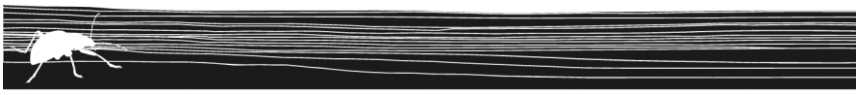
31st May 2018 edition

Quaternary Entomology Dispatch



Editorial

Dear colleagues,

I am very pleased to present the latest edition of our newsletter! This edition has been delayed a few months and I wanted to thank you all for your patience. I hope you will find that it was worth the wait!

Over the following pages you will find news on what our colleagues in the Canaries (Pedro Henríquez Valido), Czech Republic (Nick Schafstall) and the USA (Scott Elias) are currently working on. You will also find the summary of a discussion about flotation techniques, initiated by a question from Nick Schafstall back in February, and to which several subscribers to the Quaternary Entomology mailing list have participated. I have also contributed a small text on ongoing archaeoentomological research at Nunalleq, a northern hunter-gatherer site in southwestern Alaska.

Since our last edition, two new PhD dissertations based on insect subfossils data have been completed. Many congratulations to Mélanie Rousseau and Francis Rowney, who have completed their theses at Université Laval and University of Plymouth, respectively.

Many thanks to all participants to the newsletter for once again sharing with us, and in doing so, making this small project possible.

Happy reading! :)

Véronique Forbes (veroforbes@gmail.com)

Contents

News from our colleagues

News from the Canaries

From **Pedro Henríquez Valido** (pedrohenriquezvalido@gmail.com)

I am currently undertaking my PhD at Universidad de Las Palmas de Gran Canaria, under the direction of Dr Jacob Morales, Dr Amelia Rodríguez (Universidad de Las Palmas de Gran Canaria) and Dr Jean-Bernard Huchet (Université de Bordeaux). My research examines long-term food storage during the pre-Hispanic period of Gran Canaria (Canary Islands, Spain).

The first settlers of the archipelago came from North Africa, and colonized the island from ca. 400 AD until the 15th century, when the Spanish conquered it and the indigenous population collapsed. The indigenous were farmers who stored their harvest in silos dug in the volcanic tuff. After the Spanish conquest and the abandonment of storage practices, the silos were left open, but were not filled with sediment, so that the materials avoided the deterioration processes resulting from contact with the sediment and its physicochemical characteristics. The exceptional environmental conditions of these granaries have allowed the desiccated remains of the stored plant products and the pests associated with such storage to be preserved within the silos.

The plants recorded in the silos include cereals, legumes and fruits as well as other gathered indigenous plants. The presence of food plants has also allowed the proliferation of insect pests, which very likely caused significant economic losses. Our objective is to identify the species of both plants and insects found inside these silos, and to reconstruct storage techniques, and whether they were effective or not.

Among these plagues, the weevil beetles *Sitophilus granarius* stands out due to their abundance, with thousands of individuals recorded. Radiocarbon dating of these insects indicates that they were contemporaneous to the plants stored in the silos. We have also detected the presence of secondary pests, such as *Oryzaephilus surinamensis*. The record of these pests is interpreted as an indicator of long-term storage and of the strategies developed to ensure the integrity of stored plant resources.

Both above-mentioned species of beetles are synanthropic and unable to fly, so their presence in the Canary Islands should be considered as a result of their introduction by the first settlers, who unknowingly carried the eggs of both insects in the seeds and other food they carried with them during the colonization of the islands.

Many other insect remains associated with food storage have been identified, as well as insects that can provide information about the presence of other materials at the silos. For instance, we find remains of xylophagous insects, which possibly fed on the wooden structures of these granaries, such as doors, which have not been preserved.

News from Czech Republic

From **Nick Schafstall** (nick.schafstall@gmail.com

From September 2017 until the end of February 2018, I completed a study stay at Plymouth University under the supervision of Nicki Whitehouse. There, I worked with cores that I previously collected from a forest hollow in the High Tatra Mountains in Slovakia. During this time, I got re-introduced to the flotation technique and other methodology in identifying beetle remains from peat samples. Many thanks to everyone who participated in the discussion about best practices of the flotation technique. Preliminary results were presented at the QRA Annual Discussion meeting in Plymouth, a CSV showcase event in Plymouth and at the EGU General Assembly in Vienna. These preliminary results show, among other things, actual fluctuations in the quantity of primary bark beetles during the last 1000 years.

Earlier in 2017, I worked on picking Trichoptera remains from a lake record spanning 11,000 years from Prasilske Lake in Sumava National Park in Czech Republic. From this, I may have found the first record of subfossil Trichoptera remains from central Europe, as well as the first record of Trichoptera from an alpine lake. The manuscript of the article will be submitted before the end of this year.

Finally, this year I am collecting data for a fossil bark beetle database for Eurasia and North America. I want to thank Allan Ashworth, Svetlana Kuzmina and Scott Elias, who have helped me along the way. As I am pretty sure that current databases don't contain all available data, any suggestions for additions are more than welcome. I am also interested in possible collaborations on the expected publication of this database as a review paper.

News from the USA

From **Scott Elias** (scotteliasg9@gmail.com)

I am in the midst of preparing a lengthy chapter on the environments of Western, Central and Eastern Beringia during MIS 3 and MIS 2. This chapter is for a book on the Beringian Stand-Still Hypothesis. My co-editors are John Hoffecker (archaeologist, University of Colorado), Dennis O'Rourke (anthropologist/ancient DNA geneticist, University of Kansas), G. Richard Scott (Physical Anthropologist, University of Nevada-Reno), Mark Sicoli (linguist, University of Virginia) and Leslea Hlusko (human evolution geneticist, University of California - Berkeley). My co-authors on the paleoenvironments chapter are Pat Anderson, Andrei Andreev, Svetlana Kuzmina, Anatoly Lozhkin, Elena Pavlova, Vladimir Pitul'ko, Olga Potapova and Pavel Nikolskiy. The book will be published next year by Texas A & M University Press.

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Quaternary Entomology Dispatch

Techniques of flotation for peat samples: return on a QE discussion

By **Nick Schafstall** (nick.schafstall@gmail.com)

In February, I initiated a discussion amongst members of the Quaternary Entomology mailing list regarding methodology. The discussion examined this question: **Are there any solutions to avoid having to sort through an excessively large amount of floating plant remains after the flotation of peat samples?** This issue clearly remains a challenge for many of us, as indicated by the many responses.

A summary of methods for the extraction of insect fossils from sediments (Elias 2010) suggests that samples from felled peat should be soaked in cold KOH+ and wet sieved over a 0,3 mm screen. The KOH+ should disaggregate plant material, making it easier for the insect remains to detach from it. Several members of our community have advised against treatment with KOH+, NaOH+ or similar chemicals, arguing, based on experience, that it damages the insect remains.

A suggested alternative is for the peat to be treated with very hot or boiling water to get as many trapped air bubbles out as possible. It is also recommended to take care not to add new air bubbles when adding colder water to the sample after it has been soaked in paraffin.

Even if these steps and precautions are taken, a large portion of plant remains may still float. The contributors to the discussion have suggested the following solutions:

1. Dry or wet sieving over different mesh sizes. Separating the sample into different sized fractions (0,3 mm, 1,5/2 mm, 4 mm) prior to paraffin floatation allows for easier identification and sorting of insect remains. Very large beetle remains should be picked out during the process of sieving, as they usually are too heavy to float.
2. Skimming the top of the floating material with a plastic or metal lid, to avoid pouring the floating plant remains in your sieve. This strategy has been very effective for several members in our group. A variation on this is to place a sieve with 2 mm-sized mesh at the mouth of the bucket and wiggle it downward before pouring out the flot in your sieve. This should hold down at least the bigger plant remains. There is an alternative method possible if the skimming does not really seem to work. During the process of re-floating, small portions of the flot are mixed with water again. After settling, the thin layer of paraffin on top of the larger body of water should have separated the insect remains more effectively from the plant remains. For a few samples which were treated this way, the extra residue was checked. This residue then contained virtually no beetle remains. Re-floating may cost you 1-2 hours extra per sample.

A combination of these two techniques would be the best strategy in this game of avoiding floating leaves, roots and wood. It might take a bit more time, but having to pick through a much smaller portion of plant debris will certainly make it rewarding.

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Elias, S.A., 2010. *Advances in Quaternary Entomology*. Elsevier, Amsterdam.

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Quaternary Entomology Dispatch

Ongoing research project

Archaeoentomology at Nunalleq, a pre-contact Yup'ik site in Southwestern Alaska

By **Véronique Forbes** (Memorial University of Newfoundland, Université de Bordeaux and University of Aberdeen, veroforbes@gmail.com)

Main Project collaborators: Dr **Jean-Bernard Huchet** (CNRS, Muséum national d'Histoire naturelle, Paris & Université de Bordeaux), Dr **Allison Bain** and **Thiéfaine Terrier** (Université Laval), Prof **Scott Elias** and **Denisa Cretu** (University of Colorado and Royal Holloway University of London), Drs **Rick Knecht**, **Kate Britton**, **Charlotta Hillerdal**, **Paul Ledger**, **Edouard Masson-MacLean** (University of Aberdeen), **Qanirtuuq Inc**.

Since 2013, I have been involved in a large community, scientific and heritage project that focuses on Nunalleq, a pre-contact (16-17th centuries AD, Ledger et al. 2018) Yup'ik site located in southwestern Alaska. Excavations at the site since 2009 have revealed the remains of a multi-roomed sod and timber dwelling complex comprising several intact floor layers preserved in discontinuous permafrost. The large number of exceptionally well-preserved artefacts and ecofacts recovered from the site provide tremendous insights into past Yup'ik technologies, subsistence and worldviews. Based on current data, it is believed that the structure represents several occupations of a least one house that was eventually abandoned after an intense burning event. This event, combined with evidence of warfare, suggests the site came under attack probably during a conflict episode known from oral history as the 'Bow and Arrow Wars'. For more information on past fieldwork and findings at Nunalleq, you can visit the project's blog webpage at https://nunalleq.wordpress.com/

The site is extremely rich in insect remains. So far, only a small fraction of the site's bioarchaeological samples have been analysed, despite two postdoctoral fellowships and one (ongoing) Master's student project based on archaeoentomological data from the site. The fact that Nunalleq is one of a limited number of indigenous forager sites to have been the object of insect subfossil analysis has largely guided the objectives of the archaeoentomological aspect of the project:

1. To assess the potential of insect remains as indicators of activities and the use of space on hunter-gatherer sites

The analysis of insects from occupation layers has produced thousands of remains of beetles, lice fleas and fly puparia. Unexpectedly, the site has produced the first records of the human flea *Pulex irritans* for the state of Alaska (Fig. 1)! Preliminary analyses revealed differences in spatial distribution patterns for two species of lice – the human louse *Pediculus humanus* L. and the dog biting louse *Trichodectes* canis (DeGeer) – which led me to suggest back in 2015 that these may be indicative of specific activities or differences in the use of space inside the sod dwelling (Forbes et al. 2015). Thiéfaine Terrier's MA research (co-supervised by Dr. Allison Bain and myself) at Université Laval in Quebec, is currently investigating this question further. I won't say more on this for now, but stay tuned for future updates!

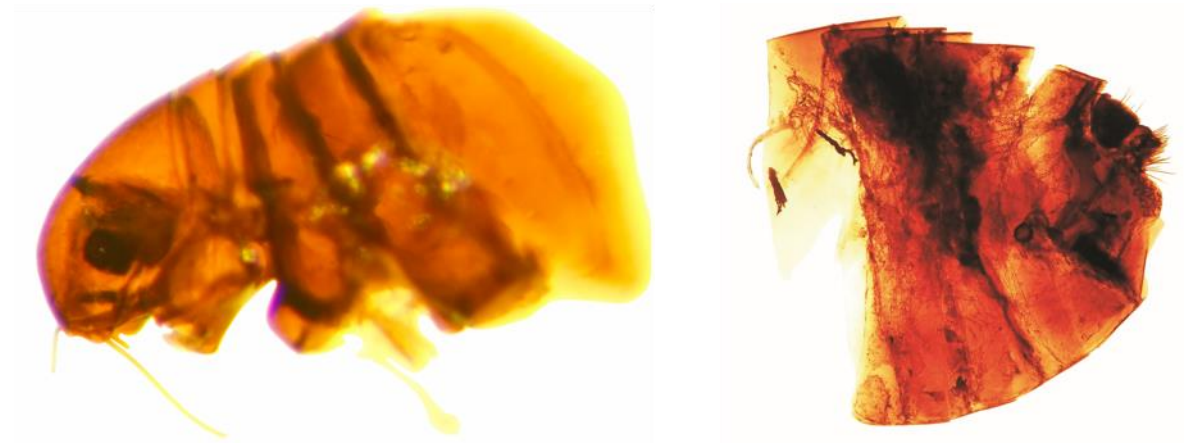

Figure 1. Human flea specimens from Nunalleq: the first records of the species in Alaska.

2. To develop an effective approach to evaluate the nature and extend of the impact of hunter-gatherer's activities on the environment

One of the recurrent features of beetle subfossil assemblages from indigenous forager sites is that although synanthropic taxa are virtually absent, they are dominated by taxa associated with decaying organic matter (Forbes et al. 2017). It appears that the activities taking place in and around sod dwellings at Nunalleq and other Inuit and Paleo-Inuit sites – e.g. butchery, food preparation, woodworking, animal carcasses processing, etc. – generated ecological conditions similar to those of particularly nutrient-rich habitats occurring in nature (e.g. forest litter, rodents' and birds' nests and burrows, rotten wood). In order to further document this phenomena and assess whether it is limited to the interior and immediate vicinity of sod dwellings, I have analysed (with the help of Paul Ledger and Denisa Cretu), insect remains from a peat profile located c. 30 meters from the site. The same section was also subsampled for radiocarbon datation and pollen and associated proxies analysis, the results of which appear in Ledger 2018. Notably, this research allowed us to compare palaeoecological samples that pre- and post-date the occupation of the site with samples contemporary with the site's occupation.

The most striking result is the sheer explosion in the concentration of beetle specimens concurrent with the beginning of the site's occupation. These coincide with the appearance of human activity indicators in the profile, including microscopic charcoal, coprophilous spores and the pollen of ruderal plants. Decomposer beetle taxa are clearly dominant in samples dating to the occupation of the site, which is similar to those collected from floor layers. These results suggests that the ecological 'footprint' of indigenous hunter-gatherer's activities is not restricted to dwellings and that – in cases where hunter-gatherer villages are occupied on a semi-permanent basis – this footprint is more substantial than previously believed.

3. To test the potential of archaeology in the reconstruction of past conflict episodes

The large region of the Yukon-Kuskokwim delta of southwestern Alaska is poorly documented from an archaeological point of view. Nunalleq is not only one of the rare sites to have been investigated in the region, it is also the only site where clear evidence for violence associated with the Bow and Arrow Wars has been recovered. In addition to items of weaponry and armoury and the burning and destruction of the sod dwelling, we also have recovered an assemblage of human remains. Since none of these represented burials, and in view of the fact that the site is currently being destroyed by coastal erosion, the local community at Quinhagak granted the fieldwork team authorisation to excavated and study these remains. This provided opportunities

to collect archaeoentomological and sediment samples around the human remains, in the hope that their study would help understand the events that took place at the site.

The last postdoc I have conducted on material from Nunalleq consisted in a collaboration with Dr Jean-Bernard Huchet, who developed the approach of 'funerary archaeoentomology'. Together we developed the Marie Curie Project 'WARFLY', a proof of concept study aimed at investigating the potential of archaeoentomology to reconstruct violent episodes in the past. Our aim was to analyse not only beetles, lice and fleas, but also necrophagous flies (e.g. Calliphoriade) associated with the human remains and the occupation layers corresponding to the attack event, and to integrate this data with other strands of evidence – especially biological anthropological data and spatial distribution patterns of other ecofacts and artifacts – in an attempt to reconstruct the timing (seasonality), spatiality and sequence of events that characterised the attack on Nunalleq.

Although the project had to be interrupted early due to my recent appointment at Memorial University, we managed to achieve several of the project's objectives. The identification of necrophagous fly puparia provided information regarding the seasonality of the attack, while also revealing insights on pre-contact warfare and the treatment of victims' corpses. In addition, the analysis of the spatial patterning of insect remains in the most recent house floors of the site (those contemporary with the attack) suggest that conflict events can influence insect subfossil assemblages on archaeological sites.

Archaeoentomology at Nunalleq is a work in progress. The results discussed above are either in the process of being written up for publication, or are currently in review… and a lot remains to be done. Stay tuned for future developments and publications!

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Forbes, V., Dussault, F., Lalonde, O. & Bain, A. (2017) Coléoptères, poux et puces subfossiles provenant d'habitats de chasseurs-cueilleurs: l'apport des recherches archéoentomologiques dans le nord circumpolaire. Recherches amérindiennes au Québec XLVII (2-3): 11-21.

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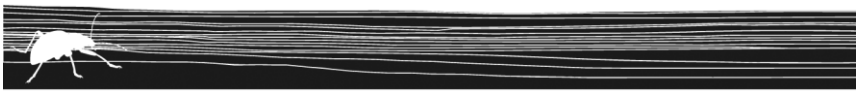

Recently completed dissertations

Des insectes et des Hommes : archéoentomologie et paléoentomologie à l'îlot des Palais (CeEt-30), Québec [Thesis in French, English title and abstract below]

Of Bugs and Men: Archaeoentomology and Palaeoentomology at l'îlot des Palais (CeEt-30), Quebec City

PhD dissertation (2017, Université Laval), by **Mélanie Rousseau** (melanie.rousseau.4@gmail.com)

Supervised by Dr **Allison Bain** (Université Laval)

The archaeological site of the Intendant's Palace (CeEt-30) is one of the important places in the history of New France. This is where the Intendant, one of the pillars of the royal government in New France from ca. 1675 to 1760 resided. The site has been excavated since 1982 until the last fieldwork season in 2016, thus providing a myriad of new information on the uses and lifeways of the occupants of the site. An archaeological site of such richness is therefore, at first glance, an excellent place to address the question of the interaction between Man and his environment. This is the goal set by the author at the origin of this research. This main objective is broken down into two distinct, yet complementary aims, namely to consider the European impact on the landscape of the site, as well as the role of the landscape in shaping colonial identity. To do this, paleoentomology and archeoentomology, the study of subfossil insects, were used.

More than 9,850 individuals belonging to more than 250 beetle taxa reconstructed the landscape associated with ten subsequent occupation periods prior to establishment on the site (ca. 800 to ca. 1662), and during its occupation (ca. 1666 to 1713). It was also possible to track local landscape changes during these periods. The study examined various aspects of the European impact on the environments of the site, namely the modification of entomological biodiversity, deforestation, the disappearance of wetlands, the biogeography of beetles and the management of the territory. However, it has not been possible to concretely address the impact of the landscape on the 'Canadianization' process of the colonial identity.

The results obtained here pave the way for future research and raises a number of new problems, including the effects of the 1663 earthquake on the archaeological sites of southeastern Quebec and the failure of certain insect pests to become established in the colonized territories.

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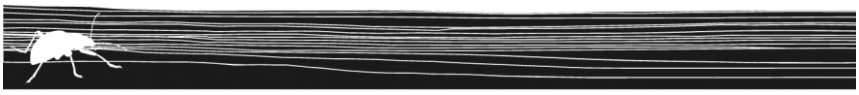

Ecology and Climates of Early Middle Pleistocene Interglacials in Britain

PhD dissertation (2018, University of Plymouth) by: **Francis Rowney** (f.rowney@exeter.ac.uk)

Supervised by Dr **Nicki Whitehouse** (University of Plymouth), Prof. **Ralph Fyfe** (University of Plymouth) and Prof. **Danielle Schreve** (Royal Holloway University of London)

This thesis refines and develops understanding of the ecological and climatic characteristics of early Middle Pleistocene (MIS 19-13, c. 780-430 ka) interglacial environments in Britain. This period is characterised by globally muted (i.e. low amplitude) glacial-interglacial cycles, which increased in amplitude c. 430 ka with the Mid-Brunhes Transition (MBT). However, the influence of these global climatic characteristics on climates and ecology at regional and local scales is yet to be fully understood. Local ecological processes, particularly disturbance processes, have also received limited attention in pre-Holocene interglacial settings, despite their likely importance for vegetation and habitat structure.

Chapters 4, 5 and 6 present in-depth multi-proxy palaeoenvironmental studies from three early Middle Pleistocene sites: West Runton, Pakefield and Brooksby. A combination of Coleoptera, pollen, coprophilous fungal spores, microcharcoal and sedimentology is used to reconstruct local ecological attributes for each site. Multivariate analyses of these datasets indicate the importance of disturbance processes (herbivore activity, wildfire, hydrogeomorphic processes) in driving and maintaining local vegetation structure and habitat heterogeneity. This is explored further (in Chapter 8), emphasising the apparent importance of site-specific factors, rather than those shared between sites, in determining the relative influence of each disturbance factor.

In Chapter 7, new approaches to the coleopteran Mutual Climatic Range (MCR) method are applied to a suite of coleopteran records from interglacial sites spanning the Middle and Late Pleistocene (c.712-126 ka, MIS 17-5e). Summer temperatures, winter temperatures and temperature seasonality are reconstructed, to test whether there is evidence for MBT expression in Northwest European thermoclimates. No evidence for this is found, and it is suggested (in Chapter 8) that MBT expression in this region may instead be reflected in hydroclimatic variables (e.g. enhanced annual precipitation).

Finally, it is suggested that disturbance processes and potentially wetter climates were beneficial to contemporary Lower Palaeolithic populations in Northwest Europe.

Recent publications

Forbes, V., Dussault, F., Lalonde, O. & Bain, A. (2017) Coléoptères, poux et puces subfossiles provenant d'habitats de chasseurs-cueilleurs: l'apport des recherches archéoentomologiques dans le nord circumpolaire. *Recherches Amérindiennes au Québec* XLVII (2-3): 11-21.

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Roy, N., Woollett, J., Bhiry, N., Haemmerli, G., Forbes, V. & Pienitz, R. (2018) Perspective of Landscape Change Following Early Settlement (Landnám) in Svalbarðstunga, Northeastern Iceland. *Boreas* 47 (2): 671-686.

About the Quaternary Entomology mailing list

Back in 2011, Véronique Forbes and Scott Elias set up a mailing list to facilitate communication amongst researchers in Quaternary Entomology. The list allows subscribers, including experienced workers in the field but also students, to exchange news and ideas and to query their colleagues about any questions, problems or requests they may have. Our mailing list is hosted by Jiscmail, a national academic service based in the UK.

The mailing list is used to distribute editions of the Quaternary Entomology Dispatch. **The next edition of QED is scheduled for November 2018.**

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