

GERANIUM INCANUM HERBA

Definition

Geranium Incanum Herba consists of the fresh or dried aerial parts of *Geranium incanum* Burm. f. var. *incanum* and var. *multifidum* (Sweet) Hilliard and Burt (Geraniaceae).

Synonyms

var. *multifidum*

Geranium incanum Burm. f. var. *b.*

G. multifidum Sweet

Vernacular names

vrouebossie, bergtee, horlosies (A), ngope-sethsoha, tlhako (S), tlako (X), mlako (Ts)

Description

Macroscopical¹



Figure 1 – Live plant

Low, spreading, much branched perennial herb, 100-250mm high, with a long thickened tap root and slender stems; **leaves** borne on slender petioles, up to 50mm wide x 70mm long, with 3-7 lobes, each lobe pinnatisect, covered with fine silvery-white hairs closely adpressed to the leaf surface; **flowers** (Sept.-Nov.) white to pale pink with darker veins (var. *incanum*) or deep magenta-pink (var. *multifidum*), up to 40mm in diameter, borne on slender

¹ Hilliard, O.M. and Burt, B. L. (1985). A revision of *Geranium* in Africa south of the Limpopo. *Notes of the Royal Botanic Garden of Edinburgh* **42(2)**:171- 225.

pedicels covered with fine hairs; **fruit** an elongated capsule resembling a stork's bill.



Figure 2 – line drawing

Microscopical

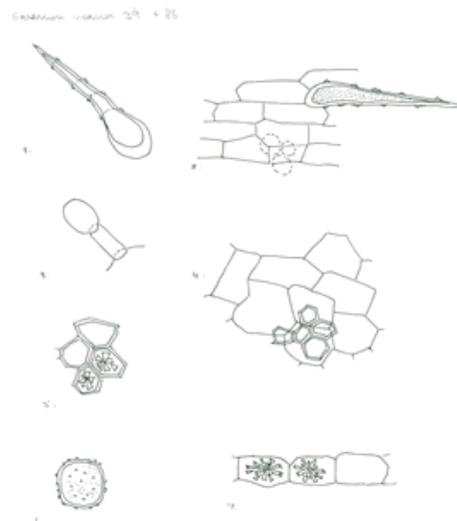


Figure 3 – microscopical features

Characteristic features are: the very numerous unicellular, rigid, thin-walled warty clothing hairs of leaf and stem, up to 500 microns long, adpressed to the leaf and stem surface or loose in the powdered herb; the small glandular trichomes of the leaf, with unicellular stalk and unicellular head up to 20 microns in diameter; the numerous small rosette aggregates of calcium oxalate, up to 16 microns in diameter, forming a crystal layer in the leaf collenchyma; the large rosette aggregates of calcium oxalate, up to 40 microns in diameter, in the parenchyma cells surrounding fibre bundles of leaf and stem, forming a crystal sheath; the vascular tissue of leaf and stem, with red-brown contents; the fairly frequent large golden-brown pollen grains, up to 70 microns in diameter, with warty exine.

1. Unicellular, rigid, thin-walled, warty clothing hairs of leaf and stem, up to 500 μ long
2. Cells of upper epidermis showing adpressed hair and underlying palisade layer
3. Glandular trichome of leaf, with unicellular stalk and head up to 20 μ in diameter
4. Collenchyma of leaf lamina with underlying thin-walled cells of mesophyll
5. Calcium oxalate rosette aggregates, up to 16 μ in diameter, forming a crystal layer in leaf collenchyma
6. Golden-brown pollen grains, up to 70 μ in diameter, with warty exine
7. Calcium oxalate rosette aggregates, up to 40 μ in diameter, in parenchyma cells surrounding fibre bundles of leaf and stem, forming a crystal sheath

Crude drug

Collected as needed or found in the market place as bundles comprising leaf, stem and flower; odour aromatic, texture soft; colour silver-grey.

Geographical distribution



Figure 4 – distribution map

Common and widespread on flats, hill slopes and dunes of the Western and Eastern Cape Provinces. Both varieties have been recorded from the Cape Peninsula eastwards to Knysna, but only var. *multifidum* occurs in the Eastern Cape Province, in coastal districts as far as Port Alfred.

Quality standards

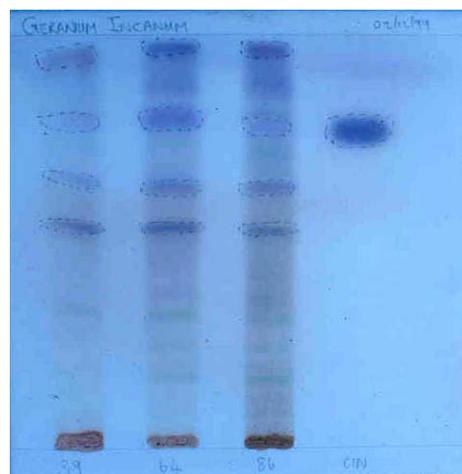


Figure 5 – TLC plate

Identity tests

Thin layer chromatography on silica gel using as solvent a mixture of toluene:diethyl ether:1.75M acetic acid (1:1:1). Reference compound cineole (0,1% in chloroform). Method according to Appendix 2a.

R_f values of major compounds: 0,54 (purple-grey); 0,63 (purple-brown); 0,80 (mauve); 0,97 (purple); cineole: 0,77 (blue-purple)

HPLC on C₁₈ column, method according to Appendix 2b.

Major compounds:

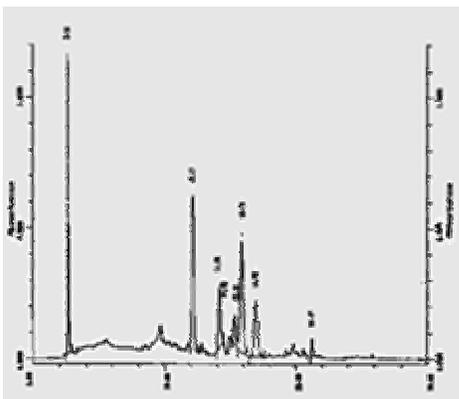


Figure 6 – HPLC spectrum

Methanol extract: (figure 6)
Retention times (mins): 2.68; 12.17; 14.45;
15.35; 15.89; 16.98

Ethanol (70%) soluble extractive value:
not less than 26, 0% (range: 26.49-30.68%)

Purity tests

Assay

Not yet available

Major chemical constituents

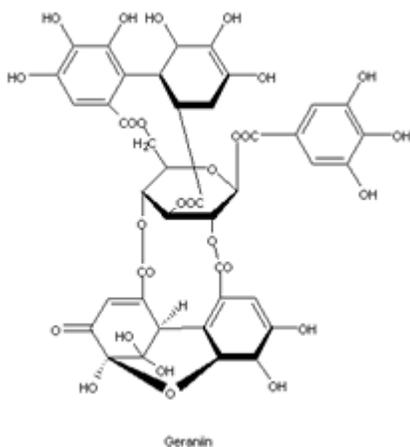


Figure 7 – chemical constituents

Microchemical tests in our laboratories indicated the presence of tannins and saponins but not of alkaloids nor of cardiac, cyanogenic or anthraquinone glycosides. The detection of tannin confirms the results

of earlier studies². The presence of the gallitannin geraniin is reported from other members of the genus. Further information regarding the secondary chemistry of this species is lacking.

Dosage forms

Used mainly as an aqueous infusion, taken orally.

Medicinal uses

An infusion is taken orally to relieve diarrhoea and colic, to treat venereal diseases, as an anthelmintic, to relieve bladder infections in women and for gynaecological problems e.g. dysmenorrhoea, oligomenorrhoea.

Pharmacology/bioactivity

No *in vitro* antimicrobial activity of aqueous extracts of *Geranium incanum* against *Pseudomonas aeruginosa*, *Candida albicans* or *Mycobacterium smegmatis* was observed, in the concentrations used for disc assays in our laboratories. Weak activity was noted against *Staphylococcus aureus*.

The results of an investigation of cytotoxicity and antiviral activity of 16 South African plant species³ showed that aqueous extracts of *Geranium incanum* were cytotoxic at all concentrations used in the assay to HeLa, Vero, Jurkat E6.1, AA-2 and CEM-SS cells. Similar extracts, in a cell culture antiviral assay, were found to reduce the infectivity of both Coxsackie B2 virus and HSV-1. In direct *in vitro* antiviral assays however, extracts were unable, at non-cytotoxic dilutions, to inhibit virus replication. The cytotoxicity of aqueous extracts may possibly be ascribed to the presence of polyphenols (tannins) and account for the use of *Geranium incanum* as an abortifacient.

² Bate-Smith, E.C. (1972). Ellagitannin content of leaves of *Geranium* species. *Phytochemistry* **11**: 1755-1757.

³ Treurnicht, F. T. (1997). An evaluation of the toxic and potential antiviral effects of some plants used by South Africans for medicinal purposes. MSc thesis, University of Stellenbosch.

Contraindications

None recorded.

Adverse reactions

None reported

Precautions

No special precautions.

Dosage

An infusion may be made by adding one quarter teacupful of fresh leaves to one teacupful (180ml) of boiling water. Allow to infuse for 10 minutes, strain and drink warm. As an anthelmintic, one teacupful is taken once daily, on an empty stomach, for 10 days.

For the relief of diarrhoea, bladder infection or colic: one teacupful three times daily. If symptoms persist for more than three days, alternative treatment should be sought.

For dysmenorrhoea: one teacupful three times daily for 2-3 days as needed.

