Seminar

MARIA SERVEDIO

Fellow, SCAS.
Professor of Biology, University of North Carolina, Chapel Hill

The Effects of Sexual Selection on Origin of Species

Tuesday, 24 April, 11:15 a.m.

In the Thunberg Lecture Hall
SCAS, Linneanum, Thunbergsvägen 2, Uppsala
www.swedishcollegium.se

SWEDISH
COLLEGIUM
for ADVANCED STUDY

ABOUT MARIA SERVEDIO

After receiving an A.B. in Biology from Harvard College in 1993, Maria Servedio attended the University of Texas at Austin for her graduate work in theoretical evolutionary biology, obtaining a Ph.D. in Zoology in 1998. Following a brief lectureship at Cornell University (1998–99), she obtained a Center for Population Biology Postdoctoral Fellowship at the University of California, Davis, which she held from 1999 to 2001. She spent 2001–02 at the University of California, San Diego, as a visiting scholar before joining the faculty of the University of North Carolina in 2002. Her research focuses on the development of mathematical models to address outstanding questions in evolutionary biology, concentrating on the topics of speciation, mate choice, and the evolutionary effects of learning. She is currently serving as a handling editor for the journal *Evolution* and as the Vice President (in 2018) of the American Society of Naturalists.

Servedio has published over sixty scientific articles in journals such as *Evolution; the American Naturalist; Trends in Ecology and Evolution; the Proceedings of the Royal Society of London B; the Annual Review of Ecology, Evolution, and Systematics*; and the *Proceedings of the National Academy of Sciences.* These include bodies of work on reinforcement, on male mate choice, and most recently on the effects of sexual selection on the process of speciation.

During her stay at SCAS, Servedio will explore novel mathematical models of how the choice of well-adapted mates may promote speciation.

ABSTRACT

The number of species on earth is vast, with about 1.5 million named species but estimates of total species numbers ranging from tens of millions to a trillion. While bacteria and asexually reproducing species make up some of this total, included in these estimates are mammals, birds, reptiles amphibians and fish totaling 80 thousand, and an estimate of over 1 million species of insects. The vast majority of these latter groups are sexually reproducing and thus closely related species pairs are potentially capable of gene exchange (or "gene flow"). Gene flow between very similar species, if extensive, has the potential to cause species to merge. Species definitions (and there are several, but this is another topic for another time) thus often hinge on the existence of barriers between to gene flow, called isolating mechanisms. When species overlap with each other in space and time discovering the source of barriers to gene flow can lend insight into the evolutionary forces allowing species to remain separated. Similarly, when species are still exchanging genes but can physically contact one another it is possible that barriers to gene flow can evolve, leading to the evolution of two distinct species.

An effective category of isolating mechanisms is that which prevents individuals from different species from mating with each other in the first place. This "premating isolation" often involves mate choice decisions, in which the choosing sex, generally the female, discriminates between males of the incipient species based upon their traits. In general, such mating can generate sexual selection, and evolutionary force akin to natural selection, in which males with certain characteristics have greater mating success than males with other characteristics.

Because closely related species that are in geographic proximity or contact often differ showy male characters that are involved in mate choice, it has often been supposed that sexual selection can be a driving force in the speciation process. Dissecting the conditions under which this is, or is not, expected to be true has been one of the foci of my recent work. I approach these questions using mathematical models. I will present two different major mechanisms of mate choice that differ in the basis of how preferences are determined. By showing how the action of sexual selection differs under these mechanisms, I will explain when each mechanism is, or is not expected to promote trait divergence between species, as well as reproductive isolation. I will end with a brief description of the work in this area that Jenny Boughman and I are beginning at SCAS.