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Prof. Dr. Catherine Graham
Senior Scientist
Unit Biodiversity and Conservation Biology
WSL Swiss Federal Research Institute
Zürcherstrasse 111
CH-8903 Birmensdorf
Switzerland
Tel: +41 44 739 23 61
e-mail: catherine.graham@wsl.ch

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Dear Committee,

Dr. Hořák's thesis addresses an important challenge in community ecology, that is, what is the relationship between species functional traits, patterns of abundance and community membership. By explicitly exploring the mechanistic links between these fundamental ecological patterns Dr. Hořák has the potential better understand macro-ecological patterns and the causes of ecological specialization. Further, his work spans both conservation and theoretical questions indicating that he is a mature and creative scientist capable of addressing multiple types of questions. In what follows I review his work pointing out its novelty and contribution to the discipline.

In the Bamenda Highlands, a biological diversity hotspot, Dr. Hořák evaluated the traits and landscape factors leading to variation in avian species presence and abundance by comparing two distinct sites, Mts. Cameroon and Oku. He found that while Mt. Oku had higher richness overall, Mt. Cameroon had higher richness and abundance of range restricted species. These results indicate that richness alone is not a good indicator of conservation potential and traits (in this case range traits) and patterns of abundance provide complementary information needed to make sound conservation decisions. In addition, on Mt. Cameroon he identified thresholds in the relationship between forest bird presence and amount of forest in the landscape. These types of careful empirically based studies are critical for conservation efforts and thereby represent an important contribution, especially as these African mountains have been largely ignored by the conservation community despite their extraordinary endemism and richness. While quantifying bird composition Dr. Hořák appears to have become fascinated with abundance patterns and ecological theory more generally.

A predominate macro-ecological pattern is the relationship between range size and abundance. Using his carefully collected data (collected in forest patches across a broad elevation gradient), Dr. Hořák showed that this relationship did not hold in the montane African tropical birds he was studying. This is an interesting observation in it of itself; however, Dr. Hořák conducted several thought-provoking studies to better quantify and understand this pattern. He showed that the pattern only predominated in high elevations, likely as a result of past isolation, ecological specialization and the limited area at the tops of mountains. This work demonstrates Dr. Hořák's ability to carefully analyze patterns to gain new insight into long-standing ecological patterns.

Dr. Hořák has also made significant contributions to the study of avian clutch size. Clutch size is an important life history trait because it strongly influences reproductive success and that varies greatly across regions (i.e., temperate vs tropical) and species. What causes this variation led to extensive debate, dating back to Skutch-Lack and controversy from the late 1940's. Skutch hypothesized that predation drove lower clutch sizes in the tropics while Lack emphasized the role of productivity in clutch size leading to large temperate clutches. Ashmole refined these hypotheses to suggest that food availability is linked to population size and population size is controlled by environmental factors, especially during the non-productive winter season. Dr. Hořák's work provides perhaps the most extensive test of these ideas -- his careful work in South Africa which included measures of population density and productivity, as well as experiments to evaluate predation, provided definitive support for Ashmole's ideas.

Dr. Hořák's final research endeavor integrates his work on distributions, abundance patterns, life-history and other traits to explore what traits drive specialization in birds. In his recent paper on the topic, focused on European birds for which ample data are available, he identified a set of traits that correlated well with specialization – some predicted by theory, and others providing novel insights. He plans to continue this work to determine if patterns in Europe are general by evaluating the data he has collected and compiled for birds of South African and the Cameroon highlands. Given his track record of thoughtful, compelling research I believe that this new line of research has the potential to uncover new insights in the field of functional ecology.

In sum, Dr. Hořák and his students and collaborators collect primary field data to evaluate fundamental ecological relationships and refine our theoretical understanding of these relationships. One of the strengths of his approach is that he collects data in poorly known regions in Africa. Such data collection is time-consuming but has the potential – as in the case of Dr. Hořák's work – to provide new insights for ecological theory. The work Dr. Hořák has produced so far is quite courageous; he goes after hard questions - many of which require extensive field work and experiments - with little fear and as a result has uncovered new insights about what drives geographic patterns abundance, specialization and trait variation. Dr. Hořák has the potential to play an important role in moving the field from largely broad-scale correlative approach to one grounded in ecological theory tested with extensive empirical data. For the reasons outlined above find the work sufficient for the successful habilitation (i.e., Associate Professor Degree).

Sincerely, Prof. Dr. Catherine Graham

Eidg. Forschungsanstalt für Wald, Schnee und Landschaft WSL
Zürcherstrasse 111, CH-8903 Birmensdorf, Telefon +41-44-739 21 11, Fax +41-44-739 22 15, www.wsl.ch