Diagnostic Characteristics of Medicinally Acclaimed *Ranunculus* Species

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Abstract

Ranunculus acris L., *R. bulbosus* L., *R. repens* L. and *R. sceleratus* L. (Family Ranunculaceae) are attributed for medicinal potential and look very alike in morphological appearance. They can be distinguished on the basis of the morphological details of leaf in respect of segmentation and trichomes. These characters are helpful for checking adulteration and mix-up between *Ranunculus* species obtained from natural habitat and market supplies.

Keywords: *Ranunculus* species, Diagnostic characters, Medicinal potential.

Introduction

Ranunculus species (family: Rannuculaceae) are medicinally acclaimed for different therapeutic actions as per medicinal claims in herbal therapies and ethno-medicinal claims. Some of the medicinally important genera are *Ranunculus acris* L., *R. arvensis* L., *R. bulbosus* L., *R. repens* L., *R. sceleratus* L., *R. trichophyllus* Chaix. *Ranunculus sceleratus* L., *R. trichophyllus* Chaix. and *R. arvensis* L. are distributed in Indian subcontinent (Khare, 2007) whereas *R. acris* L., *R. bulbosus* L. and *R. repens* L are of European origin (Gleason, 1968; Bailey, 1961). *Ranunculus acris* L., *R. bulbosus* L., *R. sceleratus* L., *R. repens* L. are of high therapeutic importance and have been recognized for their medicinal values in different systems of medicines including homoeopathy (Khare, 2007; Allen, 1874; Clarke, 1990 & Grieve, 1994).

In general Ranunculus species are tonic, extremely acrid, causes blisters followed by deep sloughing ulcer. Ranunculine ($C_{11}H_{16}O_8$), a glycoside, is present in all parts of these plants except seeds, which on breaking down produces a substance called Protoanemonin ($C_5H_4O_2$) or Ranuncular and this is the vesicant and blister causing property of these plants. Therefore this herb should not be mixed with any other drug even in a small quantity or adulterated or substituted and especially in homoeopathy, substitutions is completely prohibited.

R. acris L. (Tall butter cup) is used for treatment of bronchitis and asthma, as a lotion for dermatitis. *R. bulbosus* L.(Butter cup) acts upon muscular and fibrinous tissue, used in herpes zoster, pains in chest with apprised breathing, intercostals rheumatism and in chronic sciatica, also effective in alcohol-hiccough, epileptic form attacks, delirium, and also in day blindness. *R. repens* L. (Creeping butter cup) is used in for pulsation in back, smarting of eyes, sensation in forehead and scalp, inflammation and weakness of feet. *R. sceleratus* L. (Celery-leaved Butter Cup) is anti-fungal in nature, cures blisters on skin and has caustic property (Khare, 2007; Allen, 1874; Clarke, 1990 & Grieve, 1994).

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All these four herbs are very similar in morphological characters, having similar habit, habitat and bear similar-looking bright yellow flowers, but they differ in their efficacy and therefore should not be intermingled or substituted. These plants can be differentiated and identified on the basis of very striking but simple characteristic features and thus intermixing and adulteration can be checked which is the object of this presentation.

Material and methods

Identified plant materials and seeds were obtained from Grugapark Essen, (Germany) and Royal Horticultural Society, RHS Garden, Wisley, UK. Seeds were sown in the Experimental herb Garden of Homoeopathic Pharmacopoeia Laboratory and plants were grown. Identified plant materials obtained from Germany, France and garden grown plants were used as experimental material. Conventional method of hand sectioning and double staining methods was done following (Youngken, 1951). Sections were studied under compound microscope.

Results and Discussion

A close morphological study of these four plants shows, *R. acris* is an erect pubescent herb (Fig. 1), *R. bulbosus* is an erect and hirsute herb and has bulbous root (Fig. 2), *R. repens* is a creeping, more or less pubescent herb having roots at the nodes and very rarely ascending (Fig. 3) while *R. sceleratus* is an erect, much branched, almost glabrous herb (Fig. 4). Leaves of all these plants are fragmented giving very similar look but study shows differences which are presented in Table1 on the basis of which species can be differentiated (Figs. 5, 6, 7and 8).

Vertical section of lamina shows presence of different types of trichomes, on the basis of this simple character the species can also be identified instantly. *R. acris* bears simple unicellular, large trichomes abundantly present on lower surface (Fig. 9); *R. bulbosus* shows unicellular simple trichomes of varying length which emerge from multicellular bulbous base (Fig. 10), but in case of *R. repens* twin trichomes present frequently in grooves of upper surface of lamina (Fig. 11) and sharp leaf-teeth shows mucilage secretion; *R. sceleratus* shows small, unicellular, thin-walled, glandular trichomes (Fig. 12).

On the basis of these above said characters these four important herb drugs can be distinguished and identified which is very important because through they belong to the same genus they greatly differ in their medicinal uses and efficacy. So, these findings will help a lot to check adulteration since they are of exotic origin and not supplies often take the advantage of admixturing or adulterating.

Table 1: Differentiating characters of leaves and trichomes of four *Ranunculus* species

R. acris	R. bulbosus	R. repens	R. sceleratus
1. Leaves reniform, deeply cleft into 3 broadly lobed cuneate-ovate segments which again incised or cleft into oblong to linear lobes (Fig. 5).	Leaves 3to 5 parted, terminal division petiolated, lateral sessile or nearly so, all divisions again variously lobed or cleft (Fig. 6).	Leaves 3 parted, segments broadly ovate to sub-rounded in general outline, lobes again cleft or lobed, sharply toothed (Fig. 7).	Leaves 3 parted, segments cuneate and again variously lobed and notched (Fig. 8).
2.Trichomes simple, unicellular, long, abundant on lower surface (Fig. 8).	Trichomes unicellular of varying length, arise from multicellular bulbous base; present on both upper and lower surface (Fig. 10).	Twin trichomes present frequently in grooves of the upper surface of leaf (Fig. 11).	Trichomes small, unicellular, thin-walled and glandular; present on both surfaces (Fig. 12).

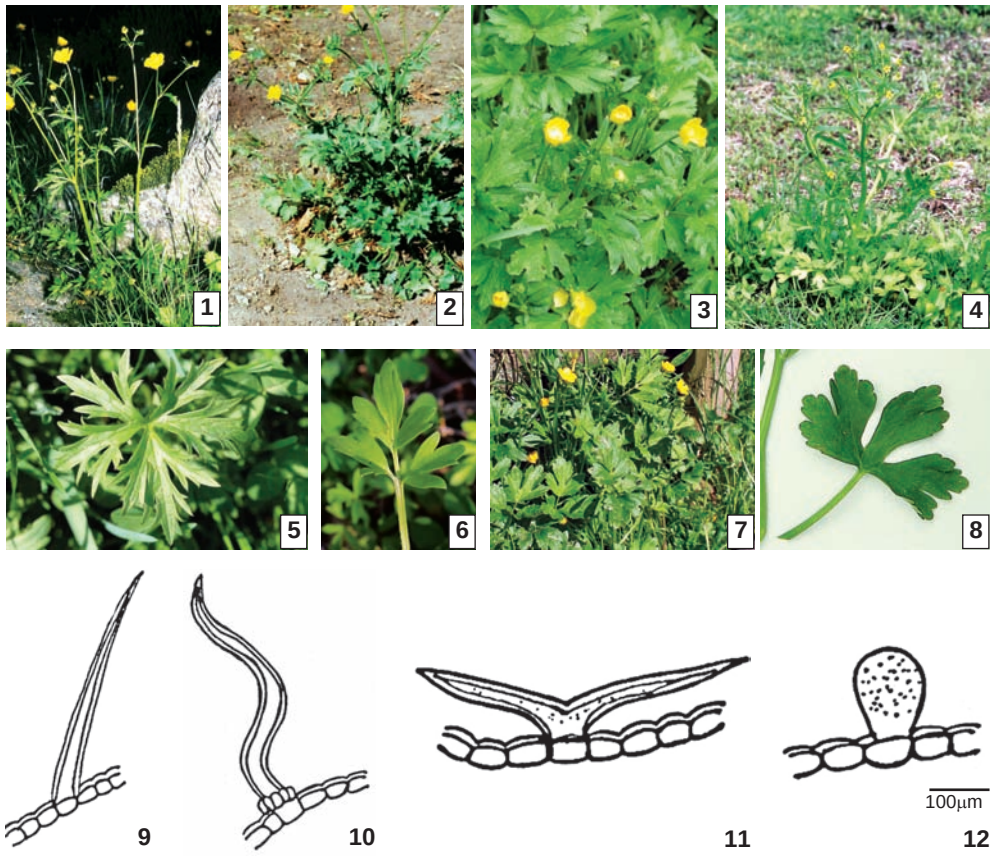

Fig 1. A view of R. acris; **Fig 2.** A view of R. bulbosus; **Fig 3.** A view of R. repens; **Fig 4.** A view of R. sceleratus; **Fig 5.** A leaf of R. acris; **Fig 6.** A leaf of R. bulbosus; **Fig 7.** A leaf of R. repens; **Fig 8.** A leaf of R. sceleratus; **Fig 9.** Simple, unicellular trichome in R. acris; **Fig 10.** Unicellular trichome with bulbous base in R. bulbosus; **Fig 11.** Twin trichomes in R. repens; **Fig 12.** Glandular trichome in R. sceleratus

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