

Flora and Vegetation of Afghanistan

Siegmar-W. Breckle

Afghanistan is a very mountainous country. It offers a big variety of ecological conditions, this means a big variety of vegetation types is covering land surface. These vegetation types are consisting of a high biodiversity, since the floristic influence from various neighbour regions is a considerable factor in floristic and vegetation pattern. On the other hand, Afghanistan is a very dry country with scarce rainfalls (Flohn 1969), but again very varying between north and south, west and east, lowlands and mountains.

Flora of Afghanistan

[click on: [vegetation map of Afghanistan](#)]

By far the most comprehensive source for the Afghanistan flora is Rechinger's "Flora Iranica", which started in 1963 (Breckle & Frey 1976c) and is now almost completed with about 180 deliveries of the various plant families. Additionally many other short research papers on the flora and vegetation of various parts have been published. Afghanistan is certainly a country which flora and vegetation has been studied quite in detail (Breckle et al. 1969, 1975, Breckle 1981, 1999), however, mainly before the critical times of the Soviet imperialism and subsequent civil wars.

Though Afghanistan is a rather dry country with a high percentage of deserts and semideserts, the number of vascular plant species is distinctly higher than in the climatically more humid Germany. GROOMBRIDGE (1992) gives an estimate of 3500 species and 30-35% of endemics, as well as about 5-10% of species, which might be added by future new discoveries. Our estimate is about 5000 species and about 25-30% of endemics.

The chorological types include species with circumboreal, with holarctic, with central Asian, with himalayan, with irano-turanian, with sahara-sindian, with sudanian, with deccanic floristic relations, but then also those, which are more restricted to specific regions, as e.g. Pamir, Wakhan, Central Afghan mountains, Western, central and/or Eastern Hindu Kush. Endemism is a character to be restricted to a distinct geographical unit, not to a state. This makes it difficult to judge, since many floras are written to describe the occurrence of species within political borders, which normally makes not much sense.

Precipitation and altitude are conditioning factors resulting in the diversity of the country's flora. A limited area in the east and southeast receives the impact of the Indian monsoons and belongs to the sub-tropical zone. Altitude, throughout all zones, may allow for the development of different strata of vegetation. Thus, diverse ecological conditions, ranging from barren deserts to lush sub-tropical regions to high alpine nival regions, have favored the establishment of a complex and varied flora.

Common physiognomic features of the plants of the region are gray or white hairs, gray bark that is particularly thick at the base, reduction of leaf area and cushion growth that protects the plants against the strong insolation, dry wind and sand-drift that threaten to dry them out. Plants are often characterized by spiny stems and leaves or glands containing etheric (essential) oils or poisonous secondary compounds or other elements that render them unpalatable to the animals that for centuries have exerted heavy impact on the flora.

In order of numerical importance the following major families are found in Afghanistan. More than 500 species are known from the Asteraceae (Compositae) plant family, including about 100 species of *Artemisia*. The second biggest genus in the area is *Cousinia* after *Astragalus*. Within the Flora Iranica Rechinger (1972) mentions 355 species of *Cousinia*, describing not less than 61 as new species.

From Afghanistan there are reported 144 species of *Cousinia*, 93 of them endemic to Afghanistan. 198 species from Iran, 40 from Turcomania, 31 from adjacent Pakistan, 21 from Iraq. The family Fabaceae (Leguminosae) is attested with some 400 - 500 species of which the genus *Astragalus* is by far most numerous. In the Brassicaceae (Cruciferae) family about 250 species are found, especially *Brassica*, which includes cabbage, mustard and radish. There are more than 150 species of the Poaceae (Gramineae) family including such important cultivated plants as wheat, rice, barley, maize and sugar cane. Other grasses include the genera *Agropyron* (wheatgrass), *Poa* (bluegrass), *Arundo* (grainreed), *Cymbopogon* (lemon grass) and *Andropogon* (bluestem). In the steppes many *Festuca*, *Bromus*, *Stipa* spp. occur as well. More than 180 species are recorded from the Lamiaceae (Labiatae) family, including *Phlomis* (Jerusalem sage), *Thymus* (thyme), *Mentha* (mint), *Nepeta* (cat mint), *Origanum* and *Eremostachys*. The family Apiaceae (Umbelliferae) is represented by more than 100 species; most notable of which is *Ferula assafoetida*, an item of export and other giant hapaxanthic umbellifers from *Ferula* or *Dorema*. There are many other drugs derived from naturally occurring species in the area (Breckle 1979, 1982, Breckle & Unger 1977). Chenopodiaceae halophytes are common, especially *Salsola*, *Suaeda*, *Arthrophytum*, *Halostachys* and *Halocharis*. On the other side the orchids (Orchidaceae), which are common in the Mediterranean and in the Himalaya spread only with few species to the area. From Afghanistan by Renz (1978) only 13 species are recorded (Iran: 48, Talysch: 28, Iraq 21, Flora Iranica total: 63). In Iridaceae, there are recorded 35 species in Afghanistan and the same number from Iran, 18 from Iraq, 10 from Turcomania, a total of 65 from the whole Flora Iranica region. A very typical genus of the drier mountain areas is *Eremurus* (steppe-lilies), where 23 species are known from the Flora Iranica area, 19 of those from Afghanistan and only 7 from Iran. The wild *Tulipa* (tulips) comprise 34 species in the Flora Iranica area, 17 in Afghanistan, 18 in Iran.

Vegetation of Afghanistan

Vegetation all over Afghanistan has been severely influenced by man and only a few high mountain and very dry desert areas retain a quasi natural vegetation cover. In most parts the vegetation depends on the winter rain, in the south winter rains are often irregular. Rainfall increases to the north and east resulting in better vegetation conditions in these parts. The eastern parts receive additionally some monsoon rains in summer.

Vegetation types have been studied in detail by Freitag (1971a,b). His survey is still the most complete of the area, especially also for the eastern, monsoonal influenced more humid parts with Himalayan forest types.

The main vegetation types which are shown on the map ([Vegetation of Afghanistan](#)), are:

- Calligonum-Aristida*-Sanddesert (1a)
- Haloxyton salicornicum*-Desert (1b)
- Other Deserts (rich in Chenopod.) (1c)
- Ephemeral Desert (1d)
- Dwarf *Amygdalus*-Semidesert (2)
- Subtropical dry Scrub and Savannah (3)
- Pistacia vera*-Woodlands (4a)
- Pistacia atlantica*-Woodlands (4b)
- Juniperus*-Woodlands (5a)
- Amygdalus*-Woodlands (5b)
- Sclerophyllous Oak Forests (6)
- Conifer Forests (7)
- Rhododendron*-Krummholz (8)
- Thorny Cushions, subalpine and alpine semideserts and meadows (9)

Nival belt, glaciers (10)

Azonal riverine vegetation (11a)

Swamps, Salt swamps, lakes (11b)

These vegetation types indicated on the map are the “natural potential vegetation”, which would be the vegetation cover without human activities. It gives an idea on the natural potential and resources of the various regions. Today, by longlasting exploitation, grazing, agriculture and irrigation, deforestation, many of these original vegetation types are only left on few spots, remote places, and are replaced by substituted associations poorer in shape, diversity and productivity, as well as also the soils are often degraded, eroded or totally destroyed.

Desert Vegetation (1)

The deserts of the north, west and south, in Registan and Dashte Margo contain active sand dune areas and dunes fixed by a rather open vegetation (1a). The flora here is scarcely modified by man. The main plants are *Haloxylon persicum*, *Calligonum* spp. and perennial *Aristida* spp. In lower lying saline areas, Chenopodiaceae are dominant (1c) and in the salt plains of Seistan the vegetation (1b) is characterized by *Haloxylon salicornicum*, *Salsola* spp., *Ephedra scoparia* and *Tamarix* spp. In some parts the ephemeral vegetation (1d) is very characteristic, in summer these areas look totally dry and dead. In saline flats in the north the black saxaul *Haloxylon aphyllum* can form open woodlands, but has been heavily used, see also paragraph azonal vegetation below. An overview on the Irano-Afghan deserts is given by Breckle (1983).

Steppe and Semidesert Vegetation (2)

The steppes in Afghanistan are scarce in typical steppe grasses, they should be named semi-deserts. Anyhow, they are the most important grazing areas where large number of nomads graze their livestock on a seasonal basis. The low lying steppes and semideserts in the west and south are dominated by an open vegetation of *Artemisia herba-alba* and other species of this genus, *Zygophyllum* spp., other dwarf shrubs are spiny *Amygdalus* (2), partly *Acantholimon* spp., *Acanthophyllum* spp., *Atriplex* spp., *Alhagi camelorum*, and *Cousinia* spp., the graminoids are often reduced by heavy grazing, *Poa*, *Agropyrum*, *Stipa*, *Festuca*, *Carex* and others are more common only on remote or inaccessible areas. An *Amygdalis brahuica* community is found between 1000 and 2000 m altitude also in the dry valleys of the east.

Along dry river beds there are thorny belts of *Stocksia brahuica*, *Amygdalus communis* and *Convolvulus spinosus*. The floral composition is very variable and depends on humidity, length of winter, sand composition, wind force and grazing pressure. More humid azonal places have denser vegetation with a richer species composition (11a). In areas west of Herat with cold winters and in some parts in the north, *Artemisia* spp. and *Ferula* spp. dominate along with geophytes like *Iris songarica*, *Tulipa*, *Iris* and *Allium* spp.

The northern loess zone supports a grass steppe dominated by *Poa bulbosa* or *Carex pachystylis* with *Bromus* spp., *Agropyron* spp., *Festuca* spp., etc. Poppy and herbaceous bulbs such as *Anemone*, *Gagea*, *Tulipa*, *Iris*, *Merendera* and *Muscari* are the first flowering plants in spring. Shrubs are completely absent (1d). In the spring the ground cover is 30-90%, but most of the plants die back from lack of water in the summer.

In the higher mountains there are other areas of semi desert. Around Bamiyan they are dominated by *Salsola* spp. High level steppes benefit from a higher precipitation as well as lower evaporation. Overgrazing generally favors the less palatable *Artemisia* shrubs and annuals at the cost of the palatable perennials. In dry years when the annuals do not germinate, heavy mortality of domestic animals takes place.

Arid Sub-tropical Woodlands and Savannah (3)

Perennial grasses and thorny evergreen shrubs and small trees predominate in the lower Kabul valley which experiences hot summers with few occasional monsoon rains and moderate winters. Heavy grazing and fuel wood collection have reduced the shrubs and led to an increase of annuals. A *Zizyphus nummularia* community occupies the lower regions up to 750 m. This is replaced at higher levels with a *Salvia-Pistacia* community. In the dry valley *Acacia modesta* penetrates the vegetation, it resembles already a subtropical savannah with a few C4-grasses (*Aristida*, *Panicum*). In Pakhtia also the dwarf palm *Nanorhops ritchieana* occurs, which leaves are heavily used for furniture and wattlework. Between 700 and 1300 m there is sometimes a *Reptonia buxifolia* and *Olea ferruginea* woodland which is heavily utilized for fodder and as pasture land.

Pistacia Woodlands (4)

To the north of the Hindu Kush on the extensive loess plains between 600 and 1600 m woodlands of *Pistacia vera* (4a) with some *Amygdalis bucharica* and in the northeast remnants of *Cercis griffithii* are characteristic.

On the lower slopes of the Hindu Kush open *Pistacia* woodlands replace the *Amygdalus* community in higher parts in the south, resp. the *Juniperus* woodlands in the north. The southern slopes of the Hindu Kush are characterized by 4-6 m high *Pistacia atlantica* (*cabulica*, *khinjuk*) (4b) and are rich in herbs like *Gagea*, *Anemone* and *Allium* spp.. On valley slopes *Pistacia khinjuk* and *Cercis griffithii* are sometimes found, especially in the Kabul and Logar Valleys. In the last century *Cercis* woodlands were much more common all around Kabul, also around Herat.

The *Pistacia vera* and *Juniperus excelsa* woodlands are heavily exploited for charcoal production.

Amygdalus and *Juniperus* Scrublands (5)

The upper part of the forest belt on the northern slopes of the Hindu Kush is formed by an open mixed woodland dominated by *Juniperus excelsa*, intermixed with other *Juniperus* species (5a).

On the same elevation between 2000 and 3000 m and in areas with more than 400 mm of precipitation in the south a 2.5-6 m high *Amygdalus* community (5b) is dominant; many scrub species and geophytes such as *Eremurus*, *Corydalis*, *Rheum*, *Gagea*, *Tulipa*, *Iris*, *Allium* spp. also occur in both types. *Amygdalus* scrublands are often intermixed with the *Pistacia* woodlands, and can be intermediate between the semideserts of the south and west and the woodlands of the Hindu Kush. These areas are important for winter pasture. These woodlands are heavily used and badly degraded.

Himalayan type Evergreen Forests in East Afghanistan (6)

Between 1200 and 2200 m the oak *Quercus baloot* (6) dominates a forest which is up to 15 m high; it has a rich undergrowth and several tree species including almonds *Amygdalus kuramica* and *Pistacia khinjuk*. It is heavily utilized for fodder, fruits and fuelwood and large parts have been destroyed to provide fuel for the main cities. The remnants of *Qu. baloot* forest in the Panjshir valley, northeast of Kabul, forms the westernmost extension of the Himalayan forest belt. A few trees were even occurring near Top Dara in the Koh-e-Daman Plain near Charikar. Formerly also at the Latahband pass (some 25km east of Kabul) there were *Qu. baloot* remnants. In very humid places with high summer rainfall in the higher mountain belts *Qu. baloot* is replaced by *Qu. dilatata* and between 2400 and 2900 m by *Qu. semecarpifolia*. Azonal associates in river valleys are *Juglans regia*, *Acer turkestanicum* and *Pyrus pashia*.

Temperate Coniferous Forests of East Afghanistan (7)

The forest belt between 2200 and 2500 m in moderately humid parts is a 5-12 m high *Pinus gerardiana* woodland with local stands of *Betula*. A thorny *Cotoneaster-Sophora-Rosa* scrubland colonizes the areas after the pine has been felled.

Between 2500 and 3100 m *Cedrus deodara* forest is found. Depending on soil and humidity the cedars may be up to 30 m high and form a very dense forest. Large parts of the *Cedrus* forest have been exploited and replaced by a stable *Artemisia* community. Logging has now reached even the western parts of Nuristan.

In the humid areas the upper belt of the forest, up to an altitude of 3300 m, is formed by a 20-25 m high *Picea smithiana*-*Abies webbiana* forest, varying from valley to valley. In the dry areas a 10 m high *Juniperus seravschanica*-*J. semiglobosa* woodland is found. However, most areas have been cut for fuelwood and mature stands are rare. The herbaceous ground cover, especially along the streams is heavily grazed.

It is very interesting to note, that fossile conifer needles (similar to *Pinus roxbourgii*) and many other fossile leaves from a rather humid vegetation have been found in marl sediments at the Latahband Pass (Breckle 1967), probably being from about early Quaternary. This is indicating that monsoonal climate has reached much far to the west.

Krummholz (8)

In areas of the east with monsoonal summer rains a dense 0.5-1 m high vegetation of *Juniperus squamata*, *Rosa* spp., *Ribes* spp. and *Rhododendron* spp. develops between 3000 and 3500 m, but only few sites are left. On deep soils, *Salix* spp. may dominate this community. On lower sites, at the tree line, the very rare *Rhododendron afghanicum* occurred, but is extinct now (Breckle 1972).

In parts of the Hindu Kush, a *Juniperus nana* community with many thorny dwarf shrubs occurs. Between 3600 and 4000 m in the dryer central and northern Hindu Kush, there is a cushion scrubland with many different species of *Acantholimon*, *Artemisia*, *Astragalus*, *Cousinia*, *Ephedra* and *Onobrychis*. A similar thorny cushion shrubland, with very varying species composition changing from mountain ridge to mountain ridge is found in many of the Central Afghan high mountain areas (Paghman, Western Hindu Kush, Koh-e-Baba). Many endemics occur in this area.

Subalpine thorny cushions, semideserts and deserts, and meadow vegetation (9)

On mountain ridges, above the tree line at about 3300 m subalpine and alpine shrublands, alpine heaths and meadows occur which offer good range forage for domestic animals. The subalpine and alpine vegetation of the Hindu Kush on dry sites is open and poor in species, but each slope may have another species pattern. This belt is therefore typical for a high and endemic biodiversity. On wet sites (melting snow water etc.) a closed meadow canopy rich in species may occur. That of the Pamirs and Eastern Hindu Kush often is somehow denser with a great variety of herbs. Usually, the alpine meadows, dominated by grasses and a variety of herbs, are heavily utilized during two months as summer pastures by nomads and the pastoral people. Studies on flora and ecology of vegetation have been performed by Breckle 1971b,e, 1973, 1974, 1975, 1988, 2002, 2004, Breckle & Frey 1974, 1976a,b. Additional data on the Wakhan and Pamir area are given in Agakhanjanz & Breckle 1995, 2002, 2004, Ahmadov et al. 2005, Breckle 2003, Breckle & Wucherer 2005, Breckle et al. 1969.

Nival Vegetation (10)

In the Pamirs and in Central and Eastern Hindu Kush, the boundary with the nival zone is 4900 m on the northern exposed slopes and 5300-5400 on the southern exposed slopes. The higher peaks and ridges are not dominated by alpine heaths (Ericaceae), as it is sometimes wrongly recorded, but by a low and very open, very frost resistant herbaceous and semifruticose vegetation. The highest record of a vascular plant in Afghanistan is the beautiful *Primula macrophylla* in the central Hindu Kush at 5600 m. *Sibbaldia cuneata* is also known from about 5500m. There are 37 species recorded from above 5000m (Breckle 1974). Mosses and lichens occur even higher, up to the highest peaks on rocky surface.

Azonal vegetation (11): Rivers, Lakes

These systems have been drastically altered by human activity. The original forests of major river valleys have been replaced by irrigated crops. Dense vegetation is found in regularly flooded areas. This is dominated by *Tamarix* spp., *Salix* spp. and reeds (*Phragmites australis*, *Typha*) and, depending on the frequency of inundation, species such as *Populus* spp., *Myricaria* spp., *Berberis* spp., *Crataegus* spp., and *Hippophaë*.

Along the river beds (11b) on well drained areas with deep soils, many of the wild ancestors of cultivated fruit trees occur. These include the apple (*Malus* spp.), pear (*Pyrus* spp.) and almond (*Amygdalus* spp.) as well as grapes (*Vitis* spp.). Trees of *Fraxinus* spp., *Acer* spp., and *Platanus* spp. are also found here. But undisturbed natural riverine vegetation can not be found today.

Little information is available on the vegetation of the lakes (11b) but Hamun-e-Puzak and Kol-e-Hashmat Khan are covered with reeds. One of the few higher plants in the Ab-e-Istada lake is the pondweed *Ruppia maritima* with colonies of *Taraxacum monochlamydeum* forming conspicuous vegetation on mudflats around the lake. Some Characeae occur in Dasht-e-Nawar, as well as in Band-e-Amir.

Azonal vegetation (saline flats, 11b)

Deserts are arid areas, where salinity close to the erosion basins is a common natural phenomenon. By irrigation without drainage in agricultural areas also salinity is enhanced, and after a few decades those fields are unproductive and have to be abandoned. They are taken over by a halophytic vegetation. The irano-turanian floristic region is very rich in halophytic species (Breckle 1986, 2000, 2002, Mirazai & Breckle 1978). It is an evolutionary center for Chenopodiaceae. Some of the above mentioned endorheic lakes (Hamun-e-Puzak and Kol-e-Hashmat Khan, Ab-e-Istada, Dasht-e-Nawar etc.) are in part huge salt swamps, where a rich halophytic vegetation occurs with *Salsola* spp., *Suaeda* spp., *Halocnemum strobilaceum*, *Halostachys caspica*, spp., *Halocharis* spp., *Halimocnemis* spp., *Gamanthus* spp., *Seidlitzia rosmarinus* and many other genera from Chenopodiaceae, but also *Limonium* spp., *Zygophyllum*, *Nitraria*, *Frankenia* spp., *Tamarix* spp., *Reaumuria* spp., *Cressa cretica* etc. are common.

Cited Literature (Additional citations, see Publication List Breckle on Afghanistan)

Flohn, H. 1969: Zum Klima und Wasserhaushalt des Hindukusch und der benachbarten Hochgebirge. *Erdkunde* **23**: 205-215

Freitag, H. 1971a: Die natürliche Vegetation Afghanistans. *Beiträge zur Flora und Vegetation Afghanistans I. Vegetatio* **22**: 286-344

Freitag 1971b: Studies on the natural vegetation of Afghanistan. in Davis, P.H. et al.: *Plant Life of South West Asia*, Edinburgh. p.89-106

GROOMBRIDGE

RECHINGER

Publication List "Breckle" on Afghanistan

AGACHANJANZ, O.E.†2002: Der Wind, der heißt Afghane – Forschungen im Pamir im Jahr der Schlange. Hrsg: S.-W.Breckle. Shaker/Aachen 236pp.

AGAKHANJANZ, O., BRECKLE, S.-W. 1995: Origin and evolution of the mountain flora in middle and central Asia in: CHAPIN III, F.S., KÖRNER, C.: Arctic and alpine biodiversity: patterns, causes and ecosystem consequences.- *Ecol. Studies* 113: 63-80

AGAKHANJANZ, O.E. & BRECKLE, S.-W. 2002: Plant diversity and endemism in High Mountains of Central Asia, the Caucasus and Siberia. In: *Mountain Biodiversity – A global assessment*. Körner, C. & Spehn, E. (Eds.) Parthenon Publ. Group, Boca Raton, New York etc., chapter 9, p. 117-127

- AGAKHANJANZ, O.E. & Breckle, S.-W. 2004: Pamir. In: Burga et al. (eds.): Die Hochgebirge der Erde (Ulmer/Stgt.) Kap. 11. p. 151-157
- AHMADOV, K. M., BRECKLE, S.-W. & BRECKLE, U. 2005: Effects of grazing on biodiversity, productivity, and soil erosion of alpine pastures in Tajik mountains. In: Spehn, E., Körner, C., & Liberman, M. (eds): Land-use Change and Mountain Biodiversity.- CRC Taylor&Francis/Boca Raton p.253-261
- BRECKLE, S.-W. 1967: Fossile Pflanzenreste am Latahband-Pass in Afghanistan.- Science (Kabul) 4: 16-21
- BRECKLE, S.-W. 1971a: Ist *Diarthron vesiculosum* (Thymelaeaceae) ein ökologisches Rätsel? Studien an Therophyten in der Steppe von Kabul/Afghanistan. I. Allgemeines, Morphologie und osmotische Verhältnisse.- Bot. Jahrb. System. 90: 550-561
- BRECKLE, S.-W. 1971b: Vegetation in alpine regions of Afghanistan.- in DAVIS, P.H. et al. (eds.): Plant Life of South-West Asia.- Proceedings of the Symposium 1970/Edinburgh, 107-116
- BRECKLE, S.-W. 1971c: Ökophysiologischer Tagesgang des Halophyten *Krascheninnikovia* in der Dasht-i-Nawor (Zentral-Afghanistan) an einem Strahlungstag.- Biol. Plantar. (Prag) 13: 402-404
- BRECKLE, S.-W. 1971d: Die Beeinflussung der Vegetation durch hügelbauende Ameisen (*Cataglyphis bicolor* Fabricius) auf der Dasht-i-Khoshi (Ost-Afghanistan).- Ber. Dtsch. Bot. Ges. 84: 1-18
- BRECKLE, S.-W. 1971e: Ökologie und Mikroklima in der alpinen Stufe des afghanischen Hindukusch.- Ber. Dtsch. Bot. Ges. 84: 721-730
- BRECKLE, S.-W. 1972: Alpenrosen im Hindukusch? - Jahrb. Ver. Schutze Alpenpfl. u.-tiere.- 37: 140-146
- BRECKLE, S.-W. 1973: Mikroklimatische Messungen und ökologische Beobachtungen in der alpinen Stufe des afghanischen Hindukusch.- Bot. Jahrb. System. 93: 25-55
- BRECKLE, S.-W. 1974: Notes on Alpine and Nival Flora of the Hindu Kush, East Afghanistan.- Bot. Notiser (Lund) 127: 278-284
- BRECKLE, S.-W. 1975: Ökologische Beobachtungen oberhalb der Waldgrenze des Safed Koh (Ost-Afghanistan).- Vegetatio (Acta Geobotanica) 30: 89-97
- BRECKLE, S.-W. 1979: Afghanische Drogen und ihre Stammpflanzen II. Süßholz (*shirin buia*).- Afghanistan J. (Graz) 6: 87-91
- BRECKLE, S.-W. 1981: Zum Stand der Erforschung von Flora und Vegetation Afghanistans.- in RATHJENS, C. (Hrsg.): Neue Forschungen in Afghanistan.- Leske/ Opladen p.87-104
- BRECKLE, S.-W. 1982: Afghan. Drogen und ihre Stammpflanzen. III. Hanf und Haschisch.- Afghan. J. (Graz) 9: 115-123
- BRECKLE, S.-W. 1983: Temperate Deserts and Semideserts of Afghanistan and Iran.- in WEST, N.E. (ed.): Temperate Deserts and Semideserts.- Ecosystems of the World ed.: GOODALL, D.W.), vol. 5, 271-319. Elsevier/Amsterdam
- BRECKLE, S.-W. 1986: Studies on halophytes from Iran and Afghanistan. II. Ecology of halophytes along salt-gradients.- Proceedings Roy. Bot. Soc. Edinb.: 89B: 203-215
- BRECKLE, S.-W. 1987: Distribution and ecology of *Cystopteris* (Athyraceae) species within the Flora Iranica region.- Pl. Syst. Evol. 155: 59-65
- BRECKLE, S.-W. 1988: Vegetation and Flora der nivalen Stufe im Hindukusch.- in: Neue Beiträge zur Afghanistanforschung, hrsg. von E. GROTZBACH.- Schriftenreihe der Stiftung Bibliotheca Afghanica, Bd. 6 (Liestal): 133-148
- BRECKLE, S.-W. 1999: Wissenschaftliche Erforschung Afghanistans - gestern, heute und morgen.- Schriftenreihe der Mediothek für Afghanistan, Band 1: Afghanistan in Geschichte und Gegenwart - Beiträge zur Afghanistanforschung (hrsg. SCHETTER, C.J., WIELAND-KARIMI, A.), IKO Frankfurt/M., p.13-2
- BRECKLE, S.-W. 2000: Wann ist eine Pflanze ein Halophyt? Untersuchungen an Salzpflanzen in Zentralasien und anderen Salzwüsten.- in BRECKLE, S.-W., SCHWEIZER, B., ARNDT, U. (Hrsg.) Ergebnisse weltweiter ökologischer Forschungen (Proceedings of the 1st Symposium of the A.F.W. Schimper-Foundation, establ. by H. & E. Walter, Hohenheim), Verlag Günter Heimbach, Stuttgart 91-106
- BRECKLE, S.-W. 2002: Salt deserts in Iran and Afghanistan. in: BOER & BARTH (eds.): Sabkha ecosystems. Kluwer/NL p. 109-122
- BRECKLE, S.-W. (ed.) 2003: Natur und Landnutzung im Pamir. Wie sind Erhalt der Biodiversität, Naturschutz und nachhaltige Landnutzung im Pamirgebirge in Einklang zu bringen? Bielefelder Ökologische Beiträge, vol. 18, (BOB18) 104pp.
- BRECKLE, S.-W. 2004: Flora, Vegetation und Ökologie der alpin-nivalen Stufe des Hindukusch (Afghanistan).. in: Breckle, S.-W., Schweizer, B. & Fangmeier, A. (eds.): Proceed. 2nd Symposium A.F.W. Schimper-Foundation: Results of worldwide ecological studies. Stuttgart-Hohenheim, p. 97-117
- BRECKLE, S.-W., BRECKLE, U. 1977: Ergänzende Bemerkungen zu "Honigbienen in Afghanistan".- Afghanistan J. (Graz) 4 : 37-38
- BRECKLE, S.-W., FREY, W. 1974: Die Vegetationsstufen im Zentralen Hindukusch. Afghanistan J. (Graz) 1: 75-80
- BRECKLE, S.-W., FREY, W. 1976a: Beobachtungen zur heutigen Vergletscherung der Hauptkette des Zentralen Hindukusch (Afghanistan).- Afghanistan J. (Graz) 3: 95-100
- BRECKLE, S.-W., FREY, W. 1976b: Die höchsten Berge im Zentralen Hindukusch.- Afghanistan J. (Graz) 3: 91-95
- BRECKLE, S.-W., FREY, W. 1976c: RECHINGER, K.H. (ed.) Flora Iranica 1963ff. - Flora des Iranischen Hochlandes und der umrahmenden Gebirge. Akad. Druck- und Verlagsanstalt Graz.- Afghanistan J. (Graz) 3 : 110-112
- BRECKLE, S.-W., FREY, W., HEDGE, I.C. 1969: Botanical Literature of Afghanistan.- Not. R. Bot. Garden Edinb. 29: 357-371
- BRECKLE, S.-W., FREY, W., HEDGE, I.C. 1975: Botanical Literature of Afghanistan. Supplement 1. Not. R. Bot. Garden Edinburgh 33: 503-521
- BRECKLE, S.-W., KULL, U. 1971: Osmotische Verhältnisse und Zuckergehalte im Jahresgang bei Bäumen Ost-Afghanistans. I. *Quercus baloot* GRIFFITH.- Flora B 160: 43-59
- BRECKLE, S.-W., KULL, U. 1973: Ist *Diarthron vesiculosum* (Thymelaeaceae) ein ökologisches Rätsel? Studien an Therophyten in der Steppe von Kabul/Afghanistan. II. Die Wirkung der Dürre auf Mineralstoffverhältnisse und Kohlenhydrathaushalt.- Bot. Jahrb. System. 93: 539-561
- BRECKLE, S.-W., MADEL, G., SCHNEIDER, P. 1969: Biologische Wakhan-Exkursion im Sommer 1968.- Science (Kabul) 5: 3-5
- BRECKLE, S.-W., RASSOUL, M. 1969: Ein Hybrid bei zentralasiatischen Anemonen.- Naturwissensch. 56: 573
- BRECKLE, S.-W., UNGER, W. 1977: Afghanische Drogen und ihre Stammpflanzen. I. Gummiharze von Umbelliferen.- Afghanistan J. (Graz) 4: 86-95
- BRECKLE, S.-W. & WUCHERER, W. 2005: Vegetation of the Pamir (Tajikistan): Land use and desertification problems. In: Spehn, E., Körner, C., & Liberman, M. (eds): Land-use Change and Mountain Biodiversity.- CRC Taylor&Francis/Boca Raton p.239-251

- KULL,U., BRECKLE,S.-W. 1972: Osmotische Verhältnisse und Zuckergehalte im Jahresgang bei Bäumen Ost-Afghanistans.- II. *Cercis griffithii* und *Pistacia cabulica*. Flora B 161: 586-603
- KULL,U., BRECKLE,S.-W. 1975: Fettsäuren in einigen Therophyten der Steppe von Kabul/Afghanistan.- Z. Pflanzenphysiol. 75: 332-338
- MIRAZAI,N.A., BRECKLE,S.-W. 1978: Untersuchungen an afghanischen Halophyten. I. Salzverhältnisse in Chenopodiaceen Nord-Afghanistans.- Bot. Jahrb. System. 99: 565-578
- WENNEMANN,M., BRECKLE, U. & BRECKLE,S.-W.: Pamir-Expedition 2002, Bielefeld-Bonn-Dushanbe 27.07.-24.08.2002. 139pp.