Gymnocarpos decandrus (Caryophyllaceae) on Fuerteventura

Dietmar Brandes, Braunschweig

1. Introduction

The potential natural vegetation of Fuerteventura is built up by Euphorbia balsamifera and E. canariensis communities) [Tabaial – Cardonal] up to altitudes of about 500 m (SANTOS GUERRA 2000). This vegetation however is mostly replaced by communities of the class Pegano-Salsoletea. Therefore in the lower zones of Fuerteventura scattered shrub sommunities of the alliance Launaeo arborescentis-Schizogynion sericeae are dominating, whose characteristic species are:

Atriplex glauca var. ifniensis
Artemisia reptans
Bassia tomentosa [= Chenoleoides tomentosa]
RR *Convolvulus caput-medusae* (BRANDES 2001)
Frankenia capitata
R *Gymnocarpus decandrus*
Launaea arborescens
Lycium intricatum
RR *Pulicaria burchardii* (BRANDES 2004)
Salsola oratavіensis
Salsola tetrandra
Salsola vermiculata
Suaeda vermiculata

Rare species are marked with R, very rare species with RR. At the very near coastal areas the arenicolous *Traganum moquinii* is to be found (FRITZSCH & BRANDES 1999, RODRÍGUEZ DELGADO et al. 2000), on rocky ground in the mountains also *Nauplius sericeus* (RODRÍGUEZ DELGADO et al. 2000).

A common alien on road sides, barrancos and also in settlements is *Nicotiana glauca* (BRANDES 2002 a), sometimes also *Maireana brevifolia* (BRANDES 2002 b), *Calotropis procera* and *Ricinus communis* (RODRÍGUEZ DELGADO 2000).

Dietmar Brandes. Working Group of Vegetation Ecology. Technical University Braunschweig.
D.Brandes@tu-bs.de

2. *Gymnocarpos decandrus*

Gymnocarpos decandrus is a relatively rare element of the flora of Fuerteventura. Because of its wide distribution in the arid region between Canary Islands and Pakistan we will show its ecology and phytosociology on Fuerteventura for comparison reasons. *Gymnocarpos decandrus* has the most extensive distribution in the genus (PETRUSSON & THULIN 1996). It is a floral element of the Saharo-Arabian region, which is found on the Canary Islands, in Morocco, Algeria, Tunisia, Libya, and Egypt on the African mainland, and in Israel, Jordan, S Syria, W Saudi Arabia, N Oman, S Iran, SW Afghanistan and SW Pakistan in Asia.

The correct name of our species is *Gymnocarpos decandrus*, not *Gymnocarpos decander* or *G. decandrum* (PETRUSSON & THULIN 1996). According to SCHÖNFELDER & SCHÖNFELDER (1997) the forma salsoloides (Webb ex Christ.) Chaudri was found on Tenerife and also on the Eastern Canary Islands, but PETRUSSON & THULIN (1996) did not recognize this forma and supposed that it is „no more than an environmentally induced modification".

3. *Gymnocarpos decandrus* on Fuerteventura

There are scattered populations on the peninsula Jandía between Esquinzo and Barlovento (KUNKEL 1977), but also dense populations north of La Pared, which were analysed by us. *Gymnocarpos decandrus* occurs on stony slopes in the lower zone of Fuerteventura. The species avoids the direct influence of the sea, but we found it nowhere higher than 150 m above sea level. In its whole area *Gymncarpus decandrus* prefers rocks and stony soils without sand:

> Egypt: „stony wadis and slopes" (BOULOS 1999). MOUSTAFA & KLOPATEK (1995): mention *Gymnocarpos decandrus* as a species only growing on the slopes [not present on terraces, gorges, ridges, wadis or plains] in the Saint Catherine area, southern Sinai, Egypt.
>
> Tunisia: „rochers et pâturages caillouteux désertiques" (POTTIER-ALAPETITE 1979).
>
> Jordan: „stony slopes overlooking the Dead Sea and Wadi Araba (AL-EISAWI 1998).
>
> Saudi Arabia: „areas without sand...widely distributed in rocky areas" (CHAUDHARY & AL-JOWAID 1999).

Dietmar Brandes. Working Group of Vegetation Ecology. Technical University Braunschweig.
D.Brandes@tu-bs.de

Tab. 1: *Gymnocarpos decandrus* community.

Number of the relevé	1	2	3	4	5	6	7	8	9	10	11	12
Field number	98/71	98/72	98/73	98/74	98/75	00/79	00/80	00/81	00/82	00/76	00/77	00/78
Microhabitat [G= gully, S= slope + gullies]	G	S	S	S	S	S	S	S	S	G	S	S
Inclination [°C]	35	30	35	40	40	40	40	40	40	30	35	35
Exposition	W	W	W	W	W	NW	NW	NW	NNW	NW	NW	NW
Area [m²]	160	50	50	100	60	35	30	30	40	16	35	50
Vegetation area [%]	25	20	20	25	20	20	20	20	15	35	20	30
Species number	10	11	10	8	9	9	10	16	13	9	8	11
Gymnocarpos decandrus	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**2.2**	**2.1**	**3.2**	**2.2**	**3.2**
Differential species of the variant a:												
D *Rubia fruticosa*	+	+	+	.	1.1	1.1	1.1	1.1	2.1	.	.	.
D *Kickxia heterophylla*	1.1	+	1.1	1.1	1.1	+	+	+	+	.	.	.
Further species of the class Pegano-Salsoletea:												
Lycium intricatum	1.1	2.1	1.1	.	1.1	+	1.1	.	+	.	+	1.1
Launaea arborescens	2.2	1.1	1.1	1.1	2.1	1.1	.	1.1	.	1.1	.	.
Salsola vermiculata	1.1	1.1	1.1	1.1	1.1	.	.	.	.	1.1	.	2.2
Chenoleoides tomentosa	.	.	.	.	.	.	.	+	+	.	.	.
Forsskaolea angustifolia	.	.	.	.	.	.	.	r	.	.	.	.
Others:												
Helianthemum canariense	.	1.2	1.1	+	+	.	.	+.2	.	.	.	.
Lobularia cf. canariensis	.	+	+	1.2	+	.	.	+	+	.	.	.
Lotus lancerottensis	.	r	.	+	.	.	.	+	+	.	.	.
Phagnalon saxatile	r	+	.	.	.	.	.	.	.	.	.	.
Ajuga iva	.	.	r	+	.	.	.	.	.	.	.	.
Phagnalon purpurascens	.	.	.	.		.	+		.	1.2	.	.
Aristida coerulescens	+	.	.	.	.	.	.	.	.	.	.	.
Reichardia tingitana	.	.	.	.	.	.	r		.	.	.	.
Cuscuta planiflora	.	.	.	.	.	.	+.2		.	.	.	.
Hedypnois cretica	.	.	.	.	.	.	.	r	.	.	.	.
Polycarpaea nivea	.		.	.	.	.	.	.	+	.	.	.
Species of Carrichtero-Amberboion:												
Lotus glinoides	+	+	.	.	.	+	+.2	.	.	+	1.2	+
Senecio falciformis	.	.	.	.	.	.	1.2	1.2	+	+.2	1.2	1.2
Trigonella stellata	r	.	.	.	.	+.2	.	+.2	+	.	+.2	.
Medicago laciniata	.	.	.	.	.	1.2	.	+	.	1.2	1.2	1.2
Keimlinge indet.	.	+	+	+	1.1	.	.	.	.	.	.	.
Asphodelus tenuifolius	.	.	.	.	.	.	.	+°	+	+	.	r
Stipa capensis	.	.	.	.	.	.	+		+	.	.	+°
Mesembryanthemum nodiflorum	.	.	.	.	.	.	.		.	+	.	1.2
Patellifolia patellaris	.	.	.	.	.	.	.		.	.	+°	+°
Plantago ovata	.	.	+	.	.	.	.	.	.	.	.	.

	.							.	.	.	.	.
Echium bonnetii	.	.	.	.	.	.		1.1				
Senecio flavus	.	.	.	.	.	.	.	+	.	.	.	.
Calendula aegyptiaca	.	.	.	.	.	.	.	.	+.2	.	.	.
Aizoon canariense	.	.	.	.	.	.	.	.	.	.	+	.
Astragalus hamosus	.	.	.	.	.	.	.	.	.	.	.	+

Relevés in february 1998 and february 2000.

Gymnocarpos decandrus is associated with other shrubs like *Lycium intricatum, Launaea arborescens, Salsola vermiculata*, and *Chenoleoides tomentosa* (see Tabl. 1). It usually dominates these scattered shrub communities (vegetation cover max. 35 %).

Gymnocarpos decandrus is without any doubt an element of the class Pegano-Salsoletea (RIVAS-MARTÍNEZ et al. 1983; RODRÍGUEZ DELGADO et al. 2000). Avoiding the dissipation of the class Pegono-Salsoletea, I prefer to value the *Gymnocarpos decandrus* community only as a local phenomenon.
We can distinguish between a variant with *Rubia fruticosa* (No. 1-9) and an inops variant (No. 10-12). The differences are presumably caused by grazing with goats. Low intensity of grazing allows *Rubia fruticosa* and *Kickxia heterophylla* to grow inside small clusters of *Gymnocarpos decandrus*. Growing intensity of grazing perhaps causes consumption and local extirpation of these two species.

Species combination of our Tab. 1 shows distinct similarities to the Chenoleoido tomentosae-Salsoletum vermiculatae.
The occurrence of *Gymnocarpos decandrus* on Fuerteventura was only documented with 2 relevés by RODRÍGUEZ DELGADO et al. (2000) in the Frankenio-Zygophylletum gaetuli (Tab. IV; cover-abundance index 1) and in the Chenoleo tomentosae-Suaedetum vermiculatae (Tab. XI, cover-abundance index 1). SUNDING (1972) found it also in this association on Gran Canaria.

Literature

AL-EISAWI, D. M. H. (1998): Wild flowers of Jordan. – Amman. 296 S.

BENABID, A. (2000): Flore et écosystèmes du Maroc. – Rabat. 359 S.

BOULOS, L. (1999): Flora of Egypt. Vol. 1. – Cairo. XV, 419 S.

Dietmar Brandes. Working Group of Vegetation Ecology. Technical University Braunschweig.
D.Brandes@tu-bs.de

BRANDES, D. (2001): Convolvulus caput-medusae Lowe on Fuerteventura (Canary Islands, Spain). – Vieraea, 29: 79-88.

BRANDES, D. (2002 a): Nicotiana glauca als invasive Pflanze auf Fuerteventura. – In BRANDES, D. [Hrsg.]: Adventivpflanzen. Beiträge zu Biologie, Vorkommen und Ausbreitungsdynamik von Archäophyten und Neophyten in Mitteleuropa. – Braunschweig. S. 39-57. (Braunschweiger Geobotanische Arbeiten, 8.) http://opus.tu-bs.de/opus/volltexte/2002/308/

BRANDES, D. (2002 b): Maireana brevifolia on Fuerteventura (Canary Islands, Spain). http://www.biblio.tu-bs.de/geobot/lit/maireana.pdf

CHAUDHARY, S, A. & A. A. A. AL-JOWAID (1999): Vegetation of the kingdom of Saudi Arabia. – Riyahd. 689 S.

FRITZSCH, K. & D. BRANDES (1999): Flora und Vegetation salzbeeinflusster Habitate auf Fuerteventura. – In: BRANDES, D. [Hrsg.]: Vegetation salzbeeinflusster Habitate im Binnenland. – Braunschweig. S. 205-219. (Braunschweiger Geobotanische Arbeiten, 6.)
http://opus.tu-bs.de/opus/volltexte/2001/209/

HOHENESTER, A. & W. WELß (1993): Exkursionsflora für die Kanarischen Inseln. – Stuttgart. 374 S.

KUNKEL, G. (1977): Las plantas vasculares de Fuerteventura (Islas Canarias), con especial interés de las forrjeras. – Madrid. 130 S. (Naturalia Hispanica, 8.)

KUNKEL, G. (1993): Die Kanarischen Inseln und ihre Pflanzenwelt. 3. Aufl. – Stuttgart. XII, 238 S.

LEBRUN, J.P. (1998): Catalogue des plantes vasculaires de la Mauretanie et du Sahara occidental. – Boissiera, 55: 322 S.

MOUSTAFA, A. A. & J. M. KLOPATEK (1995): Vegetation and landforms of the Saint Catherine area, southern Sinai, Egypt. – Journal of Arid Environments, 30: 385-395.

PETRUSSON, L. & M. THULIN (1996): Taxonomy and biogeography of Gymnocarpos (Caryophyllaceae). – Edinburgh Journal of Botany, 53 (1): 1-26.

POTT, R., J. HÜPPE & W. WILDPRET DE LA TORRE (2003): Die Kanarischen Inseln: Natur- und Kulturlandschaften. – Stuttgart. 320 S.

POTTIER-ALAPETITE, G. (1979): Flore de la Tunisie. T. 1. – Tunis. XIX, 651 S.

QUEZEL, P. & S. SANTA (1962): Nouvelle flore de l´Algérie. T. 1. – Paris. 565 S.

REYES BETANCORT, J. A., W. WILDPRET DE LA TORRE & M. C. LEON ARENCIBIA (2001): The vegetation of Lanzarote (Canary Islands). – Phytocoenologia, 31: 185-247.

Dietmar Brandes. Working Group of Vegetation Ecology. Technical University Braunschweig.
D.Brandes@tu-bs.de

RIVAS-MARTINEZ, S., W. WILDPRET DE LA TORRE, M. DEL ARCO AGUILAR, O. RODRIGUEZ, P. L. PEREZ DE PAZ, A. GARCIA-GALLO, J. R. ACEBES GINOVES, T. E. DIAZ GONZALEZ & F. FERNANDEZ-GONZALEZ (1993): Las communidades de la Isla de Tenerife (Islas Canarias). – Itinera Geobotanica, 7: 169-374.

RODRIGUEZ DELGADO, O., A. GARCIA GALLO & J. A. REYES BETANCORT (2000): Estudio fitosociológico de la vegetación actual de Fuerteventura (islas Canarias). – Viervaea, 28: 61-98.

SANTOS GUERRA, A. (2000): La vegetación. – In: MORALES MATOS, G. & R. PÉREZ GONZÁLEZ [ed.]: Gran Atlas Temático de Canarias. - Tenerife, p. 121-146.

SCHÖNFELDER, P. & I. SCHÖNFELDER (1997): Die Kosmos-Kanarenflora. – Stuttgart. 319 S.

SUNDING, P. (1972): The vegetation of Gran Canaria. – Skrifter utgitt av det Norske Videnskaps-Akademi i Oslo, Mat.-Naturv. Kl., Ny Serie, 29: 186, LIII S.

ZAHRAN, M. A. & WILLIS, A. J. (1992): The vegetation of Egypt. – London. XVI, 424 S.

ZOHARY, M. (1973): Geobotanical foundations of the Middle East. Vol. 1.2. – Stuttgart, Amsterdam.

Author´s address:

Prof. Dr. Dietmar Brandes
Working Group for Vegetation Ecology
Institute for Plant Biology
Technical University Braunschweig

D-38023 Braunschweig