

**STEFAN VOGEL (1925 – 2015)**

This issue of *Stapfia:reports* includes a paper by an author who ranks among the most significant and most highly respected representatives of his scientific discipline – Stefan Vogel. Sadly, we must report that this was the last paper he completed; Stefan Vogel died on the 5th of November 2015 at the age of 90.

The name of Stefan Vogel is well known both to botanists and to zoologists because the bulk of his scientific work was on floral ecology, at the interface of botany and zoology. Most plants have flowers that are pollinated by animals (chiefly insects but also vertebrates in the tropics and subtropics), and the enormously diverse and exciting relationships between these two branches of life were the main subject of Stefan Vogel's scientific work. He was a tireless researcher, working on many projects simultaneously, pursuing every detail, and producing fascinating and beautifully illustrated publications.

The paper published herein covers observations and analyses made over a long period – almost 40 years – in which he

travelled repeatedly to South and Central America. Its subject is the pollination of composites (Asteraceae) by birds, bats and non-flying mammals, and it is based primarily on descriptions and analyses of the floral syndromes. In many cases, Vogel had directly observed the pollination process in the field. In others, he found confirmation through the literature, and in further cases he made – sometimes quite bold – predictions based on floral syndromes he had previously analysed. Time will tell whether his predictions will prove to be true. At any rate, his paper will provide a stimulus for other researchers to carry out new, more targeted field studies on the pollination of tropical and subtropical composites.

Writing the text, grouping the photos into plates, collecting and evaluating the literature and all the other aspects of producing a scientific paper proved an arduous job for a man nearly 90 years old. Through his insistence and perseverance – one might almost say obsession – he did, however, manage to finish the

manuscript (with some help from his technical and scientific environment at the Department of Botany). Unfortunately, Stefan Vogel did not live to see the publication of the paper. He died a few weeks before this volume was published. He did, however, examine the proofs, with their beautiful colour plates, although he was by then too weak to make corrections himself.

Stefan Vogel was born on the 4th of April 1925 in Dresden, Germany. Even as a child, he concentrated on studying the plants and animals around him. He not only observed them devotedly, but also made drawings and paintings. He produced his first scientific work, a small booklet of plant drawings, at the age of seven. It was already clear that the young Stefan wanted to become a biologist. After completing his *Abitur* (university entrance examination) in 1944 the authorities would not allow him to enter university, but sent him to Poland as a soldier. However, he was soon declared unfit for the "Wehrmacht" (German Armed Forces) and returned to Dresden to work as a draughtsman in an arms factory. After the end of the war, he sought to be admitted to university in Halle. He started his studies there, during the first semester without being formally matriculated, thereafter as a regular student, studying under the botanist Hermann Meusel. As of 1947 he continued his studies at the re-founded Johannes Gutenberg-University in Mainz. His most influential professors were Wilhelm Troll (botany) and Wolfgang von Buddenbrock (zoology). In 1949 he was awarded his doctorate based on a dissertation on colour changes and patterns of floral cues.

A year-long visit to South Africa (1950–1951) with his friend and fellow student Klaus Stopp proved to be a formative event for the young Vogel. This trip not only laid the foundations for his further scientific career (*Habilitation*, 1958), but provided the impetus to continue studying tropical plants and their reproductive biology. Later scientific trips led Stefan Vogel to Colombia, Brazil (seven times!), Argentina, Chile, Mexico, Costa Rica, Cuba, Malaysia and Madagascar. Altogether, Vogel spent more than 5 years overseas and, wherever he travelled, he came back with a rich scientific harvest and a wealth of new insights.

Stefan Vogel will be remembered for the discovery of perfume flowers (Neotropical flowers that secrete tiny droplets of scent that attract male euglossine bees, who collect the scent with their forelegs and store it in special cavities of the hindlegs for use in marking the bees' swarm courses; the bees touch the flower's stamens and stigma while collecting the scent and so pollinate the flower), oil-flowers (Neotropical flowers that secrete oils as a floral reward, which is collected by female anthophorid bees and used as brood fodder), and fungus-gnat flowers (flowers that mimic the appearance and odour of mushrooms, and attract fungus gnats searching for brood sites; pollination happens while the insects search for an oviposition site or during oviposition). At a more general level, perhaps his most significant scientific accomplishment was the revival and extension of the ideas of the Italian botanist Federico Delpino, who was the first to recognise that flowers of unrelated families may be strikingly similar in shape, coloration and other details, and that this similarity had evolved as an adaptation to specific groups of animal pollinators. One of these "floral styles" (now better known as "floral syndromes") is chiropterophily – pollination by bats. While travelling in the Neotropics for the first time (in Colombia), Vogel was the first person to directly observe the pollination of Neotropical plants by bats. The concept of floral syndromes runs throughout Vogel's published work. It is therefore no coincidence that the paper pub-

lished here deals with the floral syndromes of a particular plant family, the Compositae (Asteraceae), and their presumed or confirmed pollination by birds, bats and non-flying mammals (ornithophily, chiropterophily and therophily, respectively).

As well as these highlights in Vogel's scientific output, there are few topics in floral ecology that he did not touch upon. He produced papers on pollen flowers, on nectar flowers with unorthodox nectaries, on various types of trap flowers, on partly or fully deceptive flowers, on flowers that attract insects through the movements of small and motile appendages (*Flimmerkörper*), on the pollination of Mediterranean orchids, and many other subjects. Although the majority of Vogel's papers were devoted to floral ecology, his works in other fields must not be forgotten. They include papers dealing with plant ecomorphology (e.g. the pathways of air circulation in the leaves and stems of the sacred lotus, or the "curly-whirlies" of Namaqualand – desert plants with spirally wound leaves that collect moisture from the air – published in 2011, but including observations that date back to the South Africa trip of 1950) and last but not least, papers on the philosophy of science.

It goes without saying that Vogel's discoveries and seminal publications resulted in a highly respected academic career. Apart from guest professorships in Buenos Aires and Marburg, he was first appointed as a professor at the University of Mainz (1972). The following year, he accepted a position at the Free University of Berlin; three years later (1976), he moved to the University of Vienna. When he received an offer to return to his home university at Mainz, he wavered for a long time before finally accepting. Soon after his retirement (1990), however, he moved back to Vienna, where he worked continuously at the Institute of Botany and (after its renaming) Department of Botany and Biodiversity Research, until shortly before his death.

Stefan Vogel's life was devoted – in its literal sense – to science. He scarcely took any time off for activities outside botany. This constant and prolific work was only possible because of someone in the background, his wife Ilse. She perfectly organised her husband's everyday life and supported him wherever she could. She and their three children, who had to endure their father's long absences, were the perfect team supporting the head of the family and thus helping to further his scientific work.

The death of Stefan Vogel is a great loss, not only to his family, but for the scientific community worldwide. Nowadays, that community communicates almost exclusively in English. As the majority of Stefan Vogel's papers were written in German (of these, only two major publications have been translated into English), access to these papers is difficult for many young scientists. *Stapfia:reports* therefore wishes to contribute to a greater accessibility of Vogel's work than could be achieved through a conventional, chronological publication list. The journal plans to publish an annotated publication list arranged into subject areas and research topics and containing the abstract of each paper in English.

Stapfia:reports will endeavour to honour Stefan Vogel's memory, and is proud to be able to publish the last paper completed by this extraordinary author (see pp. 5–26).

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