Anabasis aphylla L. - AMARANTHACEAE

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***Anabasis aphylla* L.**
Synonyms: *Anabasis tatarica* Pall.

Local Names

Russian: Ежовник безлистный (Ejovnik bezlistnyi); **Uzbek**: Itsigek; **Karakalpak**: Itsigek; **Kazakh**: Itsigek; **Tadjik:** Sagmezak; **English**: Salt grape.

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Botany and Ecology

Anabasis aphylla: Undershrub, 30–75 cm high, branched from the base, glabrous, with succulent terete leafless branches. Leaves reduced to barely distinct obtuse broadly triangular scales connate in pairs into short sheaths hairy in the axils. Flowers perfect, solitary in the axils of obtuse lanceolate or linear -lanceolate bracteoles, borne at the ends of stems and branches and forming spiciform inflorescences. Bracteoles much shorter than flowers; perianth 1.5–2.5 mm long. Segments distinct, concave, the three outer rounded -oval to suborbicular, developing in fruit rounded -reniform yellowish or faintly roseate upright wings, the two narrower inner segments wingless or with rudimentary wings; stigmas short and thick. Fruit succulent. Solonetzes, solonetzic solonchaks, takyrs, solonchak Haloxylon communities, loess sierozems, sands with a high brackish watertable, and old irrigated crop fields. Growing in groups or scattered, often over considerable areas (Komarov 1936) (Figs. 1, 2, and 3).

Phytochemistry

Alkaloid: Anabasine. Other alkaloids present, beside anabasine, are lupinin, aphyllin, and aphyllinin. Analysis of the plant disclosed an alkaloid content of 1.49–2.44% and 0.17% ammonia. The plant is not eaten by any kind of livestock. Analysis of West Kazakhstan plants gave the following percentage composition on an air-dry basis (two samplings): (1) [former] Gur'ev County, and (2) [former] Dzhambul County: hygroscopic water 7.84–8.65; ash 9.96–10.81, 16.92–18.52; cellulose 17.10–18.55, 6.93–7.59; crude protein 12.09–13.12, 20; 96–22.95; albumin (from first sample only) 7.12–7.74; alkaloids (determined only for second sample) 2.24–2.44; crude fat 1.19–1.29; 1.64–1.79; nitrogen–free extract 51.83–56.24;

Fig. 1 *Anabasis aphylla* (Amaranthaceae) Kyzylkum desert, Karakalpakstan region, Uzbekistan. (Photo G.J.Abdiniayzova)

Fig. 2 *Anabasis aphylla* (Amaranthaceae) Kyzylkum desert, Karakalpakstan region, Uzbekistan. (Photo G.J.Abdiniayzova)

Fig. 3 *Anabasis aphylla* (Amaranthaceae) Kyzylkum desert, Karakalpakstan region, Uzbekistan. (Photo G.J.Abdiniayzova)

44.90–49.15; soluble carbohydrates (first sample only) 1.00–1.09 before, and 2.57–2.79 after inversion; corresponding starch equivalents 37.05–39.97. Fruiting plants from Adai County gave: hygroscopic water 8.25, ash 19.31–21.05, cellulose 7.32–7.88, crude protein 15.22–16.59, alkaloids 1.36–1.49, crude fat 2.61–2.84, nitrogen-free extract 47.38–51.64, starch equivalent 36.57–39.82. The plant is used for soap production; some 40–70 kg of dry herbage burn down to a bagful of ash and this yields about 1.5 kg salts (I. Larin). Young plants from the Volga Delta contained 19% ash on an air -dry basis, of this 44% water-soluble with the following composition: K_2SO_4 8.4180 g, KCL 4.9542, NaCl 10.6161, Na_2 CO_3 10.0098, free sodium bicarbonate 5.5249 (Goebel). Fruit -bearing plants from West Kazakhstan contained 18.04% ash: K 2.48, Na 2.98, CI 0.40, P 2.05, S 0.57, Si 0.2–0.63, Fe 0.03, CaO

1.33, MgO 0.57; computed for sodium the soluble salt content would amount to 0.66. The ash contained SiO_2 3.54, Fe 0.16, CaO 7.36, MgO 3.27, S 3.16, K 13.79, and Na 16.51 (I. Larin) (Komarov 1936).

Local Medicinal Uses

Root decoction is used in pulmonary tuberculosis. Above ground powder: as a wound healing agent.

This plant contains the alkaloid anabasine ($C_{10}H_{14}N_2$), related to nicotine. Although this alkaloid was discovered only in 1929, it has already acquired considerable economic importance. Anabasine plays an important role as an insecticide and replaces nicotine in this respect. It is employed in the form of anabasine sulfate, anabasine base, and solid anabasine. The alkaloid is chiefly contained by young green branchlets. Anabasine is also highly toxic to man, several drops of pure anabasine representing a lethal dose.

Reference

Komarov VL (ed) (1936) (English 1970) Flora of the USSR, vol. 6: Centrospermae; Akademia Nauk, Moscow – Leningrad, 730 p