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and traditional taxonomy represents a very powerful approach for detection and description of cryptic species, as well as addressing synonymy issues. The ability to recover DNA barcodes from very old types is presented, emphasizing its potential for solving some of the most difficult taxonomic problems.

DNA barcodes and monitoring forest health

Jeremy R. deWaard & Leland M. Humble

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Corresponding author: Dr. Jeremy R. deWaard, University of British Columbia, Department of Forest Sciences, Forestry Sciences Centre, Vancouver, BC, Canada V6T1Z4; e-mail: jeremy.dewaard@gmail.com

The economic, sociological and biological value of Canada's forests makes their sustainability essential to our well-being. To ensure their sustainability, it is critical to regularly and effectively monitor forest health. Genetic approaches, in particular DNA barcoding, have the potential to revolutionize the practice of forest biomonitoring. We describe how barcoding is being utilized in several ongoing projects concerning the Geometridae and other forest Lepidoptera in Western Canada. Firstly, a barcode library for geometrids is near completion and is currently being employed in a pilot project for the detection and surveillance of invasive defoliators. Our reliance on natural history collections for construction of this reference database, as well as the resultant discovery of invasive species and regional records, are described. Secondly, genetic methods are being applied to monitoring the diversity effects of anthropogenic disturbances (e.g. silviculture) and natural modifications (e.g. native pest outbreaks) in Canada's forests. The combined application of DNA barcoding with a North American geometrid phylogeny and a rapidly evolving marker (informative at the population level) is described, allowing the measure of multiple levels of diversity across varying treatments of disturbance. Lastly, an outline of how barcoding is facilitating the generation of regional faunal inventories is given, highlighting how a provincial geometrid checklist is being refined, while a moth inventory for one of North America's largest urban parks is being defined.

On the systematic position and molecular phylogeny of *Lythria* Hübner (Lepidoptera: Geometridae: Sterrhinae)

Erki Õunap, Vladimir Mironov & Jaan Viidalepp

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Corresponding author: Dr. Erki Õunap, Institute of Zoology and Hydrobiology, University of Tartu, Vanemuise 46, 51014 Tartu, Estonia; e-mail: erkio@ut.ee

The geometrid genus *Lythria*, comprising five Palaearctic species, was for long treated as a member of the subfamily Larentiinae. However, detailed investigation revealed that there are several morphological characters that link *Lythria* with the subfamily Sterrhinae. Therefore, molecular phylogenetic study was conducted on a basis of three nuclear and two mitochondrial gene sequences to find out whether *Lythria* is a larentiine or sterrhine genus. The phylogenetic analysis reliably demonstrated that *Lythria* belongs to the subfamily Sterrhinae. Unfortunately, the intrageneric relationships within *Lythria* appeared to be in conflict with morphological data, as *L. sanguinaria* grouped together with *L. purpuraria*, not with *L. cruentaria*. We therefore performed an additional analysis which included also the fourth European

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