Wider aspects of a career in entomology. 7. Belize

Hugh V. Danks

This series of articles outlines some ancillary aspects of my entomological career, for the potential amusement of readers. It reports the sometimes unexpected challenges of working in new places and in the real world, an approach that serves also to expose some conclusions about research activities and some information about insects and their environments. This article stems from a field course rather than from research.

My stay in North Carolina (portrayed in ESC *Bulletin* **51**: 89) ended in 1974. Fortuitously, that year employment prospects in Canada began to improve along with the economy, and I joined Brock University in St. Catharines, Ontario[1]. As a member of faculty there, in May 1976 I taught a module of the Ontario Universities Field Biology Course in the Central American country of Belize (Figure 1).

We flew to Belize City (see Figure 2) and drove via Belmopan to the Caves Branch site. One group of students, including the participants in my course, stayed there for a week to experience the inland rainforest. Afterwards, we followed the Hummingbird highway to Stann Creek Town (now Dangriga) in order to reach South Water Caye on the

Figure 1. The location of Belize and neighbouring countries, and major towns in Belize.

Figure 2. The route travelled in Belize, with places mentioned in the text.

[1]An earlier flight north to seek a job was less successful: the airline replaced the promised non-stop jet with a small commuter plane, which landed at every intervening town in Virginia, Pennsylvania, and New York. Although I arrived just in time for interviews and a seminar, my head still buzzed from the hours of noise in a seat next to the propeller.

Hugh Danks (hughdanks@yahoo.ca) retired in 2007 after many years as head of the Biological Survey of Canada. In that role, he helped to coordinate work on the composition and characteristics of the arthropod fauna of the country, and to summarize the results. In addition, his research studied cold-hardiness, diapause, and other adaptations to seasonality in northern regions.

barrier reef, where the course continued for another week. We retraced the route to Belize City to fly home. A second group of students stayed in the same locations, but in the opposite sequence.

My module on ecology and entomology covered the nature of these subtropical habitats, with a fauna that is so different in diversity and composition from temperate areas. The abundance of insects, especially ants, was outlined; non-entomologists are always surprised that the biomass of ants exceeds that of mammals in the tropics. The course was also designed to illustrate the complexity of ecological relationships. Insects in these places provide particularly visible examples of adaptation, including patterns of mimicry and other defences against the many natural enemies, ways to exploit available resources, and developmental patterns that respond to hot and seasonally dry environments.

Our stay in Belize had been set up not only to allow a small number of students to enroll for credit in one of several different modules of the field course, but also to accommodate many others who welcomed a chance to visit the same environments. The expedition was organized by a faculty member at Brock University, assisted by a small firm in Belize that specialized in such arrangements. Participants made appropriate preparations, including relevant immunizations.

The party of more than one hundred people flew down in a chartered aircraft. Before we landed, the organizer delivered a highly exaggerated account of the dangers, with particular emphasis on snakes. Rather than simply urging caution because there are venomous snakes in Belize, he made it sound as though deadly serpents were everywhere, dropping from the trees and slithering out of the undergrowth to poison unsuspecting visitors. These dramatic warnings deflated the excited chatter on the plane. However, not only are snakes sensitive to disturbance and tend to avoid contact, but also May is near the end of the dry season, when their activity is reduced. Indeed, we saw only one snake — a non-venomous python brought in for a show and tell by the local arrangers.


H. Danks

Figure 3. Rainforest in Belize.


H. Danks

Figure 4. The machete used in Belize in 1976. Total length 85 cm.

Belize is not densely populated; the resident population in 1976 was only about 130,000. In addition to residents, there was a modest garrison of British troops. That defence force served chiefly to protect the country from a potential invasion often threatened by Guatemala, which claims Belizean territory.

Large sections of the country are covered by rainforest (Figure 3), and a machete (Figure 4) was recommended for thick vegetation (though rarely used). The dry season typically lasts from about December to July, and rivers that would be swollen after the rains were instead broken up into pools (Figure 5).


H. Danks

Figure 5. A reach of the Caves Branch river in the dry season.

At Caves Branch we occupied the site of a former logging camp[2]. After we had settled in, the local cooks employed to look after us served our first meal. They were astonished (and appalled) at

[2]The Caves Branch site is now occupied by a "jungle adventure" lodge.

H. Danks

Figure 6. A tree buttress and thick vegetation in the Belize rainforest.

the amount we ate. This capacity reflected the larger appetites of people used to cooler temperatures, as well as habits brought with us. It took some people several days to conform with the tropical pattern of lower consumption.

That first evening meal was chicken stew. The organizer had made sure that the staff knew who he was, and so the cooks reserved the greatest delicacies for him. However, he was distracted by conversation in the serving queue, and did not notice the generous way they had filled his plate. Eventually, our intrepid leader looked down—and recoiled as the claws of multiple chicken feet reached up towards him out of his meal!

His dire exposition on the plane about snakes and other perils had made people nervous, and so before breakfast on the following day, ahead of the midday heat, I took the participants in my module on a short foray into the nearby forest. By the time we returned, concerns with (absent) reptiles and deadly tropical diseases had been overcome by the interest of the rainforest environment, with tall trees supported by buttresses, and rampant vegetation with vines climbing up to the light (Figure 6). Therefore, the course itself could start normally after breakfast. Of course, the students were reminded that care is still required, including items not previously mentioned. Many cautions involved arthropods. For example, parasites such as mites and ticks that lurk on vegetation can be kept at bay by wearing appropriate clothing; proper boots defend against harmful creatures on the ground; those boots should be banged on their heels and inverted before putting them on in case scorpions (or other arthropods) in search of dark crevices have taken up residence; exploring crannies and other concealed sites is risky; many ants and wasps react aggressively to disturbance and have painful bites or stings. Outside the forest, the sun would rapidly burn unprotected skin that was still pallid after the Canadian winter!

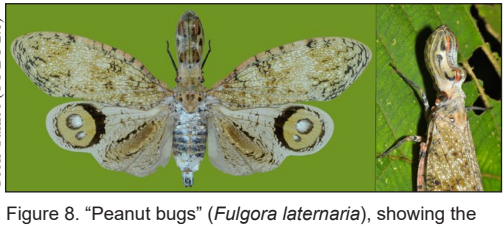
In addition to course elements about the nature of the fauna and its ecological relationships, students completed a few joint projects. Each participant also submitted a collection containing a range of arthropods.

One project studied leafcutter ants (Figure 7). These are the most commonly noticed ants in the Neotropics, as columns carrying leaf sections extend along defined trails for up to several hundred metres. The leaves they harvest support fungus cultivated as food in underground nests.

Students were impressed too by some of the large and unusual insects. For example, the peanut bug (Figure 8) is a tropical planthopper much larger than any related species native to Canada. The head protuberance, shaped like a peanut, bears false eyes

Bandwagonman (CC BY-SA-3.0,2.5,2.0,1.0)

Figure 7. Leafcutter ants carrying leaf sections. Each worker is about 1 cm long.



Geoff Gallice (CC BY-2.0)

Pavel Kirillov (CC BY-SA-2.0)

Figure 8. "Peanut bugs" (*Fulgora laternaria*), showing the hindwing eyespots and the peanut-shaped head process. Wingspan up to 15 cm, body length up to 9 cm.

resembling those of a reptile, and eyespots on the hindwings appear to serve in flash colouration. These strategies for deterring predators would be most effective in a large species like this one.

Some students tried to include as much diversity as possible in their collections; some gathered only leafcutter ants, common beetles, and other insects that were easy to find; and a few acquired species inadvertently. For example, despite being warned to remain properly clothed, anyone who took off their garments in the heat but then brushed through vegetation as they went farther afield discovered that tiny larval harvest mites had attached to their exposed skin. Although the local cooks were adept at picking the parasites off, the process was time-consuming for individuals who were infested by up to two hundred mites. None of those students chose to include the specimens in their collections, perhaps recognizing that acquiring them stemmed chiefly from a lack of attention!

Another module of the field course studied vertebrates. Members of that section made observations about selected species in the field, and also collected and examined specimens. This behaviour greatly confused some of the local people, apparently because they could not understand why it was taking so long to prepare the animals for eating…

The approach of the large group not taking a course for credit was very different. Fortunately, that group was housed in a separate building on the other side of the highway. Every evening, when students in the field course would be sampling local arthropods for their collections, the non-credit group would be sampling local beverages for their psychoactive effects. Supplies of Belikin beer, brewed by the Belikin brewery in Belize City, were purchased by the case. People drinking too much of this product rationalized their subsequent distress by claiming that the cause was traveller's diarrhoea ("Montezuma's revenge").

Another local beverage, Caribbean rum produced by Cuello's distillery in the Orange Walk district, came in bottles with a label graced with the signature image of that distillery, the striking ocellated turkey. Some of the students who later felt awful attributed their suffering to a product with what they concluded was a "turkey vulture" on the label! Given these habits, as well as genuine cases of gastrointestinal adjustments to local foods and strains of *Escherichia coli*, all of the sanitary facilities at the site were soon overwhelmed. Some awkward situations arose as many desperate people sought relief.

Nearby, a cave network can be accessed at St. Herman's Cave (Figure 9). One of the local tour arrangers led an expedition into the cave. We saw few arthropods, and it was a long, hot, and humid journey surrounded by total darkness until we emerged at another opening a considerable distance away. I had brought a flask of water, which surprisingly was the only one, so after a while I passed it around to share. The first few students took a reasonable portion, but the next one rapidly threw back most of the remaining water. Although such selfish individuals are in the minority, their selfishness has wider consequences. People who take more than their fair share, appropriate information without acknowledgement, borrow books but never return them, and so on, influence others to be less generous with favours, ideas, and data. More broadly, they prompt unduly complex and restrictive policies, regulations, and legislation.

H. Danks

Figure 9. Entrance to St. Herman's Cave in 1976.

Consideration for others is more effective. The best student courses, research projects, and other joint endeavours draw their strength from


H. Danks

Figure 10. A less bumpy section of the Hummingbird highway during the bus journey in 1976.

the cooperation and contributions of team players.

After our stay at Caves Branch, we continued down the Hummingbird highway (Figure 10) on board a "bus". This optimistically named vehicle was an old army truck, with seating formed from planks across its width slotted into the sides. The road was very rough in places (the highway was not completely paved until 1994). Therefore, it was necessary to hang on to the "seat" to limit the height to which a passenger might be flung during travel. However, this strategy did not always prevent a plank from bouncing out of position, despite the weight of the many people it carried. Crowded together, the passengers found it difficult to replace the plank as the vehicle continued to bump along at high speed. Some passengers were so fearful of a comparable journey on the return to Belize City that they took a small plane instead, despite the great expense.

Eventually we reached Stann Creek Town. Figure 11 shows the arrivals outside our hotel, as well as the two "buses" used to transport them. Much of the baggage had to be kept outside overnight, so a group of local people was hired to protect it. Moreover, as advised by the firm making our arrangements, an unrelated group of local people was hired to watch those protectors. Indeed, because theft is so common, new arrivals to the British garrison were cautioned with a joke about a potential invasion from Guatemala. This popular joke held that no invasion was feasible, because almost immediately the invading forces would be left standing in their underwear when all of their weapons and other possessions had been stolen!

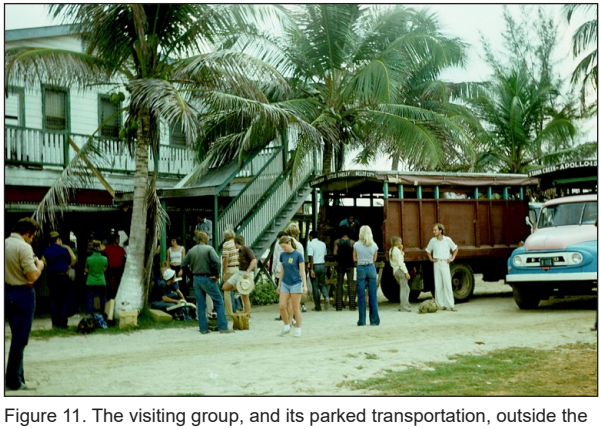

H. Danks

Figure 11. The visiting group, and its parked transportation, outside the hotel in Stann Creek Town (now Dangriga).

The following day we rode across the water to South Water Caye (Figure 12), one of many small islands on the Belize barrier reef[3]. Our "cruise ship" was an open boat towed by a small fishing vessel. Most of us slept outside on the beach, enjoying the scenery (e.g., Figure 13).

Although this part of the course included entomology (especially themes related to island


H. Danks

Figure 12. The landing at South Water Caye.

[3]The facility at South Water Caye is currently run by International Zoological Expeditions (IZE).

biogeography), it focussed on transects across the reef, from the shore into deeper water, to study marine diversity and zonation. It did not resemble my own field course in marine biology years earlier, when chilled students counted barnacles and other intertidal invertebrates on a rocky, windswept shore in Wales.

The reef transects were not located randomly. Sanitary facilities perched over the edge of the ocean allowed along-shore currents to sweep away undesirable substances…and take them through any transects that might have been set up in the wrong place.

In due course, the whole party assembled at the airport to leave Belize. As our plane waited, an unexpected "departure tax" was imposed. There was little option but to have each passenger pay the required sum of several US dollars. Students who had previously invested most of their cash in local beverages borrowed the necessary funds from their friends.

H. Danks

Figure 13. A mangrove off South Water Caye, soon after sunrise.

Our homeward journey passed through the United States. Baggage had to clear customs before continuing on, and it included preserved biological specimens. As one of the first packages emerged from the bowels of Miami airport on to the baggage carrousel, the smell of ethanol showed that a container had been broken. Our hopes fell as we envisaged the disaster about to be revealed, but fortunately nothing else was damaged. Nevertheless, the loss was a useful lesson: specimens and other breakable items must be packed for shipping with extraordinary diligence, mainly to protect them from the unexpectedly brutal treatment they receive from some shippers.

Back in Canada, we discovered that harvest mites were not the only arthropods that had interacted with the students in Belize. Several individuals developed what they thought must be infected mosquito bites…until they saw movement! Each wound contained a growing maggot of the human bot fly. The adult bot fly (the oestrid *Dermatobia hominis*) captures biting flies and attaches its eggs to them, and the larvae hatch as the carriers begin to feed on warm-blooded hosts, including many mammal species in addition to humans. In the departmental break room, information about the species was posted as well as a large sketch of one of the larvae, illustrating the backwardly pointing spines that hinder attempts to extract it from the wound. Apparently, some members of faculty did not appreciate seeing this representation, even though "Biological Sciences" was the name of the department…

I once recovered an enormous oestrid larva from a dead rabbit, and carefully fixed and preserved it. The taxonomist who examined the larva said that I should have tried instead for adult emergence, because flies of that family are much less frequently collected than larvae. Despite this admonition, I did not advise any student to allow their maggot from Belize to feed for a few more weeks in order to obtain an adult!