

# AN EQUATION FOR DETERMINING PERCENTAGE OF HERBIVORY ON *PINGUICULA MORANENSIS* – A CORRECTION

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Recently Alcalá *et al.* (2010) explored the potentially defensive function of sticky traps in *Pinguicula moranensis*. Specifically, the authors assessed the defensive role of glandular trichomes in the interaction between *P. moranensis* and its insect herbivores.

Alcalá *et al.* (2010) offered a unique digital photography tool and a method for determining the amount of herbivory. To create a baseline level of insect herbivory the authors developed an equation to determine the percentage of leaf herbivory. Unfortunately, the equation published in the article contained an error. The goal of this article is to offer a correction to the error.

Herbivory damage was defined as the percent of leaf area eaten by herbivores. A leaf was considered damaged when part of its lamina was missing, including holes or incomplete leaf margins. Using digital photography software, the authors calculated the actual leaf area for each plant. The authors estimated, taking into account leaf overlap, they were able to measure over 80% of the leaves of each plant.

The actual leaf area (ALA) was defined as the sum of the leaf area of the leaves. To estimate potential leaf area (PLA), using the software the leaf contours were drawn minus the spaces representing the damaged areas.

Specifically, Alcalá *et al.* defined leaf herbivory (LH) as:

$$\text{LH} = \frac{(\text{PLA} - \text{ALA})}{\text{PLA}} \times 100$$

If the goal is to estimate the fractional amount of leaf area that is missing as a result of herbivory, the published equation would not produce an accurate number. Mathematically, in this equation the PLA in the denominator will cancel out the PLA in the numerator, leaving only the ALA. This would result in the percentage of leaf herbivory equal to actual leaf area multiplied by 100. Consequently, the percentage of leaf herbivory would be much greater than actual leaf area available.

To determine the area missing, or percentage of area missing in the leaf, the correct operand in the numerator should be a minus sign. The correct equation should read:

$$\text{LH} = \frac{(\text{PLA} - \text{ALA})}{\text{PLA}} \times 100$$

A review of the journal's table of contents did not reveal any errata correcting this error. As the content and results of the article appear to be accurate, consistent, and reasonable, it is likely that this was a simple typographical error.

This minor error aside, the digital photographic analysis and the equation estimating leaf herbivory are useful tools, and should be considered by botanists working on carnivorous plants.

## Reference

Alcalá, R., Mariano, N.A., Osuna, F., and Abarca, C.A. 2010. An experimental test of the defensive role of sticky traps in the carnivorous plant *Pinguicula moranensis* (Lentibulariaceae). *Oikos* 119(5): 891-895.