

Tribal Classification and Diversity in the Asteraceae of Peru

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Abstract

The Asteraceae is one of the largest families of Angiosperms with +1500 genera and +20,000 species. Within the Peruvian flora, the Asteraceae is of the largest and most conspicuous elements, well-represented in all environments with the exception of the low-land tropics. This paper provides a synopsis of the current tribal classification of the Peruvian Asteraceae and diversity figures for South American representatives. Recent investigations of the Peruvian Asteraceae have yielded additional records and new species since the last listing in 1993, when 222 genera and 1432 species were recorded. In the subsequent decade, the numbers have climbed to 237 genera and 1541 species.

Fifteen tribes are represented by with native or naturalized taxa in Peru: Anthemideae (9 gen., ca. 15 spp); Astereae (18 gen, ca. 170 spp.); Barnadesieae (5 gen., ca. 28 spp); Cardueae (3 gen., 5 spp.); Eupatorieae (46 gen., ca. 325 spp.); Gnaphalineae (13 gen., ca. 50 spp.); Helenieae (4 gen., ca. 6spp.); Heliantheae (59 gen., ca. 300 spp.); Lactuceae (7 gen., ca. 32 spp.; Liabeae (13 gen., ca. 80 spp.); Mutisieae (16 gen., ca. 90 spp.); Plucheeae (4 gen., ca. 7 spp); Senecioneae (16 gen., ca. 340 spp); Tageteae (5 gen., ca. 12 spp); and Vernonieae (22 gen., ca. 70 spp). The Calenduleae has only one cultivated species (*Calendula officinalis* L.), and tribes Arctotoideae and Inuleae (sensu stricto) contain no native nor naturalized representatives in Peru.

Thirteen genera are currently recognized as endemic to Peru: *Asciidiogyne*, *Caxamarca*, *Ellenbergia*, *Hughesia*, *Nothobaccharis*, *Uleophytum*, *Syncretocarpus*, *Bishopanthus*, *Chionopappus*, *Pseudeonoseris*, *Chucoa*, *Shizotrichia*, and *Aynia*. The genus *Arnaldoa* has been discovered in southern Ecuador, as has the genus *Crossothamnus*. New, non-endemic genera for the Peruvian flora include *Chiliotrichiopsis* (Astereae), *Dillandia*

(Liabeae), *Laestadia* (Astereae), *Stenopadus* (Mutisieae), *Talamancalia* (Senecionaeae), *Trepadonia* (Vernonieae), and *Xenophyllum* (Senecioneae) amongst others.

Recent and/or important literature references is provided for each tribe. A list of the 111 species discovered since 1993 is provided. This list will be updated frequently and made available on the Internet http://www.sacha.org/Asteraceae_adiciones.htm

Resumen

Las Asteráceas representan una de las familias más numerosas de Angiospermas con más de 1500 géneros y más de 20,000 especies. Dentro del flora peruana, la familia Asteraceae es una de las más grandes y se distribuyen en casi todos los ambientes con excepción de la selva baja. El presente trabajo provee una sinopsis de la clasificación de las tribus actuales que componen la familia Asteraceae en el Perú así como cifras de su diversidad representada en Perú y Sudamérica. Las investigaciones recientes de las Asteráceas peruanas han producido registros adicionales y nuevas especies desde el último listado en 1993 en el cual se registran 222 géneros y 1432 especies. En la década siguiente, el número se ha elevado ha 237 géneros y 1541 especies.

Quince tribus están representadas por taxa nativos o naturalizados en el Perú: Anthemideae (9 gen., ca. 15 spp.); Astereae (18 gen., ca. 170 spp.); Barnadesieae (5 gen., ca. 28 spp.); Cardueae (3 gen., 5 spp.); Eupatorieae (46 gen., ca. 325 spp.); Gnaphalineae (13 gen., ca. 50 spp.); Helenieae (4 gen., ca. 6 spp.); Heliantheae (59 gen., ca. 300 spp.); Lactuceae (7 gen., ca. 32 spp.); Liabeae (13 gen., ca. 80 spp.); Mutisieae (16 gen., ca. 90 spp.); Plucheeae (4 gen., ca. 7 spp.); Senecioneae (16 gen., ca. 340 spp.); Tageteae (5 gen., ca. 12 spp.); y Vernonieae (22 gen., ca. 70 spp.). La tribu *Calenduleae* está representada solamente por una especie cultivada (*Calendula officinalis* L.) y las tribus Arctotoideae e Inlueae (s.s.) no tienen ningún representante en Perú.

Trece géneros son endémicos de Perú: *Ascidiogyne*, *Caxamarca*, *Ellenbergia*, *Hughesia*, *Nothobaccharis*, *Uleophytum*, *Syncretocarpus*, *Bishopanthus*, *Chionopappus*, *Pseudeonoseris*, *Chucoa*, *Shizotrichia*, y *Aynia*.

El género *Arnaldoa* (Barnadesieae) ha sido descubierto en el sur de Ecuador, de la misma manera que el género *Crossothamnus*. Entre los nuevos géneros no endémicos para la flora peruana se incluye a *Chiliotrichiopsis* (Astereae), *Dillandia* (Liabeae), *Laestadia* (Astereae), *Stenopadus* (Mutisieae), *Talamancalia* (Senecioneae), *Trepadonia* (Vernonieae) y *Xenophyllum* (Senecioneae), entre otros.

Las referencias de literatura recientes y más importantes son suministradas para cada tribu. Una lista de 111 especies descubiertas desde 1993 es proveída. Esta lista será actualizada frecuentemente y está disponible a través de la [www.http://www.sacha.org/Asteraceae_adiciones.htm](http://www.sacha.org/Asteraceae_adiciones.htm).

Introduction

The exact number of taxa in the Asteraceae has been variously estimated. Mabberley (1987) estimated the size of the family at 1314 genera and 21,000 species; Turner and Nesom calculated 1500 genera and +25,000 species (Turner & Nesom, 1989); and Bremer (1994) estimated 1535 genera and ca. 23,000 species. South America contains high levels of generic diversity with over 450 genera or roughly 30% of the generic diversity in the entire family (Bremer 1994). Equally high levels of species diversity are common throughout South America, where the family typically represents 10% or more of the local flowering plant diversity (Turner & Nesom, 1989). The continent of South America has been suggested as possibly the geographic point of origin of the Asteraceae (Raven & Axelrod 1974; Turner 1977; Bremer 1994). It contains most of the diversity of the Barnadesieae (Subfamily Barnadesioideae), the tribe considered basal in the Asteraceae (Bremer 1994; Jansen et al. 1991). In South America, the largest number of genera is found in the tribes Eupatorieae (ca. 116 genera), Heliantheae (ca. 90 genera), Vernonieae (ca. 57 genera), Mutisieae s.s. (ca. 54 genera), and Astereae (ca. 34 genera). The smallest tribes are the Barnadesieae with 9 genera and 92 species, the Liabeae with 16 genera and over 150 species, the Gnaphalineae with 20 genera and ca. 100 species, and the Plucheeae with 6 genera and 26 species.

In Peru, the Asteraceae are one of the largest and most diverse families in the flora. Dillon and Hensold (1993) compiled the first detailed listing of the Asteraceae for the Peruvian flora and recorded 222 genera and ca. 1432 species. That figure lacked precision due to overlooked species. Now, after nearly 10 years, the diversity figures for the Asteraceae have changed considerably. In a recent publication, Beltrán and Baldeón (2001) reported 245 genera and 1530 species for the Peruvian Asteraceae. In the current study, we have attempted to account for newly described and validly published names, and in most cases have examined a voucher. We report here 237 genera and ca. 1540 species. Our totals would reach 243 genera, if we included *Carthamnus*, *Calendula*, *Gerbera*, *Helichrysum*, *Madia*, and *Monticalia*.

Fifteen tribes are represented by native or naturalized taxa in Peru: Anthemideae with 9 genera, ca. 15 species; Astereae with 18 genera, ca. 170 species; Barnadesieae with 5 genera, ca. 28 species; Cardueae with 3 genera, 5 species; Eupatorieae with 46 genera, ca. 325 species; Gnaphalineae with 13 genera, ca. 50 species; Helenieae with 4 genera, ca. 6 species; Heliantheae with 59 genera, ca. 300 species; Lactuceae with 7 genera, ca. 32 species; Liabeae with 13 genera, ca. 80 species; Mutisieae with 16 genera, ca. 90 species; Plucheeae with 4 genera, ca. 7 species; Senecioneae with 16 genera, ca. 340 species; Tageteae with 5 genera, ca. 12 species; and Vernonieae with 22 genera, ca. 70 species. Only tribes Arctotoideae, Calenduleae (*Calendula officinalis* L.), and Inuleae (sensu stricto) contain no native nor naturalized representatives in Peru. While the tribe Cardueae contains only introduced species, it is included here since some species are widely distributed and naturalized.

Endemism in the Peruvian Asteraceae is high with over 750 species (ca. 50% of the total) and 13 genera considered endemic to Peru. The tribe Eupatorieae has 5 endemic genera

(*Ascidogyne*, *Ellenbergia*, *Hughesia*, *Nothobaccharis*, *Uleophytum*), Heliantheae only one (*Syncretocarpus*), Liabeae has 3 endemic genera (*Bishopanthus*, *Chionopappus*, *Pseudonoseris*), Mutisieae only one (*Chucoa*), Senecioneae only one (*Caxamarca*), Tageteae only one (*Schizotrichia*), and Vernonieae only one (*Aynia*). The largest genus within the flora is *Senecio* (Senecioneae) with ca. 180 species, followed by *Mikania* (Eupatorieae) with ca. 84 species, *Verbesina* (Heliantheae) with ca. 56 species, *Gynoxys* (Senecioneae) with ca. 48 species, *Ageratina* (Eupatorieae) with 43 species, *Pentacalia* (Senecioneae) with ca. 40 species, and *Diplostephium* (Astereae) with ca. 40 species. Endemic genera are in bold-face in the lists for each tribe.

In Peru, the Asteraceae is an important member of nearly every vegetational community from ocean strand to high-elevation habitats in excess of 4500 m. The family is not uniformly distributed and overall finds its greatest species and generic diversity in strongly the seasonal habitats with pronounced dry/wet cycles of intermontane valleys or in strongly diurnal regimes such as jalca and ceja de la montaña. Representation in arid or semi-arid habitats is also notable; the coastal lomas formations contain + 70 Asteraceae species, many endemic (Dillon, unpubl.data). The only environments containing reduced numbers of Asteraceae are the lowland rain forests where few species are found on the forest floor though lianas occupy canopy sites while others are restricted to disturbed habitats of roadsides, tree gaps or riparian sites.

With the advent of molecular techniques (Jansen & Palmer, 1987.) and cladistic analysis (Bremer, 1994), the accepted internal structure and classification of the Asteraceae has changed over the last 20 years. The family is now considered to contain three subfamilies. (1) the Barnadesioideae (tribe Barnadesieae), (2) the Cichorioideae (tribes Mutisieae, Cardueae, Lactuceae, Vernonieae, Liabeae, Arctoteae), and (3) the Asteroideae (tribes Inuleae, Plucheeae, Gnaphalieae, Calenduleae, Astereae, Anthemideae, Senecioneae, Hielenieae, Heliantheae, Tageteae, Eupatorieae).

The following discussion gives a summary of tribes recognized within the Peruvian flora and their generic and species diversity. We are trying to make the relevant publications on the family Asteraceae available and update the listing of tribes and genera. New species are continually being described and many more were omitted from the **Catalogue of the Flowering Plants and Gymnosperms of Peru** (Dillon & Hensold, 1993). For this reason, we provide a listing of some of the new records and species reported for the Peruvian flora.

We are also maintaining a webpage http://www.sacha.org/Asteraceae_adiciones.htm via the internet, where new Peruvian records and synonymy are being maintained as an ongoing resource to researchers.

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I. ANTHEMIDEAE

Worldwide, the Anthemideae is a large tribe consisting of 109 genera and about 1,740 species (Bremer, 1994), occurring primarily in the temperate Northern Hemisphere. It is not an important tribe in the Neotropics. In Peru, the tribe is represented by 9 genera and 15 species, most of which are introduced weeds or escapees from cultivation; however, *Cotula* and *Soliva* contain native species. There are no endemic genera in Peru.

Genera: *Achillea*, *Artemisia*, *Cotula*, *Dendrathera*, *Leucanthemum*, *Matricaria*, *Santolina*, *Soliva*, *Tanacetum*.

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II. ASTEREAEE

Worldwide, the Astereae is one of the largest tribes in the family with an estimated 170 genera and nearly 3000 species. Centers of diversity are found in North America, South Africa, New Zealand and Australia. In South America, the tribe contains approximately 34 genera primarily confined to the Andean Cordillera. In Perú, the tribe is represented by 18 genera and ca. 170 species, with highest concentration of species in *Baccharis* with 75 species, followed by *Diplostephium* with 40 species. It should be noted that *Plagiocheilus* has been moved from Anthemideae to the Astereae, and *Novenia* has been moved from the Gnaphalineae to the Astereae (Nesom, 1994). The description of *Chiliotrichiopsis* from southwestern Peru (Dept. Ayachuco) is a new interesting generic disjunction from Argentina. There are no endemic genera within the Astereae in Peru.

Genera: *Baccharis*, *Chiliotrichiopsis*, *Conyza*, *Diplostephium*, *Egletes*, *Erigeron*, *Grindelia*, *Haplopappus*, *Laennecia*, *Laestadia*, *Lepidohyllum*, *Llerasia*, *Noticastrum*, *Novenia*, *Orithrophium*, *Parastrephia*, *Plagiocheilus*, *Psilactis*.

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III. BARNADESIEAE

The Barnadesieae is a newly created tribe, but one that is quite well marked both morphologically and chemically (Bremer, 1994; Gustafsson et al., 2001; Jansen & Palmer, 1987). The distinctions are considered so great that the tribe has been placed in its own subfamily (Barnadesioideae). The members of this tribe were previously considered part of the Mutisieae and treated there in the *Flora of Peru* (Ferreya, 1995). The tribe contains 9 genera and 92 species and is confined to South America. In Peru, the tribe is represented by five genera and 28 species. Until recently, *Arnaldoa* was considered to be a Peruvian endemic; however, a new species was discovered in southern Ecuador (Ulloa et al., in press). While Harling (1991) stated that *Fulcaldea* was endemic to Ecuador, it undoubtedly has Peruvian populations (Ferreya, 1995).

Genera: *Arnaldoa*, *Barnadesia*, *Chuquiraga*, *Dasyphyllum*, *Fulcaldea*.

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IV. CARDUEAE

Worldwide, the Cardueae contains approximately 83 genera and ca. 2500 species, and is primarily distributed throughout the Old World in North Africa and Eurasian area. In South America, the tribe is represented primarily by Old World weeds and the 3 genera and 5 species represented in Peru are all introduced and often naturalize weeds in the New World. Vouchers of *Carthamnus lanatus* L. (~*Kentrophyllum*), a native of the Mediterranean region, have not been examined. *Cynara scolymus* L. (artichoke, *alcachofa*) is not usually encountered outside of cultivation.

Genera: *Centaurea*, *Cirsium*, *Silybum*.

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V. EUPATORIEAE

The tribe Eupatorieae is a large tribe with approximately 170-180 genera and 2400 species worldwide, with centers of diversity in Mexico, Central and South America. The South American Andes are one of the major centers of generic diversity with 116 genera recorded. In Peru, the tribe is one of the largest with 46 genera and 325 species. Five genera are considered endemic to Peru. The largest Peruvian genus is *Mikania* with 84 species, followed by *Ageratina* with 43 species, and *Stevia* with ca. 30 species.

Genera: *Adenostemma*, *Ageratina*, *Ageratum*, *Amboroa*, *Aristeguietia*, *Ascidogyne*, *Asplundianthus*, *Austroeupatorium*, *Ayapana*, *Ayapanopsis*, *Badilloa*, *Bartlettina*, *Brickellia*, *Chromolaena*, *Condylidium*, *Critonia*, *Critoniella*, *Cronquistianthus*, *Crossothamnus*, *Dasycondylus*, *Ellenbergia*, *Ferreyrella*, *Fleischmannia*, *Grosvenoria*, *Guevaria*, *Gymnocoronis*, *Hebeclinium*, *Helogyne*, *Heterocondylus*, *Hughesia*, *Idiothamnus*, *Isocarpha*, *Kaunia*, *Koanophyllon*, *Mikania*, *Neocuatrecasia*, *Nothobaccharis*, *Ophyryosporus*, *Phalacraea*, *Polyanthina*, *Praxelis*, *Raulinoreitzia*, *Sciadocephala*, *Stevia*, *Uleophytum*, *Urolepis*.

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VI. GNAPHALIEAE

The subtribe Gnaphaliinae (sensu Anderberg) was established for a group of ca. 180 genera ca. 2000 species, with worldwide distribution and centers of diversity in Africa, Asia, and the Neotropics. Bremer (1987) concluded that the traditional tribe Inuleae was paraphyletic and suggested that three tribes were justified. Chloroplast DNA restriction site mapping studies by Jansen et al. (1990,1991) and others (Keeley & Jansen 1991) support the hypothesis that the Gnaphalieae and Plucheeae are distinct from the Inuleae. In a series of papers, Anderberg (1989, 1991) dismantled the Inuleae (sensu lato) and treated the constituent genera in the three newly constituted tribes that roughly corresponded to the traditional subtribes: Inuleae (*sensu stricto*), Plucheeae, and Gnaphalieae.

The Peruvian genera formerly attributed to the tribe Inuleae (cf. Dillon & Sagástegui, 1991) are now assigned to two new tribes: Gnaphalineae with 13 genera and ca. 50 species, and Plucheeae with 4 genera and 7 species. The popular ornamental, *Helichrysum bracteatum* (Vent) Andrews, is rarely encountered outside of cultivation. The distribution of *Mniodes* is essentially endemic to Peru (*), but there are reports of the genus from extreme northern Chile.

Genera. *Achyrocline*, *Antennaria*, *Chevreulia*, *Cuatrecasasiella*, *Facelis*, *Gamochaeta*, *Jalcophila*, *Loricaria*, *Lucilia*, *Luciliocline*, ***Mniodes****, *Pseudognaphalium*, *Stuckertiella*.

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VII. HELENIEAE

The tribe Helenieae has traditionally been separated from the Heliantheae by the lack of paleae on the receptacle and a pappus of scales or absent. A recent study utilizing nuclear DNA evidence to realign many of the genera in this tribe (Baldwin et. al. 2002). At this moment, we have chosen to place the members of the traditional tribe Helenieae Benth. & Hook (*Helenium*, *Hymenoxys*) and the tribe Bahieae B.G. Baldwin (*Schkuhria*) in this tribe. These genera lack paleae and have pappus of scales or lack a pappus. *Madia* (Madiaceae Jeps) has been reported for Peru but no voucher has been examined. Villanova Lagasca (1816) was conserved over Villanova Ortega (1797), and moving Vasquezia, R.A. Philippi (1860) into synonymy. In the study by Baldwin et. al. (2002) the placement of Villanova is still controversial. In Perú, four genera contain six species.

Genera: *Helenium*, *Hymenoxys*, *Schkuhria*, *Villanova*

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VIII. HELIANTHEAE.

Worldwide, the Heliantheae contain 189 genera and nearly 2500 species. The highest diversity in the tribe is in the Neotropics and the Andean Cordillera. In Peru, the Heliantheae has ca. 300 species and 59 genera and marks the highest generic diversity for any tribe represented. *Xanthium strumarium* L. has been reported from Colombia to Paraguay and one Peruvian voucher is reported from MO. The largest genera are *Verbesina* with 50 species,

Coreopsis with 35 species and *Pappobolus* with 31 species.

Genera: *Acanthospermum*, *Acanthoxanthium*, *Acmella*, *Alloispermum*, *Ambrosia*, *Aphanactis*, *Aspilia*, *Baltimora*, *Bidens*, *Blainvillia*, *Borrichia*, *Calea*, *Chrysanthellum*, *Clibadium*, *Complata*, *Coreopsis*, *Cosmos*, *Delilia*, *Eclipta*, *Eleutheranthera*, *Encelia*, *Enhydra*, *Ericentrodea*, *Flourensia*, *Galinsoga*, *Garcilassa*, *Helianthus*, *Heliopsis*, *Heterosperma*, *Hidalgoa*, *Ichthyothere*, *Jaegeria*, *Lagascea*, *Melanthera*, *Milleria*, *Monactis*, *Montanoa*, *Neurolaena*, *Oblivia*, *Oyedaea*, *Pappobolus*, *Parthenium*, *Perymenium*, *Polymnia*, *Salmea*, *Schistocarpha*, *Schizoptera*, *Siegesbeckia*, *Simsia*, *Smallanthus*, *Spilanthes*, ***Syncretocarpus***, *Tridax*, *Verbesina*, *Viguiera*, *Wedelia*, *Wulffia*, *Xanthium*, *Zinnia*

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IX. LACTUCEAE

Worldwide, the Lactuceae contains 98 genera and more than 1550 species. It is primarily a Northern Hemisphere tribe with centers of diversity in the Mediterranean area, Central Asia, and southwestern North America. In Peru, the tribe is represented by 7 genera and 32 species. There are no endemic genera in Peru.

Genera: *Crepis*, *Hieracium*, *Hypochaeris*, *Lactuca*, *Pricosia*, *Sonchus*, *Taraxacum*

References

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X. LIABEAE

The Liabeae is a well defined Neotropical tribe that contains approximately 16 genera and + 180 species distributed in a wide variety of habitats throughout Mexico, Central America, West Indies (Cuba, Jamaica, Hispaniola), and Andean South America (Robinson,

1983; Funk et. al. 1996). Peru contains the greatest diversity in the Liabeae, where no fewer than 14 genera and perhaps 80 species are represented. Its acceptance as a distinct tribe was not immediate and its component taxa have, until recently, been variously placed in the Vernoniaeae or Senecioneae. Robinson and Brettell (1973, 1974) and (Nordenstam 1977) accepted the tribe and positioned it near the Vernoniaeae. Phylogenetic studies of Bremer (1987, 1994) and Jansen et al. (1991) have supported the monophyly of the tribe and its placement near the Vernoniaeae. Funk and Robinson (2001) recently described a new genus, *Dillandia*, based upon its nuclear ribosomal DNA sequence data and a suite of morphological characters.

Genera: *Bishopanthus*, *Cacosmia*, *Chionopappus*, *Chrysactinium*, *Dillandia*, *Erato*, *Ferreyranthus*, *Liabum*, *Munnozia*, *Oligactis*, *Paranephelium*, *Philoglossa*, *Pseudonosseris*.

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XI. MUTISIEAE

The Mutisieae is primarily a Neotropical tribe with 76 genera and 970 species and greatest diversity in austral South America. In Peru, the tribe contains 16 genera and ca. 90 species. The removal of the genera now treated in the Barnadesieae is one of the more recent changes in this tribe. *Gerbera jamesonii* Bojus ex Hook.f. (Transvaal daisy) is a popular ornamental.

The rare genus *Chucoa*, known from only two collections, was recently re-collected near the type locality in Prov. Santiago de Chuco, Dept. La Libertad (Sagástegui et al. 16626, HAO). *Stenopadus andicola* Pruski has been reported from Peru, but no voucher has been seen by us.

Genera: *Chaetanthera*, *Chaptalia*, ***Chucoa***, *Gochnatia*, *Jungia*, *Leucheria*, *Lophopappus*, *Lycoseris*, *Mutisia*, *Onoseris*, *Perezia*, *Plazia*, *Polyachyrus*, *Proustia*, *Trichocline*, *Trixis*

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XII. PLUCHEEAE

Worldwide, the tribe Plucheeae contains 28 genera and ca. 220 species. It is a relatively small group in South America and represented by six genera containing perhaps 36 species. In Peru, the tribe is represented by 4 genera and 7 species. This tribe finds its greatest generic and species diversity in essentially low or mid-elevation habitats of austral South

America. This is sharp contrast to the Gnaphalieae which finds its greatest species diversity in predominately high-elevation genera of the Andean Cordillera.

Genera: *Pluchea*, *Pseudoconyza*, *Pterocaulon*, *Tessaria*.

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XIII. SENECEONEAE

Worldwide, the Senecioneae contains 120 genera and more than 3000 species. It is an important tribe in South America and represented in Peru by 16 genera and ca. 340 species. The genus *Senecio* with ca. 180 species is the largest genus in the Peruvian flora (Villon & Dillon, 1996). Other large genera include *Gynoxys* with 48 species and *Pentacalia* with 40 species. No endemic genera are known from Peru.

Genera: *Aequatorium*, *Caxamarca*, *Chersodoma*, *Dendrophorbium*, *Dorobaea*, *Erechtites*, *Gynoxys*, *Lasiocephalus*, *Misbrookia*, *Paracalia*, *Pentacalia*, *Pseudogynoxys*, *Senecio*, *Talamancalia*, *Werneria*, *Xenophyllum*.

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XIV. TAGETEAE

The Tageteae contain 34 genera and + 250 species native to the New World. The tribe is characterized by highly dissected leaves and phyllaries with pellucid secretory cavities producing aromatic oils (Strother, 1977). In the treatment by Karis & Ryding (1994), its members were placed in the tribe Helenieae. The results of Baldwin et al. (2002) re-establish the validity of the tribe. In Peru, it is represented by 5 genera and 12 species, with one endemic genus.

Genera: *Flaveria*, *Pectis*, *Porophyllum*, *Schizotrichia*, *Tagetes*.

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XV. VERNONIEAE

Worldwide, the tribe Vernonieae contains ca. 70 genera and 1500 species, most of which are in the core genus *Vernonia*. The tribe is distributed thourghout the New and Old World tropics and extends into temperate North America. In Perú, the tribe is represented by 22 genera and 70 species. The genus *Vernonia*, before its fragmentation, contained ca. 38 species. H. Robinson (1989, 1996, 1999) has created and re-instated segregate genera for elements formerly treated as *Vernonia* (Dillon & Sagástegui, 1998).

Genera: *Aynia*, *Centrantheum*, *Chrysolaena*, *Critoniopsis*, *Cuatrecasanthus*, *Cyanthillium*, *Cytocymura*, *Eirmocephala*, *Elephantopus*, *Lepidaploa*, *Lessingianthus*, *Quehualia*, *Pacourina*, *Piptocarpha*, *Pollalesta*, *Pseudelephantopus*, *Rolandra*, *Struchium*, *Trichospira*,

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Appendix 1. Additions of Peruvian Asteraceae

The Catalogue of the Flowering Plants and Gymnosperms of Peru (Brako & Zarucchi 1993) was a benchmark in the recounting of Peruvian floristic diversity. Since its publication in 1993, additions and omissions to the flora have been encountered (Beltrán & Baldeón, 2001). The taxa listed here are not found in Brako & Zarucchi (1993) and are provided with the proper author citation as a resource to researchers. No judgment as to their taxonomic validity is implied or intended. New genera are in boldface.

Aphanactis hutchisonii H. Rob.
Ayapanonsis wurdackiana H. Rob.
Baccharis articulata Pers.
Baccharis jhonwurdackiana H. Rob.
Chaptalia exscapa (Pers.) Baker
Caxamarca M.O.Dillon & Sagást.
Caxamarca sanchezii M.O.Dillon & Sagást.
Chersodoma deltoidea Sagást. & M.O.Dillon
Chiliotrichiopsis peruviana Nesom, H. Rob. & Granda
Chrysactinium breviscapum M.O.Dillon & Sagást.
Chrysactinium wurdackii Zermoglio & V.A.Funk
Chuquiraga raimondiana Granda
Chuquiraga oblongifolia Sagást. & Sánchez
Coreopsis canescentifolia Sagást.
Coreopsis dentifolia Sánchez, Sagást. & Crawford
Coreopsis dilloniana Sánchez, Sagást. & Crawford
Coreopsis ferreyrae Sagást & Sánchez
Coreopsis helleborifolia Sánchez, Sagást. & Crawford
Critoniopsis ayabacensis Sagást. & M.O.Dillon
Critoniopsis boliviana (Britton) H.Rob.
Critoniopsis gynoxiifolia H.Rob.
Critoniopsis huairacajana (Hieron.) H.Rob.
Critoniopsis oblongifolia Sagást. & M.O.Dillon
Critoniopsis quilloensis H.Rob.
Delilia biflora Kuntze
Dendrophorbium multinerve (Schultz-Bip.) C.Jeffrey (~*Senecio*)
Dillandia V.A.Funk & H.Rob.
Dillandia chachapoyensis (H.Rob.) V.A.Funk & H.Rob. (~*Munnozia*)
Dillandia subumbellata V.A.Funk & H.Rob.
Diplostephium rupestre (Kunth) Wedd.
Dorobaea laciniata (Kunth) B. Nord & J. Pruski
Emilia fosbergii Nicolson

Ferreyranthus gentryi H. Rob.
Gamochaeta lulioana S.E.Freire & Iharlegui
Gochnatia lanceolata H. Beltrán & Ferreyre
Gynoxys foliosa (Rusby) S.F.Blake
Ichthyothere macdanielii H.Rob.
Lactuca sativa L.
Laestadia lechleri (Schultz-Bip.) Wedd.
Laestadia muscicola Wedd.
Lepidaploa sanmartinensis H.Rob.
Lessingianthus coriaceus (Less.) H. Rob.
Mikania hensoldiana Sánchez & M.O.Dillon
Munnozia luyensis H.Rob.
Mutisia mandoniana Wedd. ex Cabr.
Neurolaena lobata H. Rob.
Oligactis cuatrecasasii M.O.Dillon & Sagást.
Parthenium hysterophorus L.
Pentacalia brittonia (Hieron.) Cuatrec.
Pentacalia cutervonis Cuatrec. & H.Rob.
Pentacalia loretensis Cuatrec. (~*Senecio*)
Pentacalia maynasensis Cuatrec. & H.Rob.
Pentacalia mucronatifolia Cuatrec. & H.Rob.
Pentacalia nunezii Cuatrec. & H.Rob.
Pentacalia sagasteguii Cuatrec. & H.Rob.
Pentacalia tilletii Cuatrec. & H.Rob.
Pentacalia todziae Cuatrec. & H.Rob.
Pentacalia vargasiana Cabr. (~*Gynoxys*)
Perymenium celendianum B.L.Turner
Perymenium huascaranum B.L.Turner
Pluchea symphytifolia (Miller) Gillis (syn.)
Parthenium hysteriophorus L.
Pluchea symphytifolia (Miller) Gillis
Rolandra fruticola (L.) Kuntze
Sciadocephala schultze-rhnhofiae Matff.
Senecio algens Wedd.
Senecio ancashinus Cabr.
Senecio burkartii Cabr.
Senecio cantensis Cabr.
Senecio castanaefolius DC.
Senecio danai A. Gray
Senecio dombeyana DC.
Senecio expansus Wedd.

Senecio hohenackeri Schultz-Bip.
Senecio icaensis H.Beltrán & Galan de Mera
Senecio larahuinensis H.Beltrán & Galan de Mera
Senecio pascoensis Cabr.
Senecio pflanzii (Perkens) Cuatrec.
Senecio pininchense Cuatrec. (~Ecuador)
Senecio praeruptorium Schultz-Bip.
Senecio pseudodiscoides Schultz-Bip. (~Chile)
Senecio recurvatus Kunth
Senecio sericens (DC.) S.F. Blake
Senecio steinbachianus Cuatrec.
Solidago chilensis Meyen
Stenopadus andicola Pruski
Talamancalia putcalensis (Hieron.) B. Nord. & J. Pruski.
Trepadonia oppositifolia H. Rob. & H. Beltrán
Trichocline caulescens Phil.
Tridax cajamarcensis H.Rob.
Trixis monteseoensis Sagást. & M.O.Dillon
Verbesina albissima Sagást.
Verbesina ampliatiifolia Sagást. & Quipuscoa
Verbesina ancashensis Sagást. & Quipuscoa
Verbesina aypatensis Sagást. & Quipuscoa
Verbesina brevilingua Sagást.
Verbesina brunnea Sagást. & Quipuscoa
Verbesina capituliparva Sagást.
Verbesina chachapoyensis Sagást. & Quipuscoa
Verbesina crassicephala Sagást. & Quipuscoa
Verbesina citrina Sagást. & Zapata
Verbesina huancabambae Sagást. & Quipuscoa
Verbesina leivae Sagást. & Quipuscoa
Verbesina monactinoides Sagást., Leiva & Lezama
Verbesina otuzcensis Sagást. & Quipuscoa
Verbesina pauciramea Sagást., Leiva & Lezama
Verbesina perlanata Sagást. & Quipuscoa
Xenophyllum poposum (Phil.) V.A.Funk
Xenophyllum staffordiae (Sandw.) V.A.Funk
Xenophyllum lycopodioides (S.F.Blake) V.A.Funk
Xenophyllum weddellii (Phil.) V.A.Funk
Werneria spathulata Wedd.



Dillon, Michael and Sagastegui Alva, Abundio. 2001. "Tribal classification and diversity in the Asteraceae of Peru." *Arnaldoa : revista del Herbario HAO* 8, 25-44.

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