Rumex (*Rumex patientia* L.) – spinach of high-altitude cold desert

Rumex (*Rumex patientia* L.; family Polygonaceae), popularly known as soma in Ladakh, is a perennial herbaceous glabrous naturally growing plant. It is an underutilized leafy vegetable in the cold arid regions. The plant can tolerate abiotic stress and grows successfully in both arid and waterlogging conditions and can withstand extreme temperatures (–35°C to +35°C) in Ladakh[1]. It grows fast and produces more biomass in a short period than spinach even in stony, sandy and less fertile soils. It matures and produces seeds during September–October depending upon altitude. The plant becomes dormant during severe winter months (November–February) and reappears in March. In March, moisture of cultivated fields remains frozen due to low temperatures and other vegetable crops are unable to grow in these fields. After a long dry winter in Ladakh, greenery appears in the form of *Rumex* leaves. The tender leaves of the plant are used as a leafy vegetable and it is considered as an alternative source of spinach. The plant produces about 22 cm long and 6–8 cm wide tender leaves at an early stage of growth (Figure 1 *a*). The average height is 95 cm and canopy diameter is 49.8 cm when the plants are fully mature. About 300–900 g leaves can be harvested in 7–8 pickings between April and August, depending on the age of the plant. It grows successfully up to 3700 m altitude. It maintains growth during December–January in greenhouse conditions when other leafy vegetables are unable to grow due to extreme low temperature.

An average of 11.8% ash, 10.0% moisture, 14.0% protein, 11.9% fats and oil, 13.0% crude fibre and 39.4% carbohydrate have been reported in leaves of *Rumex*[2]. The leaves are also rich in anthraquinones[3], naphthalenes, flavonoids and other phenolic compounds[4]. The plant has numerous medicinal properties. Traditionally the roots (Figure 1 *b*) of *Rumex* are used for treatment of pain, inflammation, bleeding, tinea, tumour and constipation in Chinese folk medicine[5]. In Tibetan traditional system of medicine followed in Ladakh, *R. patientia* is also used by Amchies (local herbal doctors) for treating headache, piles, itching of feet, diabetes, stomachic and angina[1].

Besides the above-mentioned qualities, the plant also has an impact on the environment – it is beneficial for soil and water conservation, protects desertification and contributes towards land reclamation in the fragile cold arid ecosystem of Ladakh. More than 40 samples (seeds) of *Rumex* sp. have been collected from different valleys of Ladakh. This important and valuable germplasm in the form of seeds (Figure 1 *c*) is being preserved at the energy-efficient National Permafrost Facility developed by Defence Institute of High Altitude Research, Leh-Ladakh[6]. There is a need to bring this plant under mass cultivation for harnessing its full potential. It has the potential to meet the green leafy vegetable requirement of local people and troops deployed in Ladakh. It may also contribute towards development of products for helping in acclimatization and improved performance of especially the low-landers under high-altitude cold desert conditions.

Figure 1. ***a***, *Rumex* leaves ready for picking. ***b***, Root of *Rumex*. ***c***, Seeds of *Rumex*.

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