SUPPLEMENTARY DATA

1. SITE DESCRIPTIONS

Mexico. The region "El Huizache" is one of the most species-diverse sites for Cactaceae in America (Hernández *et al*., 2001). It lies in the southern portion of the Chihuahuan Desert, and is located in the municipality of Guadalcázar in the northern part of the state of San Luis Potosí, Mexico (22° 30'-23° 00' N, 100° 00'-100° 30' W). The area is a lowland plain with mountain systems of different sizes. Rainfall is concentrated in summer, and the annual average is 300 mm in lowland plains, increasing with the altitude to 800 mm at the highest points. Average mean temperature varies from 18 to 22° C (MacMahon and Wagner, 1986; Arriaga *et al*., 2000; Hernández *et al*., 2001).

Cuatrociénegas is another point of high diversity of globular cacti (Hernández and Bárcenas, 1995; Arriaga *et al*., 2000; Dinerstein *et al*., 2000). The region is an intermontane valley in the Sierra Madre Oriental at the eastern edge of the Chihuahuan Desert in the Mexican state of Coahuila (26° 42'-27° 00' N, 101° 52'-102° 25' W). The valley is bordered by limestone mountains, and is bisected by the Sierra San Marcos y Pinos. The valley receives <200 mm of precipitation per year, mainly between May and October. Though it receives little rain, the valley has abundant subterranean water, which emerges at the surface in numerous small pools. Temperatures varies from 18 and 22°C, with a extreme exceeding 44°C in the summer, and falling to below 0°C during the winter (MacMahon and Wagner, 1986; Arriaga *et al*., 2000; Dinerstein *et al*., 2000).

South Africa. The Great Richtersveld is located in the arid north-west of South Africa. This area belongs to the Namaqualand-Namib domain (Wyk and Smith, 2001; Desmet, 2007). The Richterseld sunsets of flat sandy plains to step mountains of volcanic rock, and the lushness of the Orange River. This region has winter-rainfall, with temperatures 12-17° C along the coast and inland temperatures around 32° C, in summer reaching >50° C (Wyk and Smith, 2001; Desmet, 2007). Rain is rare event, with an average of 68 mm per year.

The region of Knersvlakte represents one of the richest for dwarf succulent plant diversity in the world (Cowling *et al*., 1998; Wyk and Smith, 2001; Schmiedel, and Jürgens, 1999). It is situated in the northwestern part of Western Cape Province of South Africa (30°45'–31°40' S, 18°15'–19°00' E), and belongs to the domain of Namaqualand (Schmiedel, and Jürgens, 1999; Desmet, 2007). It is a broad plain bounded by the Oliphant River to the South, the Rocky Hills of Namaqualand to the North, the Sandveld and granite hills of the Spektakel (the Hardveld) to the West, and the Bokkeveld Mountains to the East. The Knersvlakte is a predominantly winter-rainfall desert region. The climate of the region is mild with light frost in winter. Rainfall is low, about 100-175 mm, and occurs mainly in winter (May-September), but the fog provides extra precipitation.

The mean annual temperature is about 20°C with an extreme about 46°C (Wyk and Smith, 2001; Desmet, 2007).

The Little Karoo is an intermontane valley with high succulent plant species richness (Wyk and Smith, 2001; Schmiedel, and Jürgens, 1999). It is located in the southwest of the South Africa (33°25'–55°00' S, 20°10'–22°30' E), and belongs to the Southern Karoo Domain. The valley is bounded by a mountain belt and is divided in the western region and eastern region by the mountains of Sandberg and Rooiberg. The winters are mild and without severe frost, and the summers are hot and dry. The Little Karoo receives an annual rainfall between 125-300 mm, with a mean annual temperature of 18°C. Annual rainfall of 15-55 mm in the Orange River Valley and greater of the mountains (Wyk and Smith, 2001).

2. BIOCLIMATIC VARIABLES. List of 19 bioclimatic variables that were analysed

Bio 1	Annual Mean Temperature
Bio 2	Mean Diurnal Range
Bio 3	Isothermality
Bio 4	Temperature Seasonality
Bio 5	Max. Temperature of Warmest Month
Bio 6	Min. Temperature of Coldest Month
Bio 7	Temperature Annual Range
Bio 8	Mean Temperature of Wettest Quarter
Bio 9	Mean Temperature of Driest Quarter
Bio 10	Mean Temperature of Warmest Quarter
Bio 11	Mean Temperature of Coldest Quarter
Bio 12	Annual Precipitation
Bio 13	Precipitation of Wettest Month
Bio 14	Precipitation of Driest Month
Bio 15	Precipitation Seasonality (Coefficient of Variation)
Bio 16	Precipitation of Wettest Quarter
Bio 17	Precipitation of Driest Quarter
Bio 18	Precipitation of Warmest Quarter
Bio 19	Precipitation of Coldest Quarter

3. CHECKLIST. Species checklist of the different families of succulent plants used in the analyses

Aizoaceae

Argyroderma crateriforme (L. Bolus) N. E. Br.
Argyroderma congregatum L. Bolus
Argyroderma delaetii C. A. Maass
Argyroderma pearsonii (N. E. Br.) Schwantes
Argyroderma subalbum (N. E. Br.) N. E. Br.
Argyroderma theartii van Jaarsv.
Conophytum auriflorum Tischer
Conophytum bilobum (Marloth) N. E. Br.
Conophytum blandum L. Bolus
Conophytum breve N. E. Br.
Conophytum calculus (Berger) N. E. Br.
Conophytum cubicum Pavelka
Conophytum ectypum N. E. Br.
Conophytum ernstii S. A. Hammer
Conophytum flavum N. E. Br.
Conophytum fraternum (N. E. Br.) N. E. Br.
Conophytum frutescens Schwantes
Conophytum gratum (N. E. Br.) N. E. Br.
Conophytum herreanthus S. A. Hammer
Conophytum joubertii Lavis
Conophytum lithopsoides L. Bolus
Conophytum loescheanum Tischer
Conophytum longum N. E. Br.
Conophytum meyeri N. E. Br.
Conophytum minimum (Haw.) N. E. Br.
Conophytum minusculum (N. E. Br.) N. E. Br.
Conophytum minutum (Haw.) N. E. Br.
Conophytum obcordellum (Haw.) N. E. Br.
Conophytum obscurum N. E. Br.
Conophytum pageae (N. E. Br.) N. E. Br.
Conophytum pellucidum Schwantes
Conophytum quaesitum (N. E. Br.) N. E. Br.
Conophytum regale Lavis
Conophytum ricardianum Losch & Tischler
Conophytum saxetanum (N. E. Br.) N. E. Br.
Conophytum schlechteri Schwantes
Conophytum stephanii Schwantes
Conophytum stevens-jonesianum L. Bolus
Conophytum subfenestratum Schwantes
Conophytum tantillum N. E. Br.
Conophytum truncatum (Thunb) N. E. Br.
Conophytum uviforme (Haw.) N. E. Br.
Conophytum velutinum Schwantes
Conophytum wettsteinii (Berger) N. E. Br.
Diplosoma luckhoffii (L. Bolus) Schwantes
Gibbaeum album N. E. Br.
Gibbaeum angulipes (L. Bolus) N. E. Br.
Gibbaeum dispar N. E. Br.
Gibbaeum geminum N. E. Br.
Gibbaeum gibbosum (Haw.) N. E. Br.
Gibbaeum heathii (N. E. Br.) L. Bolus
Gibbaeum hortenseae (N. E. Br.) Thiede & Klak
Gibbaeum nebrownii Tischler
Gibbaeum pachypodium (Kensit) L. Bolus
Gibbaeum petrense (N.E.Br.) Tischler
Gibbaeum pilosulum (N. E. Br.) N. E. Br.
Gibbaeum pubescens (Haw.) N. E. Br.
Gibbaeum pubescens subsp. *shandii* (N. E. Br.) Glen
Gibbaeum velutinum (L. Bolus) Schwantes
Lithops marmorata N. E. Br.
Lithops meyeri L. Bolus
Lithops olivacea L. Bolus

Apocynaceae

Duvalia caespitosa Haw.

Duvalia elegans (Masson) Haw.

Duvalia parviflora N. E. Br.

Duvaliaranthus x albostriatus Bruyns

Gonolobus luteus (Masson) Druce

Hoodia alstonii (N. E. Br.)Plowes

Hoodia gordonii (Sweet) ex Decne

Hoodia pilifera (L. f.) Plowes

Huernia clavigera (Jacq.) Haw.

Huernia humilis Haw.

Huernia pillansii N. E. Br.

Huernia praestans N. E. Br.

Larryleachia cactiformis (Hook.) Plowes

Larryleachia dinteri (A. Berger) Plowes

Larryleachia perlata (Dinter) Plowes

Stisseria geminata (Masson)Kuntze

Quaqua pillansii (N. E. Br.) Bruyns

Cactaceae

Ariocarpus bravoanus H. M. Hern. & E. F. Anderson

Ariocarpus fissuratus (Engelm.) K. Schum.

Ariocarpus kotschoubeyanus (Lem.) K. Schum.

Ariocarpus retusus Scheidw.

Astrophytum capricorne (A. Dietr.) Britton & Rose

Astrophytum myriostigma Lem.

Coryphantha delicada L. Bremer

Coryphantha georgii Boed.

Coryphantha glanduligera (Otto & A.Dietr.) Lem.

Coryphantha macromeris (Engelm.) Britton & Rose

Coryphantha odorata Boed.

Coryphantha poselgeriana (D.Dietr.) Britton & Rose

Coryphantha pseudoechinus Boed.

Coryphantha pulleineana (Backeb.) Glass

Coryphantha werdermannii Boed.

Coryphantha wohlschlageri Holzeis

Echinocactus horizonthalonius Lem.

Echinocereus cinerascens (DC.) Lem.

Echinocereus enneacanthus Engelm.

Echinocereus enneacanthus subsp. *brevispinus* (W.O.Moore) N.P.Taylor

Echinocereus pectinatus (Scheidw.) Engelm.

Echinocereus pectinatus var. *wenigeri* L.D.Benson

Echinocereus stramineus (Engelm.) F.Seitz

Echinomastus mariposensis Hester

Epithelantha micromeris (Engelm.) F.A.C.Weber ex Britton & Rose

Ferocactus echidne (DC.) Britton & Rose

Ferocactus histrix (DC.) G.E.Linds.

Ferocactus pilosus (Galeotti ex Salm-Dyck) Werderm.

Ferocactus recurvus (Mill.) Borg

Lophophora williamsii (Lem. ex Salm-Dyck) J.M. Coult.

Mammillaria albicoma Boed.

Mammillaria aureilanata Backeb.

Mammillaria compressa DC.

Mammillaria formosa Galeotti ex Scheidw.

Mammillaria formosa subsp. *microthele* (Muehlenpf.) D|.R. Hunt

Mammillaria geminispina Haw.

Mammillaria heyderi Muehlenpf.

Mammillaria lasiacantha Engelm.

Mammillaria magnimamma Haw.

Mammillaria pottsii Scheer ex Salm-Dyck

Mammillaria prolifera (Mill.) Haw.

Mammillaria schiedeana Ehrenb. ex Schltdl.
Mammillaria sphaerica A. Dietr.
Mammillaria surculosa Boed
Mammillaria uncinata Zucc. ex Pfeiff.
Mammilloydia candida (Scheidw.) Buxb.
Neolloydia conoidea (DC.) Britton & Rose
Sclerocactus uncinatus Galeotti ex Pfeiff.
Thelocactus bicolor (Galeotti) Britton & Rose
Thelocactus conothelos (Regel & Klein) F.M. Knuth
Thelocactus hexaedrophorus (Lem.) Britton & Rose
Thelocactus tulensis (Poselger) Britton & Rose
Turbinicarpus beguinii (N.P. Taylor) Mosco & Zanovello
Turbinicarpus pseudopectinatus (Backeb.) Glass & R.A. Foster
Turbinicarpus saueri (Boed.) John & Riha subsp. *knuthianus* (Boed.) Lüthy
Turbinicarpus schmiedickeanus (Boed.) Buxb. & Backeb.
Turbinicarpus viereckii (Werderm.) John & Riha

Euphorbiaceae

Euphorbia fasciculata Thunb.
Euphorbia heptagona L.
Euphorbia mammillaris L.
Euphorbia melanohydrata Nel
Euphorbia pillansii N. E. Br.
Euphorbia pseudoglobosa Marloth
Euphorbia schoenlandii Pax.
Euphorbia susannae Marloth
Euphorbia tuberculata Jacq.
Euphorbia tuberculatoides N. E. Br.