



Punarnava (Boerhavia Diffuse Linn) ,A Worldwide Ethnomedical Used Herbs And Its Potentiality-An Ayurvedic Approach.

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ABSTRACT: B.diffusa (Punarnava) is an available and well known herb all over the world. It is traditionally use and popular for various purposes because of its potential action. It is use in fever, edema, anemia, jaundice, spleenomegaly, menstrual disorder, sexually transmitted diseases etc. It has potent rejuvenator property. Its chemical constituents effective against a large number of ailments, resent research proved that. This article is try to provide the basic information about this herb, found in Ayurvedic text as well as resent research.

Key Word: B.diffusa, Punarnava,Ayurveda.

INTRODUCTION:

B. diffusa L. occurs abundantly as a weed throughout India. It is a creeping and spreading perennial herb. It is an important medicinal plant much used in traditional medicine in many parts of the world. The plant dies during hot summers and puts forth fresh shoots after rains and is believed to be a rejuvenator. This plant was named in the honor of Hermann Boerhaan a famous 18th century Dutch physician commonly known as tar vine. It is a herbal species of flowering plant in the four-o'clock family. Punarnava means which rejuvenates the body or renew the body.^[1] It is taken in herbal medicine and often used as a green vegetable in many parts of India.

Fig:1,B.diffusa with flower



COMMON NAME: Punarnava

BOTANICAL NAME: Boerhavia diffuse Linn. [Synonyms]: Boerhavia repens.

TAXONOMICAL CLASSIFICATION:

Kingdom: plantae **Order:** Caryophyllales, **Family:** Nictaginaceae **Genus:** Boerhavia , **Species:** B.diffusa

CLASSICAL NAME:^[2]

Punarnava, Visakha, Sosivaktika, Prithivi, Sito-varsabhu, Deergha patra, Kathilla, Gadahapurna, Sothagni, Swetamula, Chiratika, Brischir, Varsabhu, Varsangee, Varsahi, Dhanapatra, Santhi.

VERNACULAR NAME:^[3]

Arabic __ Handakuki Sabaka,

Bengali _ Sweta punya,

Burma _ Punarnara,

Kannada _ Adakaputtana-gida Sannadida

Guajarati _ Sotadi, Pyoli ,

Konkani _ Viloyee

Hindi _ Vishkhapara, Santha, Gahadpurna,

English _ Hogweed- Spreading,

Kommegida – Ceylon

Latin _ Treen thema amenogyma

Malayalam _ Talutaama

Marathi _ Ghetuli, Punarnava

Panjabi _ Itsit

Sanskrit _ Sweta punarnava

Tamil _ Mukkiratte

Telegu _ Telloatta tamamidi,

Uriah _ Sweta gonad

U.S.A _ Hog weed, Pigweed,

Brazil _ Erva, Tostao

DISTRIBUTION:^[4]

B.diffusa is found in the tropical, sub tropical and temperate region of the world. It is distributed in India, China, Australia, Baluchistan, Pakistan, Egypt, Sudan, Srilanka, U.S.A. and South Africa. It is also found in a number of countries of the Middle East. This plant is indigenous in India and U.S.A. In India it is found in the warmer parts and up to an altitude of 2000m. This wide range is explained by its small fruit which are very sticky and grow a few inches off the ground, ideally placed to latch on to small migratory birds as they walk by.

HABITAT:^[4]

It is found growing in waste lands, road side, road dividers, near railway tracks, on ruins of old buildings on rubles and near old earthen ponds.

PLANT MORPHOLOGY:^[4]

B. diffusa is a perennial diffusely branched pubescent and prostrate herb. The plant has an orthotropic and superimposed axis. Each axis becomes penderlous and the renewable shoot arises on the upper surface of this axis. The part distal to this shoot becomes main axis. Despite orthotropic shoot construction. Boerhavia is almost prostrate because of the rapid proliferation of relay axis over a length of the main axis. The stem is cylindrical, creeping sometime purplish or greenish in colour swollen at the nodes. The branches attain a length of about 90 to 158 cm. All the branches are sylleptic and emerge at every node in alternate fashion. The subtending leaves of these branches are smaller than the opposite leaf. This primary opposite decussate orientation is limited only to the most terminal shoot. The rootstock is stont, fusi form, and white woody or brownish grey in colour. The root is about 30-50 cm deep in soil. The distal part of shoot which

bears the composite inflorescence stalk usually dies out after fruiting and thus triggers the emergence of new branches during the subsequent growing season.

The cluster of monochasial cymes borne on peduncles is terminal in position and limits the growth of axial shoots. The inflorescence buds are arranged in an umbel. The flowers are small (2.5 – 3 mm) shortly stalked small bracteoles, clavate and light to dark pinkish in colour and hermaphrodite. Proved in small umbels, arranged in axillary and terminal panicles. The stamens are 3 hypogynous, sometimes unilateral pinkish, slightly exerted with two unequal lobes of another.

Ovarial part is about 0.5 – 1mm long oblique stipitate with glandular secreting trichomes. The pistils may be equal, larger or shorter than the stamens. The pistils are light pink with a large flattened disc shaped stigma. The fruit is an achene 3 to 4mm long, detachable, ovate, oblong, pubescent, five ribbed and viscid on the ribs, Capsules containing one seed. The seed coat is so thin that the position of embryo can be seen easily. It is reniform, dull black, with adede cotyledons. Different parts of Punarnava have almost

similar testa, hooked embryo, thin similar taste. However red and white land races of *B. diffusa* are bitter in taste. Edible parts of *B. diffusa* are leaves, seeds, and roots, leaves seed are cooked but sometimes it can be ground into a powder and added to cereals when making bread, cakes etc. While roots are rich in Carbohydrate and protein used in backed form.

FLOWERING AND FRUIT TIME:^[4] Winter.

PROPAGATION AND CULTIVATION:^[4]

It is propagated by seed. The compost mixture consisting of equal part of loams, leaf mould and half part each of cowdung manure and sand is best suited for its cultivation. Well drained sunny situation and mild climate are preferable.

PARTS OF USE:^[4] Leaf, Root, Seeds, Whole plant.

ANALYTICAL DATA:

Physical constituents:^[5]

Moisture content – 82.22%

Loss on drying = 7.06 ± 0.133

Total Ash value = 11.04 ± 0.63

Total Gas Volume = 0.2 DM/ml

Organic matter Digestibility = 45.86%

Value for dry matter Degradability = 65.0% at 48 hrs.

Extractive value –

Water soluble extractive = 6.19% W/w

Alcohol Soluble extractive = 7.513 (Methanol extract)

Acid insoluble ash = 3.12 ± 0.18

CHEMICAL CONSTITUENTS:^[5]

B. diffusa contains a large number of compounds such as flavonoids, alkaloids, steroids, triterpenoids, lipids, lignin, carbohydrates, proteins and glycoprotein, fixed oil, sulphate chloride, Potassium nitrate, hypoxanthine I-L- arabinofuranoside, ursolic acidoxalic acid. Punarnavaine, glycoprotein, punarnavoside, boeravinone A, F, Liiodendrin. Caffeoyltartaric acid boeravinone G and H, quercetin and Kaempferol. The Herb contains 15 amino acid such as arginine (total amino acid in herb 0.47% and in root 0.75%), alanine, aspartic acid, methionine, leucine, phenylalanine, proline, ornithine, serine, threonine, asparagine, glycine, valine, tryptophan, tyrosine. The main rotenoids known as boeravinones A, B, C, D, E, F, G present in the root of *B. diffusa*. It also contains Borehavinone- A, B, C, Hypoxanthine, O-L- arabinofuranoside, Liiodendrin. A Purine Nucleoside hypoxanthine – 9 – arabinofuranoside and anti fibrinolytic agent. Punarnavoside are isolated from root (Agarwal and Dutta et.al-1947).

TOXICITY:^[5]

The acute and sub acute toxicity studies of *B. diffusa* leaves in albino mice and rats were investigated, that dose dependent toxicity present within it. The alcoholic extract does not show any signs of toxicity up to an oral dose of 2gm/kg in mice. It is free from teratogenic and mutagenic effect but study demonstrated that renal tubular karyomegaly and myocardial degeneration in mice after injection of water extract of *B. diffusa*.

SUBSTITUTES AND ADULTERATION:^[5]

Adulteration of herbal medicines remains a major concern of users and industry for reasons of safety and efficacy. *B. diffusa* is often adulterated with root of *Trianthema portulacastrum* Linn. However both herbs are same species either by accidental substitution or by international adulteration. Leaf and bark are substituted to *cinnamomum*.

RECENT RESEARCH STUDY ON PHARMACOLOGICAL ACTIVITIES OF B. DIFFUSA:

Significant immunomodulatory activities and anti-nociceptive effect is found of the aqueous extract of *B. diffusa* leaves.^[6] The ethanolic extract of *B. diffusa* was capable to inhibit T-cell nitrogen phytohemagglutinin and concanavalin-A. Stimulated proliferation of human peripheral blood mononuclear cell (PBMC).^[7] It is reported about the cancer chemo preventive property of *B. diffusa* against skin papillomagenesis.^[8] the significant anti diabetic activity from the chloroform extract of *B. diffusa*.^[9] described the diuretic properties and alkaloidal nature of punarnavaine.^[10] investigated and reported about the pharmacology and therapeutics properties of the plant.^[11] reported the fibrinolytic activity by 50% freeze dried ethanolic extract of *B. diffusa* (L).^[12] an extract obtained from the roots of *B. diffusa* plants, inhibits the infection of several plant viruses and was tested by the agar diffusion hole method for its action on RNA containing bacterial viruses.^[13] The leaf extract of *B. diffusa* shows in vitro antifungal activity against *Microsporum nanumi*.^[14] An alcoholic extract of the whole plant exhibited hepato protective activity against experimentally induced carbon tetrachloride hepatotoxicity in rats and mice. The extract also produced an increase in normal bile flow in rats suggesting a strong choleric activity.^[15]

reported teratogenic -effects by the ethanolic extract of *B. diffusa* on litter size and survival rate of fetuses in rat.^[16] *B. diffusa* is clinically proved as a useful and safe drug in the patients of nephritic syndrome.^[17] It is

found that the aqueous and acetone extract of *B. diffusa* roots increased the liver ATPase activity in albino rats.^[18] reported a selective immunosuppressive activity from the leaf extract of *B. diffusa* (L)^[19] reported a significant spasmolytic activity in the guinea pig ileum by the methanolic extract of *B. diffusa* root probably through a direct effect on the smooth muscles.^[20] reported about the enhanced effect of punarnavine on the cell mediated immune (CMI) response against metastatic progression of B16F-10 melanoma cell in mice.^[21] reported the anti oxidant activity and genoprotective action.^[22] reported immunomodulatory activities from the ethanolic extract of *B. diffusa* roots.^[23] reported that the *B. diffusa* leaves have potent antibacterial activity against various Gram-negative and Gram-positive bacteria which might be due to the phytochemical present in the leaves.^[24] reported that there are some anti-fungal photochemical moieties in the root of *B. diffusa* plant that decrease the sporulation of target fungal species with increased supplementation of the phytoextract.^[25]

WORLDWIDE ETHNO MEDICAL USES:^[26]

In India *B. diffusa* has a long history of medicinal use in Ayurveda and Unani. Different plant parts used as an appetizer, alexiteric, eye tonic, flushing out the renal system, to treat seminal weakness and blood pressure. Its roots are used in treating Jaundice, Ascites, Anasarca, scanty urine, internal inflammation, Asthma, Piles. The plain juice used as an antidote for rat poisoning. The seed are used as expectorant, carminative, muscular pain, lumbago, scabies, scorpion sting, in Yunani medicine. Seed powder mixed with dried ginger, it is given in Urticaria.

In Punjab, the drug is considered useful for eye. In Mumbai, it is used for dropsical swelling.

In Goa, it is used as a diuretic in Gonorrhoea. In West Indies, it is used for gonorrhoea.

In Arab country, it is used for the treatment of diabetes, stress, dyspepsia, inflammation, congestive heart failure, anti-convulsant, anti-fibrinolytic, night blindness, corneal ulcer etc.

In Brazil the plant as a whole or, its extracts is used for albuminuria, Beriberi, bile insufficiency, cystitis, edema, gall stone, gonorrhoea, guinea worms, hepatitis, Hypertension, Jaundice, Kidney disorders, Renal stone, Liver sclerosis, snake bite, splenomegaly, urinary retention.

In Guatemala, it is used for erysipelas, and guinea worms (Taylor, 2005).

In Iran, it is used for abdominal pain, anaemia, ascites, asthma, blood Purifier, cancer cararacts, child birth, cholera, constipation, cough, debility, digestive sluggishness, dropsy, dyspepsia, edema, eye problem, fever, heart ailments, child birth hemorrhage, thoracic hemorrhage, internal parasites, lactation aid, menstrual disorder, rheumatism, as a diuretic, expectorant.

In Iraq, it is used for edema, gonorrhoea, liver, intestinal gas, joint pain, lumbago, nephritis, an appetite stimulant.

In Nigeria, it is used for abscesses, asthma, boils, convulsions, epilepsy, fever, laxative,

In West Africa it is used for abortion, guinea worms, and menstrual irregularities and as an aphrodisiac. In Tropical Africa the boiled roots are applied to ulcer abscess: The boiled leaves are considered expectorant

and febrifuge and in large doses emetic. A decoction of aerial parts is also taken to treat gastro intestinal pains, intestinal worms and to regulate menstruation.

In Mauritania, the seeds are ground and made into cakes which are cooked and eaten as a remedy for dysentery.

AYURVEDIC VIEW

POSITION OF PUNARNAVA IN VEDA:^[27]

In the Atherva veda Punarnava is described out of 283 herbs, act as a 'sothohara'. It also describe in yajurveda at the classification of herbs under 'Swarupa veda' category.

POSITION OF PUNARNAVA IN CLASSICAL TEXT:

Kasa hara, Sweda poga, Anuvasana poga, Vyasthapana^[28], Vidarighandhadi gana, Saka Varga^[29] Madhyam Panchamool^[30], Guruchadi gana^[31], Avayadi Varga^[32]. Guruchadi Varga^[33], Guruchadi Varga^[34], Parpatadi Varga^[35], Satapuspadi Varga^[36], Punarnavadi Varga^[37], Mutraladi Varga^[38]

VARIETIES:

There are three classical variety based on colour of the flower viz. Sweta, Rakta, Nila.^[39]

Two varieties of Punarnava viz Sweta and Rakta.^[40]

PROPERTIES AND ACTION (GUNA-KARMA) :

There are different opinions in different nighantu regarding the properties and action of Punarnava. In general rasa-panchak are –

Rasa – Tikta,^[31, 33, 35, 37, 40, 41] Kasaya,^[37,40,41] Modhur^[41], katu^[37]

Guna – Laghu^[31], Ruksa^[31, 33], ushna^[31,33,37,40, 41]

Veerya – Ushna^[31, 33,34,35, 40]

Vipak – Katu^[34, 35, 37, 40], madhur^[41]

Probhava – Not signify.

Karma- Kaphvataahara^[37, 41] Kaphahara^[31, 33, 40]

DOSE:

Dose depends on form of use and mode of use. Patient age and also disease condition, such as –

Root Extract – 1 tola, Leaf Extract – 1-2 tola , Root dust – 5-10 masa.^[42]

Root Extract – 10-20 gm, Root dust = 25 – 5 gm.^[43]

Root Extract = 1-2 tola .^[44]

Fresh juice - 5-10 ml. Seed powder – 1-3 gm.^[45]

Decoction – 1-4 tsf. , Dried plant decoction = 1 gm.^[46]

THERAPEUTIC USE .^[47]

Dosha proyoga – It is use in tridesaja vikar

Bhaya Proyoga – In ekango sotha (localised oedema) it is used locally as a lepa uponaha svedan and punarnava medicated oil forabhangha.

Abhantar proyoga –

Pachan Samasthan – Punarnava Kwath uses in Agnimandyo, Udarroga, Vivandha, Amavata, Gulma, Toda, For Vamak action – (3g) decoction is sufficient. In Pleehadora, sweta punarnava root is pounded with rice water and given orally.

Swashana Samasthan – Ghee preparation also use in swasa, Kasa,urakhata.

Projonan Samasthan- Punarnava root juice indicated in Raktaprodar, yonisul, Mudagarva, Sukra roga, Sukha prosava. For Vajikaranpurpose punarnava seed is used.

Mutrobaha Samasthan – Fresh juice is used for Mutralpata,Mutrakriccha, Asmari.

Raktabaha Samasthana – Ghee medicated with Punarnava decoction is used in Sotha. Pandu, hridroga, Pleehadora. It leaves use in sotha as avegetable.

Twacha – It uses in Kustha, Vidrodhi

Tapakarma – It use in Jwara, especially in Caterthak jwara.

Samjnabaha Samasthana – Decoetion form is used in Madatyaya andNidranash.

Satmikarna – Dourbalya, rasayana, Vayasthapana. In Alarka visasweta Punarnava is given with dhatura fruit. It also use in sarpa visa,Mushik visa.

PREPARATIVE MEDICINE:⁴⁷

B.diffusa is an exclusive and important constituent of several medicines such as,

Ethical Medicine –

i) Amlaki Rasayana

ii) Punarnava Rasayana

iii) Punarnava Mondoora.

iv) Chayavan prash

v) Punarnava Kwath

vi)Punarnava asava and aristha

vii) Sutikabharana

viii) Punarnavadi guggulu etc.

CONCLUSION:-

Throughout the millennia B.diffuse has evolved into a miracle medicinal plant having a plethora of chemical constituents effective against a large number of ailments. The plant finds considerable importance in the traditional herbs based remedies the world over. In a Ayurvedic and Unani the plant finds use as a cure for 22 ailments. In Brazil pharmacopeia 23 uses as been describe for the plant. While in Africa and Middle East the plant is prescribed for 14 ailments.

Despite several uses listed for this plant and the numerous compounds the plant harbors. B.diffuse has not been able to catch the fancy of the pharmaceutical industry. The plant and its importance require to be catalogued properly so that people become more aware of it. A detailed study of the various compounds

present in it and their pharmaceutical importance requires to be carried out such that a drug with available in near future.

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