



# A CRITICAL REVIEW OF PUNARNAVA (*BOERHAAVIA DIFFUSA* LINN.)

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## ABSTRACT

*Punarnava*, scientifically known as *Boerhaavia diffusa* Linn., belongs to the family Nyctaginaceae. It is commonly referred to as *Punarnava* in Ayurvedic medicine, and also known as spreading hog weed in English. *Punarnava* is extensively used in Ayurveda to treat various ailments such as oedema (swelling), cardiac disorders, anaemia, and more. The Ayurvedic *Samhitas* and *Nighantus* describe its synonyms, morphology, properties, actions, and medicinal uses. This herb is well-established and widely used for managing conditions like stress, inflammation, urinary tract disorders, and cardiac disorders.

**KEYWORDS-:** *Punarnava*, *Boerhaavia diffusa*, Ayurveda, plant.

## INTRODUCTION-:

*Punarnava* is known by the botanical name of *Boerhaavia diffusa* and belongs to Nyctaginaceae family. It is one of the best diuretic known among a variety of herbs mentioned in the Ayurvedic text. *Punarnava* as its name suggest means tendency to rejuvenate. Although it acts as a rejuvenator for all the systems of the body but basically it works as a rejuvenator for the urinary system. In *Atharvaveda*, *Punarnava* is described and its use as *Tridoshaghna*, *Kusthaghna*, *Rasayana*, *Jvaraghna*, *Kasahara*, *Sothahara* and as *Raktavardhaka*<sup>1</sup>. In *Charaka Samhita* it comes in *Vayahsthapana Mahakashaya*<sup>2</sup> and in *Rasayanaprakrana* by name of *Punarnava*. In *Sushruta Samhita* it is explained in *Vidarigandhadi Gana*<sup>3</sup>, *Vatasansamana* and *Tiktavarga*. In *Ashtanga Hridaya* also it comes in *Vidaryadi Gana*<sup>4</sup>.

**MORPHOLOGY<sup>5</sup>-:**

**Stem:** Greenish purple, stiff, slender, cylindrical, swollen at nodes, minutely pubescent or nearly glabrous, prostrate divaricately branched, branches from common stalk, often more than a metre long.

**Root:** Well developed, fairly long, somewhat tortuous, cylindrical, 0.2-1.5 cm in diameter, yellowish brown to brown coloured, surface soft to touch but rough due to minute longitudinal striations and root scars, fracture, short, no distinct odour, taste, slightly bitter.

**Leaves:** Opposite in unequal pairs, larger ones 25-37 mm long and smaller ones 12-18 mm long ovate oblong or sub orbicular, apex rounded or slightly pointed, base subcordate or rounded, green and glabrous above, whitish below, margin entire or sub-undulate, dorsal side pinkish in certain cases, thick in texture, petioles nearly as long as the blade, slender.

**Flowers:** Very small, pink coloured, nearly sessile or shortly stalked, 10-25 cm, in small umbells, arranged on slender long stalks, 4-10 corymb, axillary and in terminal panicles, bracteoles, small, acute, perianth tube constricted above the ovary, lower part greenish, ovoid, ribbed, upper part pink, funnel-shaped, 3 mm long, tube 5 lobed, stamen 2-3.

**Fruit:** One seeded nut, 6 mm long clavate, rounded, broadly and bluntly 5 ribbed, viscidly glandular.

**REVIEW OF LITERATURE-:**

**Charaka Samhita -:** *Aacharya Charaka* has categorized *Punarnava* as *Swedopaga*<sup>6</sup> (an adjunct to sweating therapy), *Anuvasanopaga*<sup>7</sup> (an adjunct to oleating therapy), *Kasahara*<sup>8</sup> (anti-tussive), *Vayasthapana*<sup>9</sup> (rejuvenator) *Mahakashaya*. It is mentioned in *Vamana Dravya*, *Virechana Drvaya* and *Madhura Skandha*<sup>10</sup>. It is mentioned in *Rasayana Pada* and ingredient of many Rasayanas viz. *Chyavanaprasha*, *Baladi Rasayana* and *Indrokta Rasyana*.<sup>11</sup> It is mentioned in *Punarnavaristha* i.e. indicated for *Sotha* (inflammation with swelling).<sup>12</sup> It is mentioned in *Punarnava mandoor* i.e. indicated in *Pandu*, *Sotha*.<sup>13</sup> *Taila* (oil), *Ghrita* (ghee) and *Mishraka* (both oil and ghee) prepared with the combination of drugs including *Punarnava* is indicated for *Vatavikara*.

**Sushruta Samhita-:** *Aacharya Sushruta* has categorised this plant in *Vidaarigandhadi Gana*<sup>14</sup>, *Vatashanshamana Varga*<sup>15</sup>, *Tikta Varga*<sup>16</sup> and *Shaka Varga*<sup>17</sup>. *Sushruta* quoted '*Paunarnavam shakam visheshat shophanashanam*' mentioned in *Shaka Varga* used as anti-inflammatory<sup>18</sup>. *Punarnava Kalka* with milk mentioned

in *Udraroga*<sup>19</sup>. *Punarnava* has been mentioned as a content of *Saireeyakadi Taila* indicated for *Khalitya* (hair loss) and *Palitya* (premature or greying of hair)<sup>20</sup>. It is the one of component of *Eksara Gana* to be used in snake poison<sup>21</sup>. Root of *Punarnava* with *Dhatura* mentioned in *Alarka Visha* (Dog bite).<sup>22</sup>

**Ashtanga Hridaya-:** *Punarnava* is the ingredient of *Bala Taila* which is indicated for *Jwara* (fever), *Yoniroga* (vaginal disorders), *Sutikarog*.<sup>23</sup> *Ghrita* prepared with *Punarnava* and other drugs is indicated for *Kasa* and *Vishama Jwara*.<sup>24</sup> It is the content of *Nagabaladi Ghrita* which is indicated for *Rasayana* (rejuvenator).<sup>25</sup> *Taila* prepared with *Bilva* (*Aegle marmelos*),

*Punarnava* and other drugs is indicated for *Vataja Hridroga*.<sup>26</sup> *Ghrita* prepared with *Kusha* (*Desmostachya bipinnata*), *Punarnava* and other drugs is mentioned in *Pittaja Ashamari*.<sup>27</sup> Milk boiled with *Punarnava* i.e. *Ksheerapaka* is indicated in *Mutrghata* and *Ashmari*.<sup>28</sup>

## DESCRIPTION OF PUNARNAVA IN NIGHANTUS-:

**Dhanvantri Nighantu (10th A.D.):** In *Dhanvantari Nighantu*, *Punarnava* has been described under *Guduchyadi Varga*.

**Paryaya<sup>29</sup>-:** *Punarnava*, *Vishakhah*, *Kathillah*, *Shivatika*, *Vrishchir*, *Kshudravarshabhu*, *Dirghapatrah*, *Kathillakah* are synonyms.

**Guna-Karma<sup>30</sup>-:** *Punarnava* has *Tikta Rasa*, *Ushna Virya*, *Ruksha Guna* and pacifies *Kapha Dosha*. It is useful in *Shopha*, *Pandu*, *Hridayaroga*, *Kasa*, *Urahkshata* and *Shoola*.

**Shodhala Nighantu (12th A.D.):** *Acharya Shodhala* kept *Punarnava* under *Guduchyadi Varga*.

**Paryaya<sup>31</sup>-:** *Punarnava*, *Shophaghni*, *Viksa*, *Raktapushpika*, *Varshaketu*, *Varshabhu*, *Mahavarshabhu*, *Shivatika*, *Sarini* and *Pravrishaayani* are synonyms.

**Guna-Karma<sup>32</sup>-:** Three types of *Punarnava* are *Bhedan*, *Ushna Virya* and *Rasayana*. It mitigates *Kapha* and *Vata*. It cures *Durnama* (haemorrhoids), *Vardhma*, *Shopha* and *Udararoga*.

**Madanpala Nighantu (14th A.D.):** This *Nighantu* is also known as “*Madana Vinoda*”. *Madanpala* has kept this drug in *Abhayadi Varga*.

**Paryaya<sup>33</sup>& Guna-Karma<sup>34</sup>-:** *Punarnava*, *Aruna*, *Tikta*, *Raktapushpa*, *Kathillaka*, *Kruraka*, *Kshudravarshabhu*, *Varshaketu* and *Shivatika* are synonyms. *Punarnava* has *Tikta Rasa*; *Sara* and *Laghu Guna*; *Katu Vipaka*, *Sheeta Virya*. It is *Shothahara*, *Vatahara*, *Vranaropana*, *Kaphahara*, *Ruchya*, *Rasayana*, *Grahi* and *Raktapitthara*.

**Kaiyadeva Nighantu (14th A.D.):** It is also known as “*Pathyapathyavibodhaka*” written by *Acharya Kaiyadeva*. *Punarnava* has been described under *Aushadhi Varga*.

**Paryaya<sup>35</sup>& Guna-Karma<sup>36</sup>-:** *Punarnava*, *Punarbhu*, *Sada*, *Mandalpatrika*, *Swetamoola*, *Vrishchiva*, *Varshabhu* and *Raktapatraka*, *Shophaghni*, *Jatila*, *Sadyovishoshi* and *Dirghapatraka* are synonyms. *Punarnava*



has *Madhura, Tikta, Kashaya* and *Katu Rasa*; *Sara* and *Ruksha Guna*; *Ushna Virya*. It is *Agnideepana, Shothahara, Vatanashaka, Kaphanashaka, Hridya, Ruchikarak*. It is indicated in *Arsha, Vran, Pandu, Visha* and *Udara Roga*.

**Bhavaprakasha Nighantu (16th A.D.):** *Acharya Bhavamishra* described *Punarnava* in *Guduchyadi Varga*.

**Paryaya<sup>37</sup>-:** *Punarnava, Raktapunarnava, Raktapushpa, Shilatika, Shothaghni, Kshudravarshabhu, Varshaketu, Kathillakah* and *Aruna* are synonyms.

**Guna-Karma<sup>38</sup>-:** *Punarnava, Raktapunarnava, Raktapushpa, Shilatika, Shothaghni, Kshudravarshabhu, Varshaketu, kathillakah* and *Aruna* are synonyms. It has *Tikta Rasa; Laghu Guna; Katu Vipaka; Sheeta Virya*. It pacifies *Vata, Pitta Kapha* and *Rakta Dosha*.

**Raj Nighantu (17th A.D.):** It is also known by the names of “*Nighantu Raja*” and “*Abhidhana Chudamani*”. *Narhari Pandit* described *Punarnava* under *Parpatadi Varga*.

**Paryaya<sup>39</sup>-:** *Raktapunarnava, Krura, Mandalpatrika, Raktakanda, Varshaketu, Lohita, Raktapatrika, Vaisakhi, Raktavarshabhu, Shophaghni, Raktapushpika, Vikasvara, Vishaghni, Pravrashenya, Sarini, Varshabhavah, Sonapatrah, Sonah, Sammilitdrum, Punarnava, Nava* and *Navya* are synonyms.

**Guna-Karma<sup>40</sup>-:** *Punarnava* is *Tikta, Sara, Shophanashaka, Raktapradaranashaka, Pandunashaka* and *Pittanashaka*.

#### SYNONYMS OF PUNARNAVA-:

*Punarnava*- It is perennial regenerating in rainy season.

*Pravrishayani*- It is perennial regenerating in rainy season.

*Mandalpatrika*- It is a spreading herb with round leaves.

*Raktakanda*- Its reddish stem.

*Raktapushpika*- Its red flowers.

*Vishaghni*- It also eliminates toxins and anti-poisonous.

*Sothaghni*- It is useful for oedema.

*Sarini*- Because of its diuretic action.

**VARIETIES<sup>41</sup>-:** There are two varieties of *Punarnava* -

1. *Rakta Punarnava (Boerhaavia diffusa Linn)*
2. *Shweta Punarnava (Boerhaavia verticillata Poir)*

**VERNACULAR NAME<sup>42</sup>-:**

Language	Name
Sanskrit	Kahtilla, sophaghni, sothaghni,
Hindi	Gadapurna, Lalpunarnava
English	Horse Purslane, Hog Weed
Bengali	Rakta Punarnava
Gujrati	Dholisaturdi, Motosatodo
Kannada	Sanadika, Kommeberu, Komma
Kashmiri	Vanjula Punarnava
Malayalam	Chuvanna Tazhutawa
Marathi	Ghetuli, Vasuchimuli, Satodimula
Tamil	Mukurattai (Shihappu)
Telugu	Atikamamidi, Erra galijeru
Punjabi	Itcit (IaI ), Khattan

**RASAPANCHAKA (PROPERTIES AND ACTION)<sup>43</sup>-:**

The properties of the drug as per API.

<b>Rasa</b>	<i>Madhura, Katu, Tikta, Kashaya.</i>
<b>Guna</b>	<i>Sheeta, Laghu, Ruksha, Sara.</i>
<b>Virya</b>	<i>Ushna.</i>
<b>Vipaka</b>	<i>Katu.</i>
<b>Karma</b>	<i>Shophahara, Deepana, Vatakara, Kaphaghna, Pittahara.</i>

**THERAPEUTIC USES** – *Sopha, Pandu, Hridroga, Kasa, Arsa, Vrana, Urahkshtashula, Sotha* etc.

**KARMA (ACTION)<sup>44</sup>-:** *Sothahara, Vatashamak, Pittashamak, Kaphanash, Raktpittahara.*

**TAXONOMICAL CLASSIFICATION<sup>45</sup>-:**

Kingdom	Plantae
Division	Tracheophyta
Class	Magnoliopsida
Order	Caryophyllales
Family	Nyctaginaceae
Genus	Boerhaavia
Species	diffusa

Latin name	<i>Boerhaavia diffusa</i> Linn.
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**CHEMICAL CONSTITUENTS<sup>46</sup>-:** Punarnavoside, rotenoids viz. boerwinones A, B, C, D and E, lignins viz. liriodendrin and syringaresinol mono-  $\beta$ - D glucoside, flavones and sterols, isofuroxanthone, boervine and hypoxanthine-9-L-arabinofuranoside. The leaves have various nutritive components like vitamin c, sodium and calcium.

**PART USED. -:** Whole plant, Roots.

**DOSES<sup>47</sup>-:** 1-3 g. of powder, 10-20 ml. (Fresh Juice).

#### **PHARMACOLOGICAL ACTIVITIES-:**

**IMMUNOMODULATORY EFFECTS-:** The alkaloidal fraction of *Boerhaavia diffusa* was studied for its effect on cellular and humoral functions in mice. Orally administration is significantly inhibited SRBC-induced delayed hypersensitivity reactions in mice. However, the inhibition was observed only during post-immunization drug treatment, while no effect during pre-immunization drug treatment was observed.<sup>48</sup>

**ANTISTRESS & ADOPTOGENIC ACTIVITY-:** The extract improved the stress tolerance by significantly increasing the swim duration & reducing the elevated WBC, blood glucose & plasma cortisol. Immunomodulatory activity was evaluated by carbon clearance & delayed hypersensitivity test. The extract significantly increased carbon clearance, indicating the stimulation of reticuloendothelial system. The extract also produced an increase in DTH response to SRBC in mice.<sup>49</sup>

**HYPOGLYCEMIC ACTIVITY-:** An alcoholic extract of the whole plant of *B. diffusa* exhibited hepatoprotective activity against experimentally induced carbon tetrachloride hepatotoxicity in rats and mice. Study investigating the effect of oral administration of an aqueous solution of *B. diffusa* leaf extract on normal and alloxan-induced diabetic rats showed a significant decrease in blood glucose and a significant increase in plasma insulin levels in normal and diabetic rats. The effect was more prominent than glibenclamide.<sup>50</sup>

**ANTICONVULSANT ACTIVITY-:** Study showed the crude methanolic extract of *B. diffusa* and its liriodendrin-rich fraction showed a dose-dependent protection against PTZ-induced convulsions.<sup>51</sup>

**ANTI-INFLAMMATORY ACTIVITY-:** Ethanol extract of leaves at dose of 400mg/kg exhibited maximum anti-inflammatory effect with 30.4, 32.2, 33.9 and 32% with carrageenin, serotonin, histamine and dextran induced rat paw oedema models, respectively. Ethanol extract of stem bark also exhibited COX-1 and IC50 value of 100ng/ml proving the drug use in the treatment of inflammatory condition.<sup>52</sup>

**TRADITIONAL USES-:** Well-known use of *Punarnava* is in generalized oedema i.e. general anasarca. Its leaves are anti-inflammatory in action and so external application is done in localized inflammation<sup>53</sup>. Pulp of *Punarnava* and ginger is used in ascites and generalized oedema<sup>54</sup>. Medicated oil or *ghee* i.e. *Punarnava taila* or *ghee* are also used in hepatitis<sup>54</sup>. Powder of the leaves and roots of same is given in dose of 40gm in jaundice to

remove aggravated pitta through purgation<sup>55</sup>. *Punarnava* is also called as *Ashmarighana* i.e. it helps to flush out renal stones from the kidney, *Shothghana* i.e. alleviates oedema.

**SUBSTITUTES AND ADULTERANTS<sup>56</sup>-:** Market samples of *Raktapunarnava* (*Boerhaavia diffusa* Linn.) are often adulterated with *Trianthema portulacastrum* Linn. Two plants are the sources of two different *Ayurvedic* drugs *Punarnava* and *Varshabhu* possibly with similar therapeutic effects.

**CONCLUSION-:** The multiple benefits of *Boerhaavia diffusa* made it a true miracle of nature. It has several effects like antioxidant, antifibrinolytic, anti-inflammatory, hepatoprotective effects. A detailed and systematic study is required for identification, cataloguing and documentation of plants, which may provide a meaningful way for the promotion of the traditional knowledge of the herbal medicinal plants. In view of the nature of the plant, more research work can be done on humans so that a drug with multifarious effects will be available in the future.

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