



Curriculum Vitae Prof. Dr. Thomas D. Seeley



Name: Thomas Dyer Seeley

Born: 17 June 1952

Research priorities: animal behavior, sociobiology, evolution, bees, swarm intelligence

Thomas D. Seeley is an American behavioral biologist. His research focuses on the collective intelligence of honey bee colonies, especially their "democratic" process whereby a swarm of honey bees chooses its home site. He is considered a major exponent of the concept of swarm intelligence (SI).

Academic and professional career

- 2013 - 2019 Horace White Professor of Biology, Cornell University, New York, USA
- 1993 - 2013 Horace White Professor of Biology, Cornell University, New York, USA
- 1993 Fellow, Institute for Advanced Study, Berlin
- 1986 - 1993 Associate Professor of Neurobiology and Behavior, Cornell University, New York, USA
- 1980 - 1986 Assistant Professor of Biology, Yale University, Connecticut, USA
- 1978 - 1980 Junior Fellow, Harvard University, Massachusetts, USA
- 1978 Ph.D. in Biology, Harvard University, Massachusetts, USA
- 1974 A.B. in Chemistry, New Hampshire, USA

Functions in scientific societies and committees

- 2005 - 2008 Chairman, Department of Neurobiology and Behavior, Cornell University, New York, USA

Honours and awarded memberships

since 2019	Member of the German National Academy of Sciences Leopoldina
since 2017	Fellow of the American Association for the Advancement of Science
2016	Golden Goose Award, American Association of the Advancement of Science
2001	Alexander von Humboldt Distinguished U.S. Senior Scientist Award
2001	Fellow of the American Academy of Arts and Science

Research priorities

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Seeley has been active as a hobby beekeeper since his youth and began investigating the behavior of these animals in his dissertation. Although humans had been using the honey bee for thousands of years, our scientific study of its behavior and social life goes back only a century or so. Even today Seeley states: "There remain many, many intriguing mysteries about the inner workings of a honey bee colony, and even about the individual worker bee."

From 1995 to 2010, Seeley meticulously examined the behavioral mechanisms by which a honey bee swarm accepts or rejects a future home site. This is accomplished by a few hundred scout bees conducting a "debate" to determine which of a dozen possible nest cavities is the best one.

From 1980 to 1995, Seeley investigated how the bees in a hive function as an integrated whole when gathering food, especially how they wisely distribute themselves across an ever-changing landscape of flower patches. He summarized his findings in the 1995 book "The Wisdom of the Hive: The Social Physiology of Honey Bee Colonies". His 2010 book "Honeybee Democracy" aroused especially broad interest. In it, he described the curiously democratic process whereby a honey bee colony chooses its home, and he did so in an easily understandable way.

Over 15 summers, Seeley steadily investigated the topic of nest-site selection by honey bees. This required "eavesdropping" on the debates among the several hundred scout bees of a swarm, and it involved video recording and translating all of the scout bees' waggle dances. In doing so, he comprehensively described the decision-making behavior of honey bee swarms.

According to his findings, this decision-making is, in essence, a competition to see which option first attracts a threshold level, or quorum, of support among the scout bees. When this quorum is reached, the scout bees sense this and trigger the swarm's departure from its temporary stopover. These scouts then steer the swarm to its destination, the new home. According to Seeley, the

quorum principle produces an optimal democratic decision. To this end, a few scout bees propose new homes to the swarm through waggle dances, which are then evaluated by the swarm in a multi-stage process before a single new nesting site is finally accepted.