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COMPOSITAE



NEWSLETTER

Number Six

June 1978

Charles Jeffrey, Editor, Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB, U.K.

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EDITORIAL

The proceedings of the Reading Symposium (Compositae Newsletter 2, 1975) have at last been published as Heywood, V.H., Harborne, J.B. & Turner, B.L. (eds.), The Biology and Chemistry of the Compositae, Academic Press, London, New York and San Francisco, 1978, price £55 (\$107.50). In conjunction with the papers by Carlquist, S., Tribal Interrelationships and Phylogeny of the Asteraceae (Aliso 8: 446-492, 1976), Cronquist, A., The Compositae Revisited (Brittonia 29: 137-153, 1977) and Wagenitz, G., Systematics and Phylogeny of the Compositae (Pl. Syst. Evol. 125: 29-46, 1976), it gives the first overall review of the family since Bentham's time. On the evidence provided, the infrafamilial classification proposed by Wagenitz is most strongly supported, to which that proposed by Carlquist is very similar, except for his placing of the Eupatorieae in the Cichorioideae instead of the Asteroideae.

In the previous Newsletter, a list of workers on Compositae and their research projects was published. New and revised entries to this list are welcomed by the editor; please provide your name, institution, institutional address, new or current research projects, recent publications, intended expeditions and study visits, and any requests for material or information. Articles, book reviews, notices of meetings, and any news from individuals or institutions that may be useful to synantherologists anywhere are also invited.

REQUEST FOR MATERIAL

Prof. F. Bohlmann, Institut für Organische Chemie, Technische Universität Berlin, TU Berlin, 10C, Sekr. C3, Strasse des 17 Juni 135, 1000 Berlin 12, would be grateful for fresh material of species of Senecio sensu lato and other genera of Senecioneae for phytochemical study. About 50 g. of roots and 100 g. of aerial parts, fresh by air mail in paper bags, is the minimum quantity needed. Material from India, Australasia, tropical Africa and the Americas will be especially welcome.

ARTICLES

TYPES OF ASTERACEAE AT THE PHILADELPHIA ACADEMY OF NATURAL SCIENCES (PH)

Part V. Segregated Types and Selected authentic material
of the Astereae and Inuleae.*

James A. Mears

Department of Botany, Academy of Natural Sciences, Nineteenth and the Parkway,
Philadelphia, Pennsylvania 19103, U.S.A.ASTEREAE

Achaetogeron *affinis* Gray, *A. ascendens* Greenm., *A. forreri* Greene,
A. linearifolium Watson, *A. palmeri* Gray, *A. perennis* Dejong,
A. pinnatifidum Gray, *A. versicolor* Greenm.; Actinophoria *inuloides*
 Nutt.; Amellus *diffusus* Forster, *A. spinulosus* Pursh; Ammodia *hirsuta*
 Nutt.; Aphanostephus *arizonicus* Gray, *A. arkansanus* var. *hallii* Gray,
A. pilosus Buckley, *A. ramosissimus* DC.; Aplopappus *brandegei* Gray,
A. caespitosus Nutt., *A. cuneatus* Gray, *A. cuneifolius* Nutt.,
A. glomeratus Nuttall (*Isopappus* Nutt.), *A. gracilis* Gray, *A. greenei*
 Gray, *A. hallii* Gray, *A. howellii* Gray, *A. linearifolius* Buckley,
A. monactis Gray, *A. multicaulis* Nutt. (*Stenotus multicaulis* Nutt.),
A. niveus Watson, *A. nuttallii* T. & G., *A. palmeri* Gray, *A. parryi*
 Gray, *A. pinnatifidus* Nutt. (*Gymnocoma pinnatifida* Nutt.), *A. rosulatus*
 Hall, *A. tenuilobus* Gray, *A. vernicosus* Brandegee;

Aster *adnatus* Nutt., *A. adscendens* var. *parryi* Eaton, *A. amethystinus* Nutt.,
A. amplexicaulis Muhl. ex Willd., *A. andinus* Nutt., *A. anomalus* Engelm.,
A. baldwinii T. & G., *A. bernardinus* Hall, *A. biennis* Nutt.,
A. blepharophyllus Gray, *A. castaneus* Burgess, *A. chapmanii* T. & G.,
A. collinsii Nutt., *A. coloradoensis* Gray, *A. concolor* f. *lasiocaulis*
 Fernald, *A. cordifolius* var. *racemiflorus* Fernald, *A. cornifolius* Muhl.
 ex Willd., *A. curtisii* T. & G., *A. cusickii* Gray, *A. denudatus* Nutt.,
A. drummondii Londley(?), *A. ericaefolius* Rothrock, *A. ericoides* var.
pringlei Gray, *A. fendleri* Gray, *A. flahaultii* Sennen, *A. flexuosus*
 Nutt., *A. foliaceus* var. *pubescens* Gray, *A. frondeus* Gray, *A. glomeratus*
 Nutt., *A. gracilis* Nutt., *A. graveolens* Nutt., *A. grayii* Suksdorff,
A. hallii Gray, *A. hauptii* Ledebour, *A. haydenii* Gray, *A. herveyi* Gray,
A. incertus Nelson, *A. jacobeus* Lunell, *A. jalapensis* Fernald,
A. kingii Eaton, *A. lacunarum* Aitch. & Hemsl., *A. laurentianus* var.
magdalemensis Fernald, *A. lautus* Lunell, *A. leiophyllus* Porter,
A. lemmonii Gray, *A. lentus* Greene, *A. limosus* Greene, *A. linifolius*
 Muhlenburg, *A. lowrieanus* Porter, *A. lowrieanus* var. *lanceolatus* Porter,
A. lowrieanus var. *lancifolius* Porter, *A. luengoia* Sennen, *A. macdougallii*
 Coulter, *A. montanus* Nutt., *A. multiradiatus* Wallich, *A. nuttallii* T. & G.

* For Parts I (Lactuceae), II (Anthemideae, Mutisieae, Calenduleae,
Arctotideae, Cardueae, Senecioneae), III (Vernonieae, Eupatorieae)
 and IV (Heliantheae, Helenieae), see numbers 2, 3, 4 & 5 of the
 Newsletter).

A. oblongifolius Nutt., *A. obovatus* Ledebour, *A. oreganus* Nutt.,
A. palmeri Gray, *A. paludosus* Aiton, *A. parryi* Gray, *A. pattersonii*
 Gray, *A. phlogifolius* Muhl. ex Willd., *A. pickettianus* Suksdorff,
A. porteri Gray, *A. potosinus* Gray, *A. prenanthoides* Muhl. ex Willd.,
A. richardsonii Ledebour, *A. scabriusculus* Bicknell, *A. shortii* Lindley
 ex Hooker, *A. sonorae* Gray, *A. spectabilis* var. *suffultus* Fernald,
A. spinosus Benth., *A. spinulosus* Chap., *A. umbellatus* var. *brevi-*
squamatus Fernald, *A. undulatus* (beta) T. & G., *A. vimineus* var.
saxatilis Fernald;

Baccharis *alamosa* Blake, *B. bigelovii* Gray, *B. brachyphylla* Gray,
B. coerulescens DC., *B. debilis* Rusby, *B. emoryi* Gray, *B. glandulosa*
 Greenm., *B. mapirensis*, *B. microphylla* var. *pulverulenta* Rusby,
B. oaxacana Greenm. (also type of *Hemibaccharis hieracifolia* Heer.),
B. oblanceolata Rusby, *B. potosina* Gray, *B. ramiflora* Gray,
B. salicifolia Nutt. (*B. salicina* T. & G.), *B. saligna* Nutt.,
B. seemannii Gray, *B. texana* Gray, *B. wrightii* Gray, *B. wrightii* var.
pyrrhopappa Gray; Bellis *ciliata* Raf.(?), *B. purpurascens* Rob.;
Bigelovia *albida* Jones, *B. brachylepis* Gray, *B. hartwegii* var.
tenuisecta Gray, *B. juncea* Greene, *B. parrishii* Greene, *B. pumila*
 Nutt., *B. pyramidata* Rob. & Greenm., *B. speciosa* Nutt., *B. veneta* var.
sedoides Greenm.; Biota *thyrsiflora* Nutt.; Brachyris *divaricata*
 Nutt., *B. euthamiae* Nutt., *B. virgata* Nutt.; Bradburia *hirtella*
 T. & G.;

Calimeris *flexuosa* Royle ex DC.; Calocoma *runderale* Nutt.; Chaetopappa
asteroidea Nutt.; Chrysocoma *graveolens* Nutt., *C. incana* Schlechter,
C. nauseosa Pursh, *C. puberula* Schlechter, *C. virgata* Nutt.;
Chrysoma *pumila* Nutt. (*Applopappus congestus* Nutt., *Symphorianthus*
 Nutt., ined.); Chrysopsis *alpina* Nutt., *C. angustifolia* Elliott,
C. berlandieri DC., *C. brandegei* Rob. & Greenm., *C. caespitosa* Nutt.,
C. camporum Greene, *C. coronopifolia* Nutt., *C. decumbens* Chap.,
C. divaricata Nutt., *C. flexuosa* Nass, *C. foliosa* Nutt., *C. hispida*
 var. *stenophylla* Gray, *C. hyssopifolia* Nutt., *C. longii* Fernald,
C. mariana f. *efulgens* Fernald, *C. mariana* var. *macradenia* Fernald,
C. mollis Nutt., *C. nervosa* var. *virgata* Fernald, *C. obovata* Nutt.,
C. oligantha Chap. ex T. & G., *C. pilosa* Nutt., *C. pinifolia* Elliott,
C. ruthii Small, *C. tracyi* Small, *C. trichophylla* Nutt., *C. villosa*
 Nutt. ex DC.; Chrysothamus *monocephalus* Nelson & Kennedy; Conyza
daveauana Sennen, *C. erythroleuca* Klatt, *C. evacoides* Rusby,
C. fasciculata Wallich, *C. lignescens* Rusby, *C. montividensis* Sprengel,
C. myriocephala Remy, *C. pteronioides* Nutt., *C. rouyana* Sennen fa.
hybrida, *C. yungasensis* Rusby; Corethrogyne *detonsa* Greene, *C. pacifica*
 Brandege;

Dichrocephala *grangeaefolia* DC.; Dieteria *coronopifolia* Nutt., *D. pulverulenta*
 Nutt., *D. sessiliflora* Nutt.; Diplostephium *callilepis* Blake, *D. canum*
 Gray, *D. leiocladum* Blake, *D. micradenium* Blake; Distasis *modesta* DC.;
Doellingeria *sericocarpoides* Small; Donia *ciliata* Nutt. (*Prionopsis*
ciliata Nutt.), *D. squarrosa* Pursh;

Egletes *texana* Engelm.; Ericameria *foliosa* Nutt. (*E. microphyllum* Nutt.),
E. nana Nutt. (*E. depressa* Nutt.), *E. resinosa* Nutt.;

Erigeron *acer* var. *fontis ramaei* Sennen, *E. acris* var. *oligocephalus* Fernald,
E. alpinus var. *multicaulis* Wall., *E. ambiguus* Nutt., *E. amplexicaule*
 Torr., *E. arizonicus* Gray, *E. asperus* Nutt.(?), *E. austinae* Greene,
E. bellidiastrum Nutt., *E. bigelovii* Gray, *E. bradegei* Gray,
E. brazoensis Buckley, *E. brittonianus* Rusby, *E. californicus* Jepson,
E. canadensis (beta) *grandiflorus* Schweinitz, *E. cereus* Sandberg &

- Leiberg, *E. chrysopsidis* Gray, *E. cinereus* Gray, *E. clokeyi* Cronquist, *E. compositus* Pursh, *E. corymbosus* Nutt., *E. coulteri* Coulter & Porter, *E. decumbens* Nutt., *E. eastwoodianus* Howell, *E. elongatus* eriocalyx Ledebour, *E. ervendbergii* Gray, *E. exilis* Gray, *E. filifolius* Nutt., *E. flagellaris* Gray, *E. foliosus* Nutt., *E. glabellus* Nutt., *E. glabratus* Hooker, *E. glandulosus* Porter & Coulter, *E. heteromorphus* Rob., *E. heterophyllus* Muhl. ex Willd., *E. hirsutus* Nutt., *E. howelli* Gray, *E. incomptus* Gray, *E. jonesii* Cronquist, *E. leibergii* Piper, *E. lemmoni* Gray, *E. lobatus* Buckley, *E. lonchophyllus* var. *laurentianus* Victorin, *E. longiradiatus* Nelson, *E. macdougallii* Heller, *E. macranthus* Nutt., *E. maritimus* Nutt., *E. modestus* Gray, *E. nudiflorus* Buckley, *E. obscurus* Lunell, *E. ochroleucus* Nutt., *E. oxyphyllus* Greene, *E. palmeri* Gray, *E. parrishii* Gray, *E. pedatus* Nutt., *E. pedunculatus* Heller, *E. petrocallis* Greene, *E. podolicus* Ledebour, *E. podolicus pumilus* Ledebour, *E. poliospermus* Gray, *E. pringlei* Gray, *E. pumilus* Nutt., *E. pusillus* Nutt., *E. repens* Gray, *E. rusbyi* Gray, *E. scaturicolus* Fernald, *E. siskiyouensis* Howell, *E. socorrensis* Brandegee, *E. sonorae* Gray, *E. spathulatus* Eaton, *E. speciosus* DC., *E. strigosus* Muhl. ex Willd. *E. tenue* T. & G., *E. tephrodes* Greene, *E. thellungii* Sennen, *E. thunbergii* Gray, *E. tweedyi* Canby, *E. zionis* Cronquist;
- Eriocarpum *grindelioides* Nutt., *E. megacephalum* Nash; Euthamia *glutinosa* Nutt., *E. occidentalis* Nutt.;
- Felicia *azurea* Schlechter, *F. ciliata* Schlechter, *F. crenulata* Mattf.;
- Golionema *heterophylla* Watson; Greenella *arizonica* Gray; Grindelia *arguta* Gray, *G. boliviana* Rusby, *G. costata* Gray, *G. discoidea* Nutt., *G. fraxinoprattensis* Reveal & Beatl., *G. glandulosa* Greenm., *G. havardii* Steyermark, *G. humilis* Nutt., *G. integerrima* Rydb., *G. lanceolata* Nutt., *G. nana* Nutt., *G. nana* var. *turbinella* Steyermark, *G. paludosa* Greene, *G. pubescens* Nutt., *G. robusta* Nutt., *G. robusta platyphylla* Greene, *G. squarrosa* var. *hirtella* Steyermark, *G. texana* Scheele, *G. virgata* Nutt., *G. wrightii* Gray; Gutierrezia *berlandieri* Gray, *G. corymbosa* Nelson, *G. greenei* Lunell, *G. microphylla* Gray, *G. perseverans* Nelson, *G. texana* Gray, *G. wrightii* Gray; Gymnocoma *chilensis* Nutt.;
- Gymnosperma *corymbosa* DC.; Gymnostephium *laeve* Bolus;
- Hazardia *detonsa* Greene, *H. serrata* Greene; Heleastrum *chapmani* T. & G., *H. grandiflorum* Nutt.; Heterostephium *virgatum* Nutt.; Heterotheca *chrysopsidis* DC., *H. latifolia* Buckley, *H. subaxillaris* var. *procumbens* Wagenknecht; Homopappus (*Actinophoria*) *multiflorus* Nutt. (*Isopappus multiflorus* Nutt.);
- Kaulfussia *amelloides* DC.; Keerlia *effusa* Gray, *K. mexicana* Gray, *K. skirrhobasis* DC.;
- Lessingia *imbricata* Green, *L. pectinata* Greene;
- Machaeranthera *grandiflora* Buckley (= *Xanthisma*), *M. hansonii* Nelson, *M. parthenium* Greene, *M. parviflora* Gray, *M. shastensis* Gray;
- Macronema *angustifolia* Nutt., *M. discoidea* Nutt., *M. grindelifolia* Rydb.;
- Mairea *decumbens* Schlechter, *M. montana* Schlechter; Micropappus *cordatus* Nutt.; Myriactis *wallichii* Less. (*Balsamita dentata* Wall. ex DC.), *M. wallichii* (beta) *hispidior* DC.;
- Olearia *ciliata* Mueller;
- Pentachaeta *aurea* Nutt.; Prionopsis *chapmanii* T. & G., *P. ciliata* Nutt.;
- Psilactis *asteroides* Gray, *P. crispa* Brandegee, *P. longipes* Gray;
- Pteronia *ambrariifolium* Schlechter, *P. namaquensis* Bol.; Pyrethrum *occidentalis* Nutt. ined.? (= *Leucopsidium arkansanum* DC?); Pyrrhochaeta *grindelioides* Nutt.; Pyrrhocomma *grindelioides* Heller, *P. rigida* Rydb.;

Sericocarpus rigidus var. laevicaulis Nutt.; Solidago albopilosa Braun,
S. angustifolia Nutt., *S. anticostensis* Fernald, *S. arenicola* Small,
S. bartramiana Fernald, *S. bigelovii* Gray, *S. boottii* var. *ludoviciana*
 Gray, *S. brachyphylla* Chap. ex T. & G., *S. californica* Nutt.,
S. celtidifolia Small, *S. ceretana* Sennen, *S. chapmanii* Gray,
S. ciliaris Muhl. ex Willd., *S. cinerascens* Schweinitz ex Elliott,
S. confinis Gray, *S. cordata* Short & Peter, *S. cuneifolia* Nutt.,
S. curtisii T. & G., *S. drummondii* T. & G., *S. elliottii* var.
pedicellata Fernald, *S. elongata* Nutt., *S. fistulosa* f. *epilis*
 Fernald, *S. flavovirens* Chapman, *S. gattingeri* Chapman, *S. glutinosa*
 Nutt., *S. helleri* Small, *S. hirsuta* Nutt., *S. x hirtipes* Fernald,
S. hispida Muhl. ex Willd., *S. hispidula* Small, *S. juncea* var.
neohemica Fernald, *S. lanceolata* var. *tenuifolia* Pursh, *S. lepida*
 var. *fallax* Fernald, *S. missouriensis* Nutt., *S. monticola* T. & G.,
S. muhlenbergii T. & G., *S. multiradiata* Pursh, *S. patula* Muhl. ex
 Willd., *S. perlonga* Fernald, *S. pitcheri* Nutt., *S. pubens* Curtis ex
 T. & G., *S. puberula* Nutt., *S. pubescens* Wall., *S. pulverulenta* Nutt.,
S. radula Nutt., *S. riddellii* Frank in Riddell, *S. rupestris* Raf.,
S. sarothrae Pursh, *S. satanica* Lunell, *S. scabra* Muhl. ex Willd.,
S. scabrifolia Raf., *S. shortii* T. & G., *S. speciosa* Nutt.,
S. sphacelata Raf., *S. squarrosa* Nutt., *S. tenuifolia* Pursh,
S. tenuifolia var. *pyncnodephala* Fernald, *S. uliginosa* Nutt.,
S. ulmifolia Muhl. ex Willd., *S. verna* Curtis ex T. & G.,
S. virginiana var. *leiocarpa* Gray; Stenactes divaricata Nutt.;
Stenotus multicaulis Nutt.;

Tetramolopium consanguineum var. leptophyllum Sherff; Townsendia annua
 Beaman, *T. arizonica* Gray, *T. eximia* Gray, *T. grandiflora* Nutt.,
T. hookeri Beaman, *T. incana* Nutt., *T. jonesii* var. *tumulosa* Reveal,
T. sericea leptotes Gray, *T. sericea papposa* Gray, *T. spathulata* Nutt.,
T. strigosa Nutt.; Tripolium divaricatum Nutt., *T. imbricatum* Nutt.,
T. occidentale Nutt.;

Xanthisma texana DC.; Xanthocephalum sericocarpum Gray, *X. tomentellum* Rob.;
Xylorhiza glabriuscula Nutt.

INULEAE

Achyrocline deflexa Rob. & Greenm., *A. saturejoides* var. *citrina* Lorentz,
A. tomentosa Rusby; Adenocaulon integrifolium Nutt.; Anaphalis
araneosa DC., *A. occidentalis* Gray, *A. royleana* DC., *A. sierrae* Heller;
Antennaria alpina var. *cana* Fernald & Wiegand, *A. anaphaloides* Rydb.,
A. andina Gray, *A. angustiarum* Lunell, *A. bayardii* Fernald, *A. brunnescens*
 Fernald, *A. columnaris* Fernald, *A. confusa* Fernald, *A. eucosma* Fernald
 & Wiegand, *A. fendleri* Gray, *A. flavescens* Rydb., *A. foggii* Fernald,
A. howellii var. *rivularis* Suksdorff, *A. longii* Fernald, *A. lunellii*
 Greene, *A. megalcephala* Fernald, *A. microcephala* Gray, *A. neodioica*
 var. *petaloidea* Fernald, *A. parvifolia* Nutt., *A. soliceps* Blake,
A. speciosa Nelson, *A. subviscosa* Fernald, *A. suffrutescens* Greene,
A. wiegandii Fernald;

Buphthalmum angustifolium Pursh, *B. sagittatum* Pursh;

Calocephalus brownii Mueller, *C. sonderi* Mueller; Chevreulia elegans Rusby;
Craspedia pleiocephala Mueller; Cupularia blakei Sennen, *C. graveolens*
 var. *rubriflosculosa* Sennen, *C. viscosa* var. *angustifolia* Sennen;

Diaperia prolifera Nutt.; Dimeresia howellii Gray; Disparago anomala
 Schlechter, *D. hoffmanniana* Schlechter;

Eriochlamys knappii Mueller; Evax multicaulis DC.;
Facelis capillaris Rusby; Filaginopsis drummondii T. & G.; Filago
 bornmulleri Hasskn., F. californica Nutt., F. pseudoevax Sennen;
Gnaphalium adnatum Wallich ex DC., G. altamiranum Greenm., G. ammophilum
 Wallich, G. brachypterum DC., G. californicum Nutt., G. calviceps
 Fernald, G. canum Wallich, G. cinnamomeum Wallich, G. cobrense Greene,
G. concinnum Gray, G. cuneifolium Wall. ex DC., G. depressum Nutt.,
G. flavissimum Sieber ex Benth., G. franciscanum Heller, G. gossypinum
 Nutt.; G. hamiltoni Wallich, G. helleri Britt., G. jaliscense Greenm.,
G. nivale Tenore, G. nubigenum Wallich ex DC., G. oreganum Nutt.,
G. perfoliatum Wallich ex DC., G. pringlei Gray, G. pulchellum
 Wallich, G. ramigerum DC.(?), G. ramosissimum Nutt., G. sarmentosum
 Klatt, G. semiamplexicaule, DC., G. sulphurescens Rydb., G. wrightii
 Gray; Gynema latifolia Raf.;
Helichrysum altigenum Schlechter, H. ayersii Mueller, H. baccharioides
 Mueller, H. chrysosphaerum Schlechter, H. cinereum Mueller,
H. flavissimum Benth., H. lasianthum Schlechter, H. lawrencella
 Mueller, H. obcordatum Mueller, H. obtusifolium Mueller, H. podolepidium
 Mueller, H. semifertile Mueller; Helipterum hyalospermum Mueller,
H. polyphyllum Mueller;
Inula argentea Persoon (?), I. caspica Ledebour, I. haussknechtiana Bornm.,
I. lanuginosa Wallich, I. nervosa Wallich, I. reflexa Nutt.,
I. rupestris Aitchison, I. scabra Pursh;
Leontonyx neglectus Schlechter;
Metalasia aurea Don, M. wrightii Harvey; Micropus angustifolius Nutt.;
Nestlera rehmanioides Schlechter;
Omalotheca dioica Nutt.; Osmitopsis nana Schlechter; Ozothamnus retusus
 Sonder & Mueller;
Pallenis madritensis Sennen; Phagnalon brevifolium Sennen, P. saxatiliforme
 Sennen, P. tenorii var. minor Sennen, P. umbellatiforme Webb; Pluchea
longifolia Nash, P. purpurascens var. succulenta f. obovata Fernald,
P. rosea var. mexicana Godfrey; Podolepis siemssenia Mueller;
Psilocarphus brevissimus Nutt., P. elatior Gray, P. globiferus Nutt.,
P. oreganus Nutt., P. tenellus Nutt.; Pterothryx flaccida Schlechter;
Stoebe cyathuloides Schlechter, S. sphaerocephala Schlechter; Stylocline
gnaphaloides Nutt., S. micropoides Gray;
Tessaria borealis Gray.

DESCRIPTIVE TERMINOLOGY - A QUESTION OF TAXONOMY, PHYLOGENY OR MORPHOLOGY?

Jette Baagoe

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The following remarks on terminology describing the different corolla types in Compositae were provoked by a recent paper by Carlquist (1976) and encouraged by the idea of a synantherological glossary.

Through my own work I have noticed that uses of the terms "ray flower" and especially "ligulate" are ambiguous. A historical review of the terms shows that Cassini (1826), who regarded all Compositae florets as derived from regular, tubular ones, refused to have anything to do with the female

or neutral florets of which he thought as mere monstrosities. Among the perfect florets, on the other hand, he distinguished several types according to the degree of splitting of the corolla limb. Thus, in Cassini's terminology the corollas of Lactuceae are simply tubular and split along the inner nerve.

Bentham (1873) used the term "ligulate" for both the 5-toothed Lactuceae corollas and the mostly 3-toothed ray corollas in the radiate tribes. By stressing the difference between the two types of corollas he may unintentionally have created a confusion about the term "ligulate" in English synantherological literature.

Both Hoffmann (1889-94) and Uexküll-Gyllenband (1901) used the German words "Zungenförmig" or "Zungenblüte". Like Cassini they stressed the sexual differences, using them as the main distinction between the florets of Lactuceae and "Zungenblüten" in other tribes.

Small (1917-19) paid much attention to corolla types but confused his terminology by introducing evolutionary concepts in his discussion. He claimed that all ray florets were originally bilabiate and suggested that the term "ligulate" be reserved for the 5-lobed florets of Lactuceae, continuing immediately below with the following statement: "In the monotypic genus Catamixis all five petals are fused and the split is posterior so that something like a ligulate corolla results, but this is just one more variation in the manner of splitting and cannot be taken as an intermediate type leading to the Cichorieae".

Carlquist (1976) distinguishes the "ligulate" florets with a 5-toothed limb in which all lobes are outlined by veins from the "ray flower" in which basically 3 teeth are outlined by veins, while veins representing the "missing" lobes may be present along the corolla margins. In his definitions Carlquist includes as "ligulate" only the florets in the homogamous heads of Lactuceae. Further down, however, this strict definition is made unclear by a discussion of the rays in Arctotideae. Carlquist regards the "ray flowers" in Arctotideae as of a "ligulate" type and uses this as an argument for the inclusion of the tribe in his subfamily Cichorioideae. By so doing this author introduces taxonomical concepts in his terminology.

In a discussion of descriptive terminology, however, the problem should not be whether Catamixis is the missing link between Lactuceae and the remainder family, or Arctotideae are closer to Cichorioideae than to Asteroideae, the question is whether we have an unambiguous terminology unloaded with evolutionary and taxonomical implications.

The rays in the radiate tribes may or may not have been derived from bilabiate florets (in fact we seem to have examples of both situations, cp. Uexküll-Gyllenband 1901 e.g.); they may even have been derived several times by parallel evolution. No matter how it was derived, however, a usual ray floret in a radiate head has a corolla limb of a ligulate shape just as has any floret in Lactuceae. Generally a ray corolla is 3-lobed and a corolla in Lactuceae 5-lobed, but both types may sometimes be 4-lobed, and the only real distinction between them is sexual. A female, ligulate floret in a radiate head, a "ray floret", may have anther rudiments, but they could never be confused with the fully developed anthers in Lactuceae.

In a radiate head the term "ray floret" serves to distinguish the marginal zygomorphic florets with ligulate (e.g. Helianthus annuus), or perhaps bilabiate corolla limbs (e.g. Gerbera jamesonii) from their more modest neighbours, the "disc florets". Rather than to the floral morphology, the term "ray floret" (or "ray flower") relates to the position of the floret in the head and to the orientation of its corolla limb.

The term "ligulate" is also widely used to distinguish the homogamous heads with all flowers perfect and with ligulate corollas (Lactuceae). Linguistically this is nonsense, the heads of Lactuceae are not of a ligulate shape, they are composed of a number of florets with ligulate corolla limbs. Stearn (1973) mentions the term liguliferous (liguliferus) for this type of head, and the word liguliflorous (liguliflorus) has also been applied in several contexts. Both terms are applicable, but liguliferous is perhaps less ambiguous and therefore preferable.

Davis (1975) uses the word "radiant" to distinguish the special type of disciform heads in which the central florets are tubular, hermaphrodite, erect, and \pm equal in length, and the marginal ones similar of basic construction, but neuter, larger, spreading and with a more infundibular limb (e.g. Centaurea spp.). It may be a matter of taste whether a distinction of this group of heads is necessary, and certainly the idea of so doing will easily appear to a taxonomist working with Compositae in Asia Minor. In my own opinion the term is somewhat superfluous, perhaps even a bit confusing. To the unprejudiced botanist it would mean exactly the same as "radiate", though linguistically it does rather mean "beaming" or "shining" than "having rays"; ("radiant" from Latin radians, present participle of the verb radio; "radiate" from the Latin adjective radiatus, which is derived from radio).

Thus I would suggest that we distinguish four types of heads within Compositae, discoid, disciform (incl. radiant), radiate and liguliferous. The terms "ray flower/floret" and "disc flower/floret" should be preserved for a distinction between marginal and central florets in a radiate head.

For a description of the actual corolla types we should use the already widely applied terminology derived from Greek and Latin and based upon differences in shape among the corollas. Florets in Compositae may be actinomorphic and tubular (e.g. Eupatorieae), or zygomorphic with tubular (e.g. Cynareae), bilabiate (e.g. Mutisieae), or ligulate (e.g. Lactuceae and Heliantheae) corolla limbs.

In order to clarify these suggestions, I have attempted the following schematic review, in which no attention is paid to the finer variations in outline and shape of the corolla limb. Tubular corollas for example may range from filiform to broadly campanulate and ligular ones may be linear to broadly ovate.

Compositae flower heads may be:

- A. Homogamous and discoid with perfect florets that may be:
 - 1. Actinomorphic with
 - . Tubular corolla limbs (e.g. Eupatorium spp.)
 - 2. Zygomorphic with
 - . Tubular corolla limbs (e.g. Chaenactis sp.)
 - . Bilabiate corolla limbs (e.g. Jungia spp.)

- B. Homogamous and liguliferous with perfect florets that are:
 - 2. Zygomorphic with
 - . Ligulate corolla limbs (Lactuceae)

- C. Heterogamous and disciform (incl. radiant), or radiate with:
 - a. Perfect florets which may be
 - 1. Actinomorphic with
 - . Tubular corolla limbs (as in e.g. Heliantheae) and/or
 - 2. Zygomorphic with
 - . Bilabiate corolla limbs (as in many e.g. Mutisieae) and/or
 - . Ligulate corolla limbs (as in a few Mutisieae)

and

 - b. Female or neutral florets which may be
 - 1. Actinomorphic with
 - . Tubular corolla limbs (e.g. Conyza spp.) and/or
 - 2. Zygomorphic with
 - . Tubular corolla limbs (e.g. Centaurea spp.) and/or
 - . Bilabiate corolla limbs (e.g. Gerbera spp.) and/or
 - . Ligulate corolla limbs (e.g. Anthemis spp.)

and/or

 - c. Male florets which may be
 - 1. Actinomorphic with
 - . Tubular corolla limbs (e.g. Conyza spp.)
 - 2. Zygomorphic with
 - . Bilabiate corolla limbs (e.g. Lycoseris spp.)

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BOOK REVIEW

COMPOSITAE IN NATAL by O.M. Hilliard, University of Natal Press, Pietermaritzburg, South Africa, 24 Krugerrand. xii & 659 pp. ill. Index to taxa, including synonyms. 1977.

A floristic treatment of just one family of flowering plants for only one of the provinces of South Africa may seem of little consequence, and one may wonder how such a work could fill even an entire volume. The amazing answer is that 600 species in all 13 tribes of the sunflower family (Compositae) occur within the borders of Natal, and that the treatment itself is over 650 pages long! It is an important work because this is the first treatment of the Compositae of Natal to the specific level in over 100 years, and it is the only comprehensive one ever completed for this region. In addition, some of the treatments of individual genera are so extensive (e.g. Senecio, 124 spp.; Helichrysum, 123 spp.; Berkheya, 30 spp.; and Vernonia, 26 spp.) that they provide an almost revisionary perspective.

Because of the large number of taxa of Compositae in the flora of Natal (600 spp.), a format economical of space was used to keep the book to a reasonable length (659 pages). This option restricted the kinds of information that could be provided for each taxon, and the result is somewhere between a "manual" in the narrow sense and a "flora" in the broad sense. The type of information included for each genus is (in order of presentation of data, each set up as a separate paragraph): description; diagnosis of more easily observed characters (a unique and good feature of the book); number of species and geographical distribution; and a key to the species. For each of the species the types and order of information are:

taxon name with author(s) and literature citations; type citation; description; distribution and ecology with additional comments on how the taxon can be distinguished from close relatives (sometimes segregated as a separate paragraph in difficult species); and representative specimens (usually only one collection cited).

Several aspects of the information for each species could have been improved. First, the format of the literature citation is unconventional both in mode of citation of some authors' names as well as in the method of showing date of publication in parentheses (cf. Guide to the Citation of Botanical Literature, International Code of Botanical Nomenclature). The formats used are consistent throughout the text, however, and therefore detract little. Second, the citation of type specimens is handled in an uneven way, with some being cited in great detail and others only sketchily mentioned. Some of this undoubtedly relates to information available in the protologue, but in other cases it seems to be lack of documentation (e.g. "Types described from the Cape", p. 282, for Pulicaria scabra). Another problem is the decision not to discriminate between isotypes and holotypes (so stated on p. 2) and probably other kinds of types (syntypes, paratypes, lectotypes) as well, although this was not stated. As much effort obviously went toward examining as many types and protologues as practicable (most were seen - and this is one very excellent feature of the book!), a further documentation would have been helpful. Third, although synonymy is given for each species (another good feature), it is not clear exactly what synonyms are included and which are omitted. It is stated in the "Plan of the Work" that "... synonymy of a species is not necessarily complete, but all names relevant in the Natal context are included" (p. 2). Exactly what this clause means is uncertain, but the types cited reflect material from South Africa generally, rather than those just from Natal. Fourth, the citation of usually only one representative specimen provides inadequate documentation. Dot maps or extensive citation of specimens would have been worth the increased length, even if a second volume had to be produced. Fifth, the inclusion of unidentified taxa (e.g. as "Helichrysum sp.", p. 210; see also pp. 247, 379, 386, 387, 534, 564, etc.) is of dubious value, not only here in a flora, but in any type of treatment. It is particularly out of place in this work, because the user is principally concerned with the identification of individual specimens. It is helpful to highlight variant collections but it is better to do this as part of a discussion of a particular taxon. If the entity is indeed new, then it should be described and named formally either in the flora or preferably in a separate publication. This same practice has been carried to such an extreme in the text that a specimen representing a potential new genus is also included as "Genus nov.?" (p. 254).

As a general introduction to the classification and evolution of the Compositae, the book is not very helpful. A conspicuous lack is the absence of phytogeographical discussion of how the Compositae in the flora of Natal relate to those in other African floras such as in S.W. Africa. Only a very short initial section is devoted to the diversity throughout the family of corollas, stamens and styles, and this is conveyed largely by three plates which are patterned after plates from Bentham's 1873 paper (Bot. J. Linn. Soc. 13: 335-577). This is accompanied by only one paragraph indicating recent trends in classification in the family (although it is clear by these few comments that the author is aware of current research). A good key is included to the traditional 13 tribes of the family, but this is the extent of material relevant to tribal similarities and differences.

The keys to genera and species seem one of the best parts of the book. Although I did not attempt to identify material with them, they are dichotomous (indented format) with understandable and mutually exclusive leads. Problematical genera that may key only with difficulty are indicated either in the key itself or by a footnote. A minor inconsistency is the segregation (without explanation) of the keys to genera of the Lactuceae to the back of the book (beginning on p. 596), whereas the keys to genera of all other tribes are in the front.

The style of publication of the book is by photo-offset from typed manuscript, which undoubtedly helped to hold down costs (although the volume still is not cheap - about \$36 U.S.). The type is clear and quite suitable for the subject matter. The illustrations are good (and original), but there is only one or at the most a few for each tribe, which is not adequate to be of uniform value throughout the family for identification purposes.

To summarize, considering that the "main purpose of this work is to provide keys for the determination of genera and species native to Natal and those aliens established there, together with descriptions of the species" (p. ix), I believe that this objective has been accomplished well (the term "alien", however, is not defined, e.g. does it mean introduced?, naturalized?, escaped from cultivation?, etc.). The descriptions are precise and detailed, the data are presented in a very consistent format, and many type specimens have been consulted. I recommend this book for all students of the Compositae, and especially for those with particular interest in Helichrysum (Inuleae) which is treated in great detail. - TOD F. STUESSY, Ohio State University, Columbus, Ohio 43210.

NEWS FROM INDIVIDUALS

Gregory K. Brown, Department of Botany and Microbiology, Arizona State University, Tempe, Arizona 85281, U.S.A., a student of Dr. Don Pinkava, is currently doing biosystematic research on Platyschkuhria Rydb.

Prof. James Estes, Department of Botany and Microbiology, University of Oklahoma, 770 Van Vleet Oval, Room 135, Norman, Oklahoma 73019, U.S.A., is continuing research on pollination systems within the Compositae.

B.M. Narayana, Post Graduate Department of Botany, University of Mysore, Mysore 570006, India, is working on the biosystematics of some genera of Compositae of Mysore State.

Dr. K. Watanabe, Biological Institute, Faculty of General Education, Kobe University, Kobe 657, Japan, is working on the cytotaxonomy of some genera of Compositae.

RECENT LITERATURE

These references have been abstracted from the Current Awareness Lists of the Library, Royal Botanic Gardens, Kew. A comprehensive bibliography of Compositae, published annually, is contained in the Kew Record of Taxonomic Literature.

The numbers at the lower left of each citation indicate geographical regions, as follows: (0) known in cultivation; (1) Europe and North Africa (including Iceland, east to Urals); (2) temperate Asia (including Egypt, Arabia, Asia Minor, Caucasus); (3) North America (including Greenland); (4) Central and South America (including Mexico, West Indies); (5) Tropical and South Africa (including Madagascar); (6) Tropical Asia and Pacific (including Hawaii, New Guinea); (7) Australia and New Zealand (including Tasmania). Subantarctic islands in 4, 5 or 7, as appropriate. A symbol (En), (Fr), etc., at the end of a reference indicates that a summary in that language is provided.

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