Florschütz Award 2018

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Award:
Florschütz Award 2018

The Dutch Palynological Society 'Palynologische Kring' has installed an annual Florschütz Award for the best master thesis written at a Dutch university in the field of paleobotany and palynology in its broadest sense. The award has been named after the eminent Dutch professor *F. (Frans) Florschütz* (Hasselt 1887- Rheden 1965) who may be considered the founding father of paleobotany and palynology in The Netherlands (Figure 1). Florschütz was a professional jurist, who had a keen interest in both botany and geology. He became particularly fascinated by pollen analysis. In the late 1920s he built his private palynological research laboratory at his home in the village of Velp near Arnhem. Once a week he came to the Botanical Museum of Utrecht University, where he generated enthusiasm for the young science among staff and students. In 1947 he was awarded an honorary doctor's degree for his pioneering research achievements. Meanwhile he had transferred his activities from Utrecht to the Geological Institute of Leiden University, where he was appointed professor of 'Paleophytology of the Cainozoicum and Palynology' in 1948. In his inaugural lecture on 28 January 1949 *'In het grensgebied van twee wetenschappen'* ('On the boundary of two disciplines') he hinted already to the novel interdisciplinary approach in palynological research.

Figure 1. F. Florschütz in the field examining a profile.

Florschütz's students classified him as a very inspiring teacher, promoting research with focus on geology, vegetation science and climates of the past. He used paleobotanical fossils as information to reconstruct changing Pleistocene environments along the geological time scale. Among his collaborators and students were *F.P. (Frits) Jonker* (1912-1995) and *T. (Thomas) van der Hammen* (1924-2010); both became the next-generation Dutch professors of paleobotany and palynology at the universities of Utrecht and Amsterdam, respectively. Almost forgotten is the iconic book *'Nederland in het ijstijdvak'* ('The Netherlands during the ice age'), a beautifully written and illustrated book by Van der Vlerk & Florschütz (1950), now a 'dated' master piece in scientific outreach. But also *W. H. (Waldo) Zagwijn* (1926-2018), who spent his life at the Dutch Geological Survey and who was appointed at the end of his career professor at the Free University Amsterdam, was educated by Van der Vlerk and Florschütz. So, there is every reason to install a 'Florschütz Award' for the best Dutch master thesis in the broad field of palaeobotany and palynology.

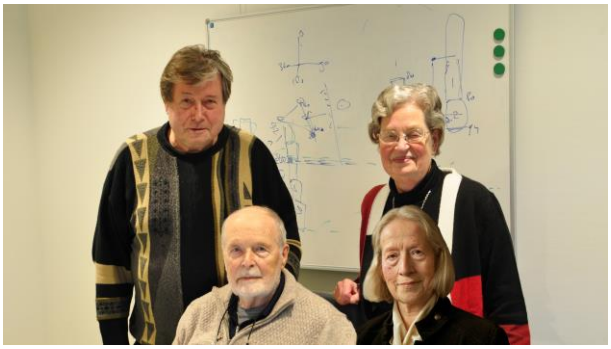

Figure 2. Photograph of the jury of the Frans Florschütz Award consisting of four Dutch emeritus professors: Henry Hooghiemstra (top left), J.H.A. (Han) van Konijnenburg-van Cittert (top right), Henk Visscher (bottom left), and Corrie C. Bakels (bottom right).

A dedicated jury of four Dutch emeritus professors was installed by the Dutch Palynological Society: Corrie C. Bakels (1942) from Leiden, J.H.A. (Han) van Konijnenburg-van Cittert (1943) from Leiden, Henk Visscher (1937) from Utrecht, and Henry Hooghiemstra (1948) from Amsterdam (Figure 2). Four master theses were submitted. The jury was pleased by the high quality of the master theses and selecting a winner was an enjoyable task.

The 2018 Florschütz Award winner - The jury unanimously identified the master thesis of Amber Woutersen, entitled *'The Origin and evolution of the Nitrariaceae; An integrative study to the steppe-desert taxon Nitraria and its development at the Tibetan Plateau'* as the winner (Figure 3). Carina Hoorn was the source of inspiration and she guided Amber through the research project.

Figure 3. The recipient of the Florschütz Award 2018, Amber Woutersen.

Nitraria is a halophytic taxon that belongs to the plant family Nitrariaceae and commonly occurs in coastal regions from the Mediterranean, across Asia into the south-eastern tip of Australia but also in the Tibetan Highlands, presently far removed from the sea. The taxon is thought to have originated in Asia during the Paleogene (66-23 Ma), alongside the former proto-Paratethys epicontinental sea. Although *Nitraria* may provide important clues on the links between

climatic and biotic evolution in the Paleogene Tibetan steppe, such investigation has been hindered by the challenges of taxonomic identification. The evolution of *Nitraria* was studied through time, by investigating if the morphology and chemical composition of the wall of the pollen grain between species are distinct and informative of evolutionary history of *Nitraria*. Furthermore, Amber investigated if pollen morphological and chemical traits differentiate between extant taxa from coastal and highland environments. To answer these questions, a novel approach consisting of a combination of Fourier Transform Infrared spectroscopy (FTIR) was used to determine the chemical composition of the wall of the pollen grain, in combination with pollen morphological analyses using light microscopy (LM) and scanning electron microscopy (SEM). Data were analysed using ordinations (principal components analysis and non-metric multidimensional scaling), and directly mapped on the Nitrariaceae phylogeny to produce a ‘’phylomorphospace’ and a ‘phylochemospace‘. LM, SEM and FTIR analyses show clear morphological and chemical differences between extant *Nitraria* species. Moreover, morphology of fossil pollen grains shows a larger variety but also considerable overlap with extant pollen morphology, with *N. sphaerocarpa* and *N. retusa* as modern analogues. Differences in the morphological and chemical characteristics of highland species (*Nitraria schoberi, N. sphaerocarpa, N. sibirica* and *N. tangutorum*) and lowland species (*Nitraria billardierei* and *N. retusa*) are subtle yet suggest an early separation between the coastal and highland taxa. Phylogenetic history appeared to be a more important control on *Nitraria* pollen grains than local environmental conditions. This approach shows that pollen morphology and phylogeny provide the best key to explore the early Paleogene history of *Nitraria.* Taken together this study demonstrates how novel methods for studying fossil pollen grains can facilitate the evolutionary investigation of living and extinct taxa, and the environments they represent. Congratulations to Amber Woutersen, who received the award while travelling in Patagonia. She published already a part of this study in PeerJ (2018) doi: 10.7717/peerj.5055.

Report written by:
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