



INDIANA ACADEMY OF SCIENCE NEWSLETTER

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OUT FOR BLOOD: SPRING TIME IS TICK TIME

by Robert Pinger, PhD, Ball State University

Ticks are a common occurrence throughout Indiana. Because spring usually marks their annual appearance, now is a good time to review what we know about the three species most often encountered by people and their pets.

The American dog tick is ubiquitous, occurring throughout Indiana. *Dermacentor variabilis* (Fig. 1) is a large, slow-moving tick with short mouthparts. It is a cousin of the Rocky Mt. wood tick which occurs in the western United States. Immature stages (larvae and nymphs) of the American dog tick prefer to feed on small mammals and are rarely seen by humans. Adults are active from late March through June.



Fig. 1. American dog tick (adult female).

The lone star tick is more common in southern counties but seems to be occurring with increasing frequency in some central and northern counties. *Amblyomma americanum* (Fig. 2) is a fast crawling tick with long mouthparts. Once confined to Indiana's southernmost counties, lone star ticks have now been reported in at least 67 counties. In some southern counties, such as Warrick, Spencer, Perry and Crawford counties, populations of lone star ticks can become frighteningly high. Unlike the American dog tick, all stages of the lone star tick readily feed on humans. Larvae and nymphs, often referred to as "seed ticks" or "turkey ticks," are small

and difficult to see. It is now thought that lone star ticks do not transmit Rocky Mt. spotted fever, as was once believed, but do transmit a similar, milder disease, human monocytic ehrlichiosis. They also transmit a spirochete, *Borrelia lonestari* that has been associated with southern tick-associated rash illness (STARI). Both of these agents have been isolated from lone star ticks collected in Indiana (Burket et al. 1998; Pinger, unpublished data).



Fig. 2. Lone star tick (adult female).

A third tick species, the blacklegged tick, is now spreading across that state (Fig 3). *Ixodes scapularis*, was virtually unknown in Indiana 30 years ago, but has now been reported in 64 of Indiana's 92 counties. It is much more abundant in the northwestern and western counties. The



Fig. 3. Blacklegged tick (adult female)

continued next page

story of the blacklegged tick in Indiana is an interesting one. The first scientific record of *I. scapularis* in Indiana was that of Banks (1908), suggesting that the species had a historical presence in the state. Subsequent surveys, however, failed to produce additional specimens (Cooley & Kohls 1945, Bishopp & Trembley 1945, Wilson 1961). Wilson, who examined more than 4,300 ticks from Indiana mammals, concluded, "I do not believe that *Ixodes scapularis* occurs within the state as a permanent resident at the present time, although occasionally it may be introduced from farther south on domestic animals or man." Whitaker (1982) and Demaree (1986) also failed to confirm *I. scapularis* as a member of the recent tick fauna in Indiana. Demaree, who examined 12,377 tick specimens between 1982-1986, stated that "*Ixodes scapularis* is not an established species in Indiana but is frequently removed from people and pets returning from southern vacation trips."

What happened to the blacklegged tick in Indiana? Why did it disappear during most of the 20th century? Why has it returned? It turns out that the distribution of the blacklegged tick is dependent on the distribution of its primary host, the white-tailed deer. Adult blacklegged ticks, unlike the two other species discussed in this article, are active in the fall. They prefer to feed and mate on the deer. They can, perhaps, survive for a few generations without deer, but they require deer to thrive.

According to Mumford and Whitaker (1982), the white-tailed deer was extinct in Indiana by 1900. It is my view that in the absence of deer, the blacklegged tick also disappeared from Indiana. Occasional reintroduc-

tions from populations outside the state occurred but, in the absence of deer herds, these reintroductions failed to establish a permanent population.

The reintroduction of deer in the 1930s and successful management of these herds over the subsequent decades eventually resulted in the abundance of deer observed in the state today. In 2006, for example, 125,381 deer were legally harvested.

The first specimens of blacklegged ticks collected from indigenous deer were sent to our lab in 1987. These came from Porter, LaPorte, Marshall and Park counties (Pinger & Glancy 1989). In the ensuing years, the species spread throughout much of the state, so that by 2007 specimens had been collected in 65 of Indiana's 92 counties.

The growing distribution of the blacklegged tick in Indiana is a public health concern because the tick's ability to transmit Lyme disease (LD). The first cases of LD in Indiana were reported in the mid-1980s (Pinger et al. 1989). Lyme disease spirochetes were detected in field collected ticks beginning in 1990 (Pinger et al. 1991). During the period 1993-2006, an average of 27 cases of LD was reported annually. A total of 55 cases occurred in 2007, the latest year for which complete data are available (James Howell, Indiana State Department of Health, personal communication).

The presence of ample deer populations throughout most of Indiana suggests that *I. scapularis* will eventually be found in all of Indiana's 92 counties. In some counties, such as Pulaski County, virtually all of the deer arriving at check

stations are infested with deer ticks. At Tippecanoe River State Park the proportion of these ticks that are infected with Lyme disease can exceed 50% (Steiner et al. 2008). As hunters take their deer home they assist in the spread of these ticks. It is important that both scientific and health care provider communities become aware of the health risks posed by the expanding distribution of *I. scapularis* in Indiana. For further information, see the article in the December 2009 issue of the *Proceedings of the Indiana Academy of Science*.

One final note: What is the proper way to remove a tick? While folk remedies abound regarding tick removal, the safety and effectiveness of most of these methods have not been scientifically verified. Glen Needham (1985), of the Ohio State University's Acarology Lab, outlined the correct procedure for removing attached ticks. Blunt curved forceps or tweezers should be used. If fingers are used, shield them with a tissue, or rubber gloves. 1) Grasp the tick as close to the skin surface as possible and pull upward with steady even pressure (Fig. 4). (Do not twist or jerk the tick as this may cause the mouthparts to break off and stay in the skin. Take care not to squeeze,



Fig. 4. Proper tick removal.

crush or puncture the body of the tick as its fluids (saliva, hemolymph, gut contents) may contain infective agents. Do not handle the tick with bare hands, as infectious agents may enter via mucous membranes or breaks in the skin. This precaution is particularly directed to individuals who “detick” domestic animals using unprotected fingers. Children should not be permitted to do this procedure.). 2) After removing the tick, thoroughly disinfect the bite site and wash hands with soap and water. 3) Dispose of the tick safely by placing it in a container of alcohol or flushing it down the toilet. 4) Never remove the tick by using fingernail polish, alcohol, Vaseline, or hot matches.

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Switching Fall and Spring meetings?

In the last Newsletter I wrote about switching the Spring and Fall meetings of the Academy, making the Spring meeting the BIG meeting with presentations and papers and poster presentations, and the Fall meeting to be a business meeting, maybe even including the annual budget meeting as part of the fall meeting.

With the BIG meeting in the spring, we may be more likely to attract students, graduate and undergraduate, who are putting the finishing touches on projects and thus get an opportunity to give reports on their research efforts to the academy as well as a rehearsal for a final defense.

The new fall meeting could also include a debriefing of section chairs and more about their plans for the following spring. Section chairs should remember that we have funds available to sections for special projects in connection with the BIG meeting in the spring and plans for the section to tap into this fund on a competitive basis. (Remember, as section chairs, you are members of the council, and your presence at council/business meetings would be greatly appreciated.)

So, as I wrote earlier, **my challenge to you as individual members of the Academy**, as section chairs or vice chairs, as other members of the council, is to let me know what you are thinking about these suggested changes. E-mail me at johansen@usi.edu with your ideas. I will then be in a position to report on your reactions at our upcoming spring meeting. As the commercial says, let's “think outside the bun.”

-- Nils I. Johansen, P.E.
2009 IAS Past President

Note from the President's Corner

Many of us have had a long winter. The best medicine for those winter blues is to think spring – stretch those muscles, get out of the office/lab, and plan to meet some colleagues and friends. As you follow my unofficial medical advice, include the Indiana Academy of Science in your plans! It will soon be time for our annual spring meeting. This year we meet at the Indiana University campus in Kokomo.

In recent years attendance at the spring meeting has not matched that of my early years with the Academy – which is a shame. It is more than just a business meeting involving officers and section chairs. All members are invited and Section Chairs should feel free to organize their own events as well. Over the years, I recall hearing some fine science presented after Friday night dinners. These are usually by given by a faculty member at the host institution. Last year it was on the ecology of insect-plant interactions. A few years earlier it was on DNA fingerprinting. This year promises to “wow” us with Neutron Star Mergers and Gamma Ray Bursts. It should be a really cool way to blast into spring.

Saturday mornings feature an excellent pair of field trips: one biological and another from a different disciplinary area. Here too I have had memorable experiences including the geology of McCormick's Creek State Park and the Indian earthworks at Mounds State Park. As I write, one of the 2009 field trips will feature Silurian geology. So come, bring the family, and take in spring.

The spring business meeting should include some important agenda. First, we want to take actions that will make the Fall 2009 meeting one to remember. To that end I would ask Section Chairs to bring recommendations for Keynote speakers or other special events. Recall that we have \$200 honoraria available and I want to totally spend that budget line! Perhaps several Sections might combine forces? For the membership at large, communicate your ideas for speakers or other events to your Section Chair or myself. Consider what is happening in Indiana (and beyond!) in your area of expertise and how to share that with the broader Academy membership.

The second and major agenda item for the spring meeting is updating the IAS web-functions. I know from on-going conversations that the ad hoc committee has been diligently investigating how to move more Academy functions on-line. We expect to hear their report and act on it. Your discussion is needed. A final issue of concern at the spring meeting is whether and in what ways we should modify our semi-annual meetings.



Paul Rothrock, 2009 IAS President.

In the meantime, have you seen the 4-part Natural Heritage of Indiana on your local PBS station? They are now playing outside of the Indianapolis market. I saw them during January. It made me proud to see the IAS among the sponsors.

As always, the Indiana Academy of Science is what you make it. Please share your needs and ideas and be involved. Invite your nearest colleague to join!

Best wishes.

-- Paul Rothrock
plrothroc@taylor.edu
2009 IAS President

IAS Spring Meeting

**Where: Indiana University
Kokomo**

When: April 17-18, 2009

BOOKS FOR SALE

One of the perks of being an IAS member is a discounted rate on all of the outstanding IAS publications (if purchased directly from the Academy). We also purchase limited quantities of books written by IAS members but published by other organizations and offer them to IAS members at a reduce rate (much like a coop). Any of the books from the list of titles we maintain would make an excellent addition to your personal collection, local library, or as a gift. We encourage you to take advantage of this

special perk. Contact **Bill McKnight** at **iaspublications@indy.rr.com** to make a purchase or visit the special publications link on our web site to learn more about the available pubs. The revised *Mammals of Indiana* and *Natural Heritage of Indiana* are now both available to IAS members for less than you can get them anywhere else, and *Sedges of Indiana: The Non-Carex Species* (by Paul Rothrock) will be released later this summer.

Future Bioblitzes

Loblolly BioBlitz

In “A Girl of the Limberlost,” author Gene Stratton-Porter lamented and publicized the final years of the Limberlost Swamp. Now, 100 years later, we are asking the question, “What species have returned to these wetlands and again call the Limberlost home?”

Join us at the Loblolly Marsh Wetland Preserve for a 24-hour rapid assessment of the flora and fauna on site. No studies have been done in the Limberlost Swamp since the early 1900’s when Gene Stratton-Porter once traversed the land. Watch experts from colleges, universities, the state government and local high school students as they

discover what lurks in the marsh including reptiles, birds, fish, trees, flowers, and much more!!! Presentations will be provided on topics like extinct animals of Indiana, native versus invasive and natural environment groups you can become a part of in your area!

DATE: June 19, 4 PM-12 PM & June 20, 5 AM- 4 PM

LOCATION: Loblolly Marsh Wetland Preserve, CR 250, West Bryant, IN.

For more information: Call **260.368.7428** or check out **genestratonporter.com**

Brown County State Park’s BioBlitz

Imagine trying to conduct a plant, animal, bird, insect and fungal inventory at a 16-thousand acre Indiana state park on a relatively-busy summer weekend. Now try to gather first time data from teams stationed in the park’s remote back-country areas who may be experts, but unaccustomed to hiking up and down rugged ravines and ridge-tops. Now add the inquiring public who may not appreciate current demands on the resource, the role of today’s biologist and botanist and the sheer immensity of the project. This is what’s in store (and more) at Brown County State Park, just outside Nashville, Indiana on the **weekend of June 5, 6 and 7, 2009.**

Participating in bio-blitzes is nothing new to IAS membership. Many IAS members had participated in the recent Wesselman Woods bio-blitz. What’s different at Brown County is the size of the property (it is Indiana’s largest state park), its rugged and remote back-country with limited access and no previous extensive inventory has been conducted. “The sky’s the limit”, says the park’s

interpretive naturalist, Brittany Davis. Davis admits while park records include watch and checklists on more common species, little investigative work has resulted in thorough community mapping or known specie occurrence. “Even the most basic baseline data is lacking in most areas”, says Brittany. “It’s exciting. We anticipate gathering more information from this endeavor than any other field research project to date.”

“Rapid Assessment” is the term used to describe most bio-blitzes. The timed event (usually 24 hours) has been considered competitive between taxa teams at other events. Because of the property size, bio-blitz planners have extended the event to include the entire weekend. “We are happy to have all come to participate; keeping experts in the field as long as they are comfortable and minimally interrupted is one of our missions”, says Jim Eagleman, the park’s resource specialist and naturalist. “We will use the same blocks for the bio-blitz as we use for deer hunt zones and burn units. Getting some sense of

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bioblitz continued

where things are, and coordinating this knowledge is a step in the right direction.”

Davis and Eagleman have added to the park’s bio-blitz website that includes an application, collecting permit procedures, a volunteer waiver form and general park information. “We hope to invite as many IAS members as

possible... tell your co-workers and friends”, says Davis. The park’s nature center will be the bio-blitz headquarters for the entire weekend. Go to www.bcbioblitz.com for more information, or call the **Brown County State Park Nature Center, (812) 988-5240**.

REQUEST FOR TERRESTRIAL THALLOSE LIVERWORT SPECIMENS

As part of a long-term plant distribution project, members are here solicited to send specimens of soil-inhabiting thallose liverworts from Illinois or Indiana locations to **Bill McKnight, 9680 Haverstick Road, Indianapolis IN 46280-1850**. He is especially interested in receiving specimens of the genus *Riccia* (usually fan-shaped and isodiametric, to about 1 cm). Specimens

should be largely free of substrate and include collection info; i.e., collector, date, brief description of habitat, and especially location (using either GPS or USGS). Collectors should send material soon after harvest since specimens kept enclosed in plastic are prone to molding. All specimens will be identified and vouchered in a regional herbarium. **Contributors will be reimbursed for postage.**

IAS Spring Meeting Agenda

The spring meeting of the Academy will be hosted by **IU Kokomo on April 17th and 18th**.

Directions and campus maps are available <http://www.iuk.edu/maps/>.

The Friday meeting will be held in the **Kelly Center, Room 221** with the business meeting scheduled for 3:00-5:00 PM.

Dinner and Featured Speaker: 5:30-8:00 in Room 130. (\$10.50 per person.)

Featured Speaker: Dr. **Patrick Motl**, Assistant Professor of Physics at IU Kokomo. His talk is entitled “**Neutron Star Mergers and Gamma Ray Bursts**”.

Field Trip: Saturday AM to examine Silurian deposits at three area quarries.
Time:TBD

-- *Michael S. Finkler*
Local Arrangements

INDIANA ACADEMY OF SCIENCE

CALL FOR CANDIDATES

The Nominations and Elections Committee asks for your suggestions and recommendations for proposed nominees for elective offices of the Indiana Academy of Science. Recommendations for nominees should reach the committee by May 1st, 2009. The terms of service begin January 1, 2010. The four positions to be filled by election in 2009 are:

President-elect - 1 year term {serves as President in 2011 and on Executive Council thru 2012}

Secretary – 3 year term

Member of the Research Grants Committee - 5 year term

Member of the Academy Foundation Committee - 3 year term

Please take a moment to consider members of the Academy who have ability to serve effectively in these positions. Encourage them to be considered for nomination. Make your recommendation by completing the following items:

A. Name of person recommended _____

B. Recommended for office of _____

C. Signature of two Academy members in good standing for 2008, who endorse this recommendation

1. _____

2. _____

D. Statement of recommended candidate: I am pleased to be considered for nomination to the position

of _____ in the Indiana Academy of Science.

If elected, I agree to serve to the best of my ability.

Signature _____ Date _____

E. Please send this copy, with candidate's vitae indicating IAS service to Terry R. West, Professor of Earth Science, Department of Earth & Atmospheric Sciences, Civil Engineering Building, 550 Stadium Mall Drive, Purdue University, West Lafayette, IN 47907-2051, by May 1, 2009.

**2009 Spring Meeting of the IAS
will be held at
Indiana University Kokomo
April 17th - 18th**

Deadline for submission of material for the June issue of the IAS Newsletter is May 22, 2009.

Send copy to Donald G. Ruch at druch@bsu.edu

For IAS information, go to: www.indianaacademyofscience.org

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