



Phytotaxa 17: 1–271 (2011)
www.mapress.com/phytotaxa/
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Monograph

ISSN 1179-3155 (print edition)
PHYTOTAXA
ISSN 1179-3163 (online edition)



PHYTOTAXA

17

A revision of *Geonoma* (Arecaceae)

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Magnolia Press
Auckland, New Zealand

Accepted by W. Baker: 2 Nov. 2010; published: 18 Feb. 2011

ANDREW HENDERSON
A revision of *Geonoma* (Arecaceae)
(*Phytotaxa* 17)

271 pp.; 30 cm.

18 Feb. 2011

ISBN 978-1-86977-647-3 (paperback)

ISBN 978-1-86977-648-0 (Online edition)

FIRST PUBLISHED IN 2011 BY

Magnolia Press

P.O. Box 41-383

Auckland 1346

New Zealand

e-mail: magnolia@mapress.com

<http://www.mapress.com/phytotaxa/>

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ISSN 1179-3155 (Print edition)

ISSN 1179-3163 (Online edition)

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Abstract

A taxonomic revision and phylogeny of the neotropical palm genus *Geonoma* based on morphological data and morphometric methods was carried out. 4990 herbarium specimens were scored for 44 qualitative variables and 27 quantitative variables. Qualitative variables were divided into 30 characters and 14 traits. Using the phylogenetic species concept, characters were used to recognize 68 species. These are widely distributed from southern Mexico to Bolivia and Paraguay, and reach the Lesser Antilles and Hispaniola. Analysis of each species for traits, geographic distribution, and quantitative variables led to recognition of 90 subspecies in 18 species, giving a total of 140 taxa. Twelve new species (*G. bernalii*, *G. concinnoidea*, *G. deneversii*, *G. dindoensis*, *G. fosteri*, *G. galeanoae*, *G. gentryi*, *G. operculata*, *G. peruviana*, *G. sanmartinensis*, *G. schizocarpa*, *G. venosa*) and 33 new subspecies (*G. brongniartii* subsp. *pascoensis*, *G. concinna* subsp. *simplex*, *G. concinnoidea* subsp. *coclensis*, *G. concinnoidea* subsp. *jefensis*, *G. congesta* subsp. *osensis*, *G. cuneata* subsp. *guanacastensis*, *G. cuneata* subsp. *indivisa*, *G. cuneata* subsp. *minor*, *G. cuneata* subsp. *rubra*, *G. deversa* subsp. *belizensis*, *G. deversa* subsp. *peninsularis*, *G. deversa* subsp. *quadriflora*, *G. ferruginea* subsp. *nicaraguensis*, *G. lehmannii* subsp. *corrugata*, *G. longivaginata* subsp. *copensis*, *G. longivaginata* subsp. *sanblasensis*, *G. longivaginata* subsp. *vallensis*, *G. maxima* subsp. *dispersa*, *G. maxima* subsp. *multiramosa*, *G. maxima* subsp. *sigmoidea*, *G. pohliana* subsp. *linharensis*, *G. pohliana* subsp. *rodriguesii*, *G. pohliana* subsp. *unaensis*, *G. stricta* subsp. *antioquiensis*, *G. stricta* subsp. *bracteata*, *G. stricta* subsp. *divaricata*, *G. stricta* subsp. *pendula*, *G. stricta* subsp. *pliniana*, *G. stricta* subsp. *quibdoensis*, *G. stricta* subsp. *submontana*, *G. undata* subsp. *tacarcunensis*, *G. undata* subsp. *tumucensis*, *G. undata* subsp. *venezuelana*) are described. Forty-one new combinations are made. Several of the most variable species are considered to be species complexes and are divided into morphotypes—groups of similar specimens with no formal taxonomic status. Nomenclature, descriptions and distribution maps are provided for each species and subspecies. Images of the type specimens of all new taxa are also provided. A phylogenetic analysis, using the same 30 characters used for the taxonomic revision was carried out using parsimony analysis. A sample tree and consensus tree are shown and a discussion is given of the various clades.

Key words: Palmae, palms, phylogeny, morphometrics, Neotropics

Introduction

Geonoma Willdenow (1805: 174) is one of the largest three palm genera in the Neotropics, approximately equal in size to *Bactris* Jacquin ex Scopoli (1777: 70) and *Chamaedorea* Willdenow (1806: 638). Species of *Geonoma* are common in lowland and montane tropical moist forests in Central and South America, and reach Hispaniola and the Lesser Antilles. They occur from sea level to just over 3000 m elevation. *Geonoma* are usually rather small, understory palms, although some reach the canopy of montane forests.