

Review on *Tephrosia villosa* Per A Useful Weed

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Abstract: *Tephrosia villosa per* a well known plant of India and other part of the world commonly known as “Shevet sharpunakha” in Indian traditional system, *Tephrosia villosa* a weedy plant native to India grows as common waste land weed and has been used traditionally as folk medicine in india and other parts of the world for its valuable medicinal properties, but its identity as medicinal plant is not established till date. several phyto constituents like Flavonoids, Flavones, Retenoids, Saponins and Alkaloids etc have been identified and various research work like Antioxidant, Anti microbial and Anti diabetic properties also identified from the plant extracts which indicate further scope in isolation and other activates, in our studies there is a brief explanation about active constituents and pharmacological actions, along with Ethnobotanical uses of the plant has been discussed.

Keywords: *Tephrosia villosa*, Weed, Folk medicine, Ethnobotanical Phytoconstituents.

I. INTRODUCTION

“**S**harpunkha” an important ayurvedic drug has been in use for a long time two kinds of sharpunkha the shevet (white) and Raktha (Red) are described in some of the ayurvedic texts like Vagbhata’s “Astang Hridayam” and in Nighantus¹. shevet sharpanakha is *Tephrosia villosa* due to its persistently villous like white part and this view receives the support also from “Shivadatta Nighantu” which mentions “Sharpunkheti vikhya shreepuspha kavachid bhavet” Genus *Tephrosia* Pers is a large seasonal pantropic genus of about 400 species belongs to family Fabaceae, in india genus *Tephrosia* Pers is represented by 29 taxa including 27 species 1 variety and 1 sub species out of which 7 taxa are endemic to india. in india maximum taxa of *Tephrosia* are recorded in presidency of Madras i.e 20 (Gamble, 1957)².

The name is from greek word Tephros meaning ash-coloured, referring to the grayish tint given to the leaves by their dense hairs.

Genus *Tephrosia* Pers is characterized by herbs or shrubs leaves stipulate, pinnate, imparipinnate, rarely simple. Flowers generally in terminals or leaf opposed racemes. calyx lobes subequal, petals clawed, standard sub orbicular, stamens diadelphous, pods usually linear, flattened, many seeded, continuous or scarcely septate (Hooker 1961) some of the species are cultivated as cover crops, green manures, fish poison and ornamental.

Dignostic characters *Tephrosia* are

1. Leaves cut into forks (Horn like structure).
2. Pods flat, not joined many seeded.
3. Standard petal obtuse.
4. Sepals subequal, calyx lobes connate.
5. Anthers muticous, basifixed

Tephrosia villosa

Fabaceae - Papilionoideae (L.) Persoon

II. BOTANIC DESCRIPTION

Tephrosia villosa is an annual or perennial bushy herb, 0.3-1.3 m tall. Stem white tomentose. Leaves imparipinnately compound with 7-19 leaflets, up to 10 cm long; stipules 2-5 mm long; leaflets obovate to elliptical, up to 21 mm x 9 mm, hairy on both sides, each side with 4-8 pairs of distinct veins. Stipule tomentose, caducous and lanceolate. Flowers in a terminal or upper axillary pseudo raceme 8-22 cm long; pedicel with densely matted hairs, 2-4 mm long; calyx densely matted hairy, tube about 2 mm long, lobes long-acuminate, to 9 mm long; standard transversely elliptical to broadly ovate, up to 7 mm x 10 mm, dorsally with dense brown hairs. Style glabrous, up to 3-5 mm long, bent sharply upward at base, twisted, penicillate. Pod strongly curved, up to 4 cm x 6 mm, densely silvery or brown tomentose, hairs to 2 mm long, 4-10-seeded. Seed 12-16, rectangular, black, smooth, with short hard excrescences, up to 4.5 mm x 2.5-2.75 mm. Flower in November and fruit in February in India³ (agroforestry database)

The specific name ‘villosa’ means covered in white soft hair in Greek.

Taxonomy

Kingdom : Plantae

Division: Magnoliophyta

Class : Magnoliopsida

Order: Fabales

Tribe : Millettieae

Family: Leguminosae (Fabaceae)

Genus: *Tephrosia*

Species: *villosa* Pers.

Scientific Name:	<i>Tephrosia villosa</i> (L.) Pers.
Synonym(s):	<i>Cracca incana</i> Roxb. <i>Cracca villosa</i> L. <i>Cracca villosa</i> L. var. <i>incana</i> (Roxb.) Hiern <i>Galega hirta</i> Buch.-Ham. <i>Galega incana</i> Roxb. <i>Tephrosia ehrenbergiana</i> Schweinf. <i>Tephrosia hirta</i> (Buch.-Ham.) Benth. <i>Tephrosia incana</i> (Roxb.) Wight & Arn. <i>Tephrosia incana</i> (Roxb.) Wight <i>Tephrosia villosa</i> (L.) Pers. var. <i>argentea</i> Thwaites <i>Tephrosia villosa</i> (L.) Pers. var. <i>incana</i> (Roxb.) Baker


 Photographs of *Tephrosia villosa* Herb & Pod

Ethnobotanical uses of *tephrosia villosa per* in various parts of the world

Region	Common name	Uses	Reference
Khandmal District Orissia State, India.	Kulthia, Piderkalata	Root powder with black peper is taken in empty stomach for stomach ache and stomach disorders. Root paste with raw milk is taken in empty stomach twice a day for seven days to cure cold, fever and Typhoid	Soumith k Behra et.al., ⁴
Bidar District Karnataka state India	Niligida	Crushed leaves are taken internally once in a day early in the morning for 51days for various skin diseases	Prashanth p et.al., ⁵
Meinit ethnic group Ethiopia	Kash bach	Plant is used in the form of herb(root) for respiratory track problem, stoma cache and in cattle for cough and trypanosmiasis	Mirtuse Gidy et.al., ⁶

Bodamali hills eastern ghats Namakkal district Tamilnadu, India	Kottukolungi	The root powder is salutary for brushing teeth for dental pain and bleeding Leaf paste with turmeric applied externally on boils.	Raju sathiyraju et.al., ⁷
Delhi ridge Delhi, India	Salunak	Plant is useful in Ascitus, Anasaraca, cold, cough, asthma, constipation, calculus dropsy and enlargement of abdominal viscera Seed paste is used in skin diseses painful swelling and alopecia.	Amit panday et.al., ⁸

Phytoconstituents identified in *tephrosia villosa per*

Plant part	Phytochemical group	Reference
Whole plant	Flavonoid (2S)-5,4'-dihydroxy-7-O-[(E)-3,7-dimethyl-2,6-octa-dienyl]-8-C-[(E)-3,7dimethyl2,6octadienyl]flavanone 7-O-methylglabranin tephcalostan 12a-dehydro-6-hydroxysumatrol 7-methylglabranin	Jayaraman et al., 1980 ⁹
Pods and Root	Flavonoid villosone, villol, villinol and tephtrinone	Rao and Srimanarayana, 1981 ¹⁰
Whole plant	Triterpenoid lupenone	Prashant and Krupadanam 1993 ¹¹
Whole plant	Sterol stigmasterol Rotenoid 12a-dehydro-6-hydroxysumatrol	Prashant and Krupadanam 1993 ¹²
Whole plant	Rotenoid Adehydrorotenone 6a,12a-dehydro,2,3,6- trimethoxy-8-(3',3'-dimethylallyl)-9,11dihydroxy rotenone	Prashant and Krupadanam, 1993 ¹³
Whole plant	Isoflavone Villosin	David Krupadanam et al., 1997 ¹⁴
Root	Rotenone	Ganapaty et al., 2008 ¹⁵
Root	Triterpene lupeol	Ganapaty et al., 2008a ¹⁶
Leaves	Flavonoid (2S)-5,4'-dihydroxy-7-O-[(E)-3,7-dimethyl 2,6octadienyl]flavanone	Madhusudhana et al., 2010 ¹⁷

III. MEDICINAL PROPERTIES

*Anthelmintic activity*¹⁸

Odhong c et al., 2014; reported that leaves and seed extract of *Tephrosia villosa per*. Against gastrointestinal nematodes using In vitro egg hatching and larval development inhibition assay, finding shows significant inhibition the larvicidal and ovicidal effect of the plant may be attributed due to presence of alkaloids, tannins, rotenoids and flavonides. Studies of

Ramadhani et al.,2011;shows that all the ethanolic extracts of the plant exhibited larvicidal activity with highest activity being in fruit extract with LC 50 value of 53.25 ug/ml.

Antimicrobial and Brine shrimp activity^{19, 20}

S Ganapathy et al.,2008; identified four different compounds namely Stigmasterol,Lupeol

Rotenone and Dihydrorotenone in ethylacetate and methanolic root extracts and also reported that both extracts showed the moderate action against bacteria and fungi

Ramadhani et al.,2011; reported that most of the extract of the plant showed weak antibacterial and antifungal activity and good activity observed from the fruit extract against *Cryptococcus neoformans* Brine shrimp lethality test is normally used to predict the presence of toxic bioactive compounds and also possible presence of compounds with potential anticancer activity,Fruit and root extracts of the plant were found to be very toxic with their LC 50 value below that of anticancer drug cyclophosphamide where as leaf and twinge extracts were found to be non toxic this suggests that toxic characteristic of *T villosa* is due to fruits and roots. Brine shrimp results obtained from the fruits and roots support the ethnobotanical claims of *T villosa* toxicity to animals and fish.

*Potential bio insecticide*²¹

Varaprasad Bobbarala et al., studied various plant extract as alternative biocontrol agent to control seed borne pathogen *Macrophomina phaseolina* and reported that *T villosa* per is having high activity to control *Macrophomina phaseolina* in sorgham plants

*Antioxidant activity*²²

Aparna surya mani et al.,2017; reported that chloroform extract of leaf and aerial part the plant are active as antioxidant alternative in DPPH free radical scavenging activity due the presence of various secondary metabolites in the extracts

Antidiabetic activity^{23 24}

Sufiyah ahmed et al.,2009;reported the antidiabetic activity of ethanolic extract of leaves of *T villosa* per. on allaxon induced diabetic rat at two different doses it shows the significant reduction in the blood glucose level and concurrent histopathological examination pancreas of these animals showed comparable regeneration. The same activity is also overviewed by Patel D K et al.,2012

*Green corrosion inhibitor activity*²⁵

A Samsath begum et al., 2017;evaluated the *T Villosa* per. Leaf extract to minimise the corrosion rate of mild steel in acidic medium and reported that plant extract could serve as excellent eco friendly green corrosion inhibitor

IV. CONCLUSION

The traditional knowledge is the holistic approach supported by experimental evidences can serve as an innovative and powerful tool for newer ,safer and affordable medicines. The present review is focused on overall out line of plant used in Ayurveda and other traditional system and its future prospects for further scientific investigation.in present review any

Researchers have been shown different activities of the plant like Anthelmintic, Brine shrimp inhibition, Anti microbial, Antioxidant, Antidiabetic and also identified various chemical molecules but still the isolation and correlation of ethnic or traditional use of the plant is necessary.

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REFERENCES

- [1]. S.R.Paul,R.C.Gupta Pharmacobotanical studies on “Shevet Sharpunkha” – a comparative diagnostic account of *Tephrosia villosa* per and *T. Purpurea(linn).pers.*ancient science of life,vol no.VII Nos.3&4,January&April 1988,pages207-21.
- [2]. Flora of the Presidency of Madras,J.S.Gamble vol.I published under the Authority of the Secretary of State for India in council London , Adlaed & Son,limited 21,Haet street, W.C. <https://doi.org/10.5962/bhl.title.21628>
- [3]. Orwa, C.; Mutua, A.; Kindt, R.; Jamnadass, R.; Anthony, S., 2009. Agroforestry Database: a tree reference and selection guide version 4.0. World Agroforestry Centre, Kenya <http://www.worldagroforestry.org/resources/databases/agroforestry>
- [4]. Soumith K Behra,Anima panda and Sushanth K Behra Indian journal of Traditional knowledge vol 5(4), October 2006-p 519-528.
- [5]. Prashanth p and Vidya sagar Indian journal of Traditional knowledge vol 7(2),April2008 273-276.
- [6]. Mirutse Giday, Zemedede Asfaw, ZerihunWoldu Medicinal plants of the Meinit ethnic group of Ethiopia: An ethnobotanical study.J. Ethnopharmacol. (2009),
- [7]. Raju sathiyaraju,Ariyan sarvalingam Arul balachandran,Rama koti reddy Diversity of Ethnomedical plants in Bodamali hills eastern ghats Namakkal district Tamil nadu.Journal of plant science 2015;3(2);77-84.
- [8]. Amit panday and Shwetha sing Ethnobotanical evidences of common wild medicinal herbs existing on Delhiridge a chick list Journal of medicinal plants studies 2017;5(5);46-60.
- [9]. Jayaraman I, Ghanim A, Khan HA. (1980). A new prenylated flavanone [7-methylglabranin] from *Tephrosia villosa*. *Phytochemistry* 19.
- [10]. Rao PP, Srimanarayana G. (1981) .Tephtrone—a new flavone from *Tephrosia villosa*. *Curr. Sci* 50,319-320.
- [11]. & [12]. Prashant A, Krupadanam GD. (1993). A new prenylated dehydrorotenoid from *Tephrosia villosa* seeds.*Journal of natural products* 56, 765-766.
- [13]. Prashant A, Krupadanam GL. (1993). Dehydro-6-hydroxyrottenoid and lupenone from *Tephrosia villosa*. *Phytochemistry* 32, 484-486.
- [14]. David Krupadanam GL, Sarma PN, Srimannarayana G, Subba Rao NV. (1977). New C-6 oxygenatedrottenoids from *Tephrosia*

- villosa* -- villosin, villosone, villol and villinol *Tetrahedron Letters* 18, 2125-2128.
- [15]. Ganapathy S, Lakshminarayana K, Lakshmi P, Thomas PS. (2009). *Asian Journal of Chemistry* 21,1007-1010.
- [16]. Ganapathy S, Nyamathulla S, Srilakshmi GVK, Prasad KVNMR. (2008). Chemical and Antimicrobial Studies of the Roots of *Tephrosia villosa* (L) Pers. *Asian Journal of Chemistry* 20, 4498-4502.
- [17]. Madhusudhana J, Reddy RN, Reddy BAK, Reddy MVB, Gunasekar D, Deville A, Bodo B. (2010). Two new geranyl flavanones from *Tephrosia villosa*. *Natural Product Research* 24, 743-749.
- [18]. Odhong c, R G Wahane, Vaarst, Nalubwana In vitro anthelmintic effect of crude aqueous extracts *Tephrosia vogeli*, *Tephrosia villosa* and carica papaya leaves and seeds African journal of Biotechnology, vol 13 (52), pp 4467-4672, 20
- [19]. Ganapathy S, Nymathulla S, G V K Srilakshmi Chemical and antibacterial studies of roots of *tephrosia villosa* (L) per. *Asian journal of chemistry* vol 20, No 6 4498-4502 (2008)
- [20]. Ramadhani S O Nando, Zakario H Mbawbo BMC Complementary and alternative medicine 2011.
- [21]. Varaprasad Bobbrala, Chandrashekhara K naidu Alternative approaches for the control of Sorgham pathogens using selected medicinal plants, Intech open access book, sep 2012.
- [22]. Aparna surya mani, Yejela Rajendra Prasad Phytochemical and antioxidant activity and screening of chloroform leaf and aerial parts extract of *Tephrosia villosa* .
- [23]. Sufiyan ahmed . B R Balakrishnan Anti diabetic activity of leaves of *Tephrosia villosa* pers. in alloxan induced diabetic rats *Journal of pharmacy Research* vol 2, Issue 3 528-532, March 2009.
- [24]. D K Patel, R Kumar, D Haloo, Diabetes mellitus : An overview on its pharmacological aspects and reported medicinal plants having ant diabetic , *Asian journal of Tropical biomedicine*, may; 2(5) pp 411-420 2012.
- [25]. A Samsath begum, A Jamal abdul Nasser, Corrosion inhibition by aqueous extract of *Tephrosia villosa* leaves. *World journal of Pharmaceutical research*. vol 6, issue 17, 1072-1100, 2017.