10.1016/j.ttbdis.2021.101886
- Larson R.T., Bron G., Lee X., Siy P., and Paskewitz S.M. *Peromyscus maniculatus*: an overlooked reservoir of tickborne disease in the Midwest (U.S.A.)? Ecosphere. 12 (11): e03831.10.1002. http://doi.org/10.1002/ecs2.3831. 2021.
- Mandli J., Lee X, Bron G. and Paskewitz S.M. Integrated tick management in South Central Wisconsin: Impact of invasive vegetation removal and host-targeted acaricides on the density of questing *Ixodes scapularis* nymphs. Journal of Medical Entomology. 58: 2358-2367. https://doi.org/10.1093/jme/tjab131. 2021.
- Siy P. N., Larson R.T., Zembsch T., Lee X., and Paskewitz S.M. High prevalence of *Borrelia mayonii* (Spirochaetales: Spirochaetaceae) in field-caught *Tamias striatus* (Rodentia: Sciuridae) from Northern Wisconsin. Journal of Medical Entomology. 58: 2504-2507. https://doi.org/10.1093/jme/tjab102. 2021.
- Zembsch T., Bron G., and Paskewitz S.M. Evidence for vertical transmission of *Babesia odocoilei* (Piroplasmida: Babesiidae) in *Ixodes scapularis* (Acari: Ixodidae). Journal of Medical Entomology. 58: 2484-2487. https://doi.org/10.1093/jme/tjab074 2021.
- Zembsch T., Lee X., Bron G., Bartholomay L., and Paskewitz S.M. Co-infection of *Ixodes scapularis* (Acari: Ixodidae) nymphs with *Babesia* spp. (Piroplasmida: Babesiidae) and *Borrelia burgdorferi* (Spirochaetales: Spirochaetaceae) in Wisconsin. Journal of Medical Entomology. 58:1891-1899. https://doi.org/10.1093/jme/tjab056. 2021.
- Larson R., Bron G., Lee X. and Paskewitz S.M. High proportion of unfed larval blacklegged ticks, *Ixodes scapularis* (Acari: Ixodidae) collected from modified nest boxes for mice. Journal of Medical Entomology. 58: 1448-1453. https://doi.org/10.1093/jme/tjaa287 2021.

- Bron G., Fenelon H., and Paskewitz S.M. Assessing recognition of the vector of Lyme disease using resin-embedded specimens in a Lyme endemic area. Journal of Medical Entomology. 58:866-872. https://doi.org/10.1093/jme/tjaa234. 2021.
- Bron G., Lee X. and Paskewitz S.M. Do-it-yourself tick control: granular gamma-cyhalothrin reduces *Ixodes scapularis* (Acari: Ixodidae) nymphs in residential backyards. Journal of Medical Entomology. 58:749-755. https://doi.org/10.1093/jme/tjaa212. 2021.
- Lennart Justen, Gebbiena M. Bron, Duncan Carlsmith, Susan M. Paskewitz, and Lyric C. Bartholomay. Identification of public submitted tick images: a neural network approach. PLoS One. https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0260622 2021.

Schoville Lab

The Schoville lab has a couple new papers out:

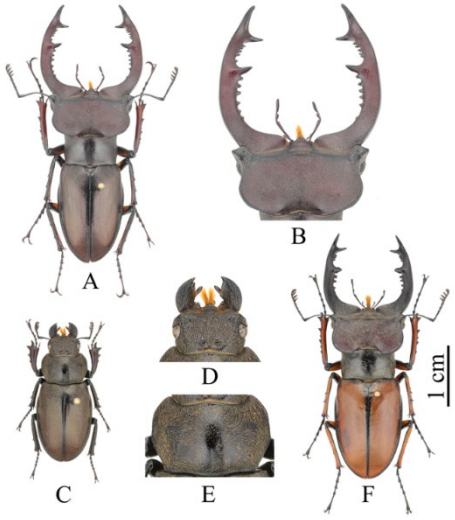
- **Pélissié, B.**, Y.H. Chen, **Z. Cohen**, **M. Crossley**, D. J. Hawthorne, V. Izzo, and **S.D. Schoville**. 2022. Genome resequencing reveals rapid, repeated evolution in the Colorado potato beetle. *Molecular Biology and Evolution* 39(2): msac016 Link to article
- **Schat, J.**, **Y-M. Weng**, R. Y. Dudko, D. H. Kavanaugh, L. Luo, and **S.D. Schoville**. 2022. Evidence for niche conservatism in alpine beetles under a climate-driven species pump model. *Journal of Biogeography* Link to article

Young Lab

Ann Marsh. Ann continues as the (largely virtual) TA for ENT 201 alongside Drs. Schoville and Groves. She has begun to develop her Ph.D. staphylinid research under the joint supervision of Drs. Schoville and Young. Still working largely from home base, Ann has invested in a fantastic home imaging system. Great output, Ann!

Jacki Whisenant. Jacki plans to complete her master's research this semester: A Survey of the Tetratomidae of Wisconsin (Coleoptera: Tenebrionoidea). Additional updates: Continuing a bit of work at Zoology Museum; ENT 799: Practicum in College Teaching (helping me in both ENT 302 and ENT 701); Chipping away at the hallway mural on the 3rd floor (See next pg.).

Zhihong Zhan. Zhihong was back on campus for the fall but returned home to China for fieldwork relating to his M.S., a taxonomic study of the *Lucanus fortunei* species group endemic to China, based largely on a comparative external morphological approach. We conducted his certification via zoom in late January with Zhihong, myself, our very own Professor Trowbridge, and Professor Kerry Katovich, biology department chair and coleopterist at the UW-Whitewater.



Zhihong and I also submitted a manuscript to Zootaxa on my wonderful fire-colored beetles:

- Descriptions of the mature larva and pupa of *Pseudopyrochroa facialis* (Fairmaire) from Southwest China (Coleoptera: Pyrochroidae: Pyrochroinae), with notes on natural history and redescriptions of adult stages. (15 manuscript pages + 7 color plates).

Jacki's progress on the third floor hallway mural.

Dan Young. Instructionally, fall was a very heavy lift with **ENT 302** (Introduction to Entomology – as always for going on 40 years)! I also taught **ENT 331**: Taxonomy of Adult Insects, my most rigorous course, and my **ENT 375** FIG: Global Biodiversity and the Sixth Mass Extinction. All three course in all formats – lectures, discussions, and labs were in person once again. ENT 302 included our "normal" daylong, Sunday field collecting trips to the Mecan River (Marquette Co.) and Cruson Slough of the Lower Wisconsin River (Richland Co.). The ENT 331 gang enjoyed a long weekend collecting & bonding trip to the Kemp Natural Resources Station on beautiful Tomahawk Lake. Not to be entirely left out, the FIG'gies were once again trated to a Sunday at the Milwaukee Public Museum and "behind the scenes" special tour of biodiversity and entomology themed venues that are off-limits to the public.

As the new semester stokes up, I have a pretty full class in **ENT 302** with 38 eager students in three lab sections. **ENT 701: Advanced Taxonomy of Diptera** has a robust 12 early instar dipterists. Our two field trips for ENT 302 are booked, and the ENT 701 gang will spend a long weekend in the field back at Kemp and several collecting field trips to Hemlock Draw in the beautiful Baraboo Hills. In addition to my teaching load, I continue to serve as co-Chair of the UW Natural History Museums Council (NHMC), Liaison between the Society for the Preservation of Natural History Collections (SPNHC) and the Entomological Collections Network (ECN), and Director of the WIRC. Hopes remain high of returning to the in-person SPNHC annual conference, with the 2022 meetings being held in Edinburgh, Scotland in early June. A pre-meeting visit to work in the beetle collection at The Natural History Museum in London seems only fitting, as well. Pyrochroidae await!

Wisconsin-based summer 2022 fieldwork will focus on a 3rd year of Malaise trap sampling at the Kemp Natural Resources Research Station as well as ongping survey work at Hemlock Draw that dates all the way back to 1995! A few other research highlights are noted in the publications, below.

Unidentified bot fly larva causing intracranial myiasis in Nigerian red river hogs.

- Friant, S., D. K. Young, T. L. Goldberg. 2021. Typical intracranial myiasis in Nigerian red river hogs (*Potamochoerus porcus*) caused by an unknown bot fly (Diptera: Oestridae). International Journal for Parasitology: Parasites and Wildlife 17 (2022): 14-19. https://doi.org/10.1016/j.ijppaw.2021.11.005.
- Pan, Z., J-C. Duan, Q. Gao, and D. K. Young. 2021. The adult, larva, and pupa of a new Pseudopyrochroa (Coleoptera: Pyrochroidae: Pyrochroinae) from China, with molecular phylogenetic inferences. Insects 12 (12), 1089, 19 p. https://doi.org/10.3390/insects12121089.
- Young, D. K. 2021. The Outdoor Classroom in Spring. Kemp's Point. News from the University of Wisconsin-Madison's Kemp Natural Resources Station. 22(1): 3.

A new species of Pseudopyrochroa from China

- Young, D. K. 2021. Kemp Beetles: An Update. Kemp's Point. News from the University of Wisconsin-Madison's Kemp Natural Resources Station. 22(1): 7.
- Young, D. K. 2022. New record of *Gnoriosta macra* Johannsen (Diptera: Mycetophilidae) from Wisconsin. The Great Lakes Entomologist [9 manuscript pages including figures – should be out any day; also got the journal cover photo again!]. See image, middle right.
- Young, D. K. Family Cupedidae. In Evans, A., A. Smith, P. Skelly, eds., Beetles of Canada and the United States. CRC Press, Inc., Boca Raton, FL. (book chapter: 8 manuscript pages)
- Young, D. K. & P. J. Johnson. Family Artematopodidae. In Evans, A., A. Smith, P. Skelly, eds., Beetles of Canada and the United States. CRC Press, Inc., Boca Raton, FL. (book chapter: 7 manuscript pages)
- Young, D. K. & P. J. Johnson. Family Brachypsectridae. In Evans, A., A. Smith, P. Skelly, eds., Beetles of Canada and the United States. CRC Press, Inc., Boca Raton, FL. (book chapter: 5 manuscript pages)
- Young, D. K. Family Ischaliidae. In Evans, A., A. Smith, P. Skelly, eds., Beetles of Canada and the United States. CRC Press, Inc., Boca Raton, FL. (book chapter: 6 manuscript pages)
- Young, D. K. Family Pyrochroidae. In Evans, A., A. Smith, P. Skelly, eds., Beetles of Canada and the United States. CRC Press, Inc., Boca Raton, FL. (book chapter: 11 manuscript pages)

New record of Gnoriosta macra *from Wisconsin*

On deck! In addition to the five beetle family chapters noted above, I'm also working on Callirhipidae, Clambidae, Micromalthidae, Prostomidae, Stenotrachelidae, Synchroidae, and Tetratomidae – just for fun!

Bugs in the news

- Our very own **Skye Bruce (Harnsberger)** was interviewed for this piece in Popular Science: Monarch butterflies show hints of a comeback out West, but experts are cautious.

- Air pollution significantly reduces pollination by confusing butterflies and bees. A new study finds pollination reduced by almost a third when diesel fumes and ozone were present. Common air pollutants from both urban and rural environments may be reducing the pollinating abilities of insects by preventing them from sniffing out the crops and wildflowers that depend on them. – ScienceDaily.com
- Scientists find previously unknown jumping behavior in insects. A team of researchers has discovered a jumping behavior that is entirely new to insect larvae, and there is evidence that it is occurring in a range of species -- we just haven't noticed it before. The previously unrecorded behavior occurs in the larvae of a species of lined flat bark beetle (*Laemophloeus biguttatus*). Specifically, the larvae are able to spring into the air, with each larva curling itself into a loop as it leaps forward. What makes these leaps unique is how the larvae are able to pull it off. – ScienceDaily.com
- Genetic strategy reverses insecticide resistance. Using CRISPR/Cas9 technology, scientists have genetically engineered a method to reverse insecticide resistance. The gene replacement method offers a new way to fight deadly malaria spread and reduce the use of pesticides that protect valuable food crops. – ScienceDaily.com
- Mosquitoes' mating game discovery provides new clues to combat malaria. Male mosquitoes beat their wings faster when swarming at sunset to better detect females and increase their chance of reproducing, finds a novel study led by UCL scientists. The findings provide a vital new insight into how mosquitoes, driven by their internal circadian clock, combine changes in wing beats with their acute auditory senses to successfully mate. Faster wing beats produces a different flight tone (sound), allowing male mosquitoes to better detect the flight tones of females. – ScienceDaily.com
- Mosquitoes are seeing red: These new findings about their vision could help you hide from these disease vectors. New research indicates that a common mosquito species — after detecting a telltale gas that we exhale — flies toward specific colors, including red, orange, black and cyan. The mosquitoes tend to ignore other colors, such as green, purple, blue and white. The researchers believe these findings help explain how mosquitoes find hosts, since human skin, regardless of overall pigmentation, emits a strong red-orange 'signal' to their eyes. – ScienceDaily.com
- Chimpanzee mother seen applying an insect to a wound on her son. Researchers have observed chimpanzees in Gabon, West Africa applying insects to their wounds and the wounds of others. The Ozouga team started to monitor the chimpanzees for this type of wound-tending behavior, and over the next 15 months documented 76 cases of the group applying insects to wounds on themselves and others. – ScienceDaily.com
- Insects: How farmers can be better engaged in species conservation. While farmers have the capacity to drive species conservation worldwide, their true potential is yet to be fully realized. An international team of researchers shows how this can change. The researchers interviewed 560 farmers around the world to find out what they know about their local pollinator diversity and their engagement in the issue. The results offer important insights. – ScienceDaily.com
- How a fly's brain calculates its position in space. A new study makes significant headway on solving this mystery by reporting that the fly brain has a set of neurons that signal the direction in which the body is traveling, regardless of the direction in which the head is pointing. The findings, published in *Nature*, also describe in detail how the fly's brain calculates this signal from more basic sensory inputs. – ScienceDaily.com
- Interactions between bee gut microbiotas and pesticides. A major review by University of Ottawa researchers has provided the first field-wide summary of how pesticide exposure affects social bee gut microbiotas and what pesticide-induced disturbances mean for bee hosts. – ScienceDaily.com
- Zoologist solves the 100-year-old mystery of the floating phantom midge. The freshwater aquatic larvae of the *Chaoborus* midge are the world's only truly planktonic insects, regulating their buoyancy using two pairs of internal air-filled sacs, one in the thorax and the other in the seventh abdominal segment. – ScienceDaily.com