RAMAPO COLLEGE OF NEW JERSEY
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"Three species" Hybrid Peat Moss Widespread in the Holantarctic

Study led by Ramapo College Professor Eric Karlin

(MAHWAH, NJ) — Genetic studies have shown that a hybrid peat moss (*Sphagnum ×falcatulum*) having genomes from three different species to be widespread in the Holantarctic floristic region. Populations of this "three species" hybrid are documented for the southern tip of South America, New Zealand, Tasmania, and Macquarie Island according to a study published in the *Journal of Bryology*. The research team was headed by Ramapo College Professor Eric Karlin.

The finding is significant because it shows that this peat moss likely evolved in New Zealand, with subsequent long distance dispersal leading to the relatively recent establishment of many isolated populations across the Holantarctic. Because *S. ×falcatulum* has an extremely variable morphology, genetic study was required to establish the range of morphological variation in the species and also to determine its geographical distribution. "Some forms of the plant have even been described as different species," said Professor Karlin. Indeed, one major outcome of the study was that seven *Sphagnum* species were found to be synonymous with *S. ×falcatulum*.

Another outcome was that, although it is a young species, *S.×falcatulum* was found to be the most widespread peat moss in the Holantarctic floristic region, with populations on both sides of the Pacific Ocean. Although a genetic oddity, the plant is ecologically successful and clearly has the capacity for effective long distance dispersal.

A prior study by Professor Karlin and his colleagues had established that *S.×falcatulum* and another *Sphagnum* species (*S.×australe*) were both "three species" hybrids, the first to be reported for mosses and other bryophytes (liverworts and hornworts).

Hybrids are usually highly infertile and/or sterile. However, hybrids may become fertile if their chromosomes double (resulting in a condition called allopolyploidy). Thus the evolution of fertile "three species" hybrids is associated with two separate hybridization events, each being followed by chromosome doubling. Perhaps the best known "three species" hybrid is bread wheat (*Triticum aestivum*), a flowering plant whose origin is believed to have been within the last 10,000 years.

The research team also included colleagues at the New York Botanic Garden (Dr. Bill Buck) in Bronx, New York, USA, the Australian Antarctic Division (Dr. Rod Seppelt) in Kingston, Tasmania, and Duke University (Sandra Boles, Professor Jonathan Shaw) in Durham, North Carolina, USA. Genetic lab work was done at the Duke University Bryology Lab directed by Professor Jonathan Shaw.

The study is available at:
http://www.ingentaconnect.com/content/maney/jbr/2013/00000035/00000003/art00001

For more information, please contact Professor Karlin at 201.684.7743 or via email at ekarlin@ramapo.edu. For more information about the *Journal of Bryology*, please visit http://maneypublishing.com/index.php/journals/jbr/

Journal Reference: Eric F. Karlin, William R. Buck, Rodney D. Seppelt, Sandra B. Boles, & A. Jonathan Shaw. 2013. The double allopolyploid S*phagnum* ×*falcatulum* (Sphagnaceae) in Tierra del Fuego, a Holantarctic perspective. *Journal of Bryology* 35 (3): 157–172.

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Ranked by *U.S. News & World Report* as sixth in the Best Regional Universities North category, Ramapo College of New Jersey is sometimes mistaken for a private college. This is, in part, due to its unique interdisciplinary academic structure, its size of approximately 6,008 students and its pastoral setting in the foothills of the Ramapo Mountains on the New Jersey/New York border.

Established in 1969, Ramapo College offers bachelor's degrees in the arts, business, humanities, social sciences and the sciences, as well as in professional studies, which include nursing and social work. In addition, Ramapo College offers courses leading to teacher certification at the elementary and secondary levels. The College also offers six graduate programs as well as articulated programs with the University of Medicine and Dentistry of New Jersey, New York Chiropractic College, New York University College of Dentistry, SUNY State College of Optometry and New York College of Podiatric Medicine.