

Plantago asiatica subsp. *erosa* (Wall.) Z.Yu Li: A less known nutraceutical herb of Northeast India

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Abstract: The rich plant diversity of Northeast India is deeply associated with the lives of different tribal and indigenous communities in the region as a natural source of food, medicine, and other purposes. Plantains are considered very nutritious but most are less known for their edibility. *Plantago asiatica* subsp. *erosa* is a swamp herb known for its high medicinal uses and food values in Northeast India. The nutraceutical value of this species is less known by people, even though it is distributed in other parts of the country. Many regions of developing and underdeveloped countries with high populations are prone to hunger, malnutrition, or cannot afford to get healthy nutritional diets. The exploration of wild nutraceutical plant species of *Plantago* is attempted to be documented here with its morphological characters for identification and ethnobotanical uses with respect to food and medicinal uses from the Northeast region of India. This documentation could be helpful to people be aware of the common nutraceutical plants and how they could be helpful to reduce food insecurity around the world. This could be also helpful to draw the attention of the researchers to work on the pharmacological aspects and value addition of this species.

Keywords: Ethnobotany, nutritional herb, exploration, food, medicine

Introduction: Northeast India is blessed with enormous plant diversity with various habits (Kumar et al. 2018; Kumar and Thorat 2018; Devi et al. 2018; Devi et al. 2019; Devi et al. 2020; Kumar et al. 2022). Although many such plant diversity may be distributed in other parts of the country, its rich ethnobotanical uses of many species are confined to many tribal and indigenous communities of Northeast India. Consumption of natural nutraceutical plants unknowingly keeps them healthy, young and prevent from many diseases and disorders. However, the influence of many foreign cultures, food habits, lifestyle have affected to some extent. Most of the local markets of Northeast India are unique as many of such wild edible foods, medicine or nutraceutical are easily available for consumption with reasonable prices. The utility of each species may differ from one place to another. This could be one of the reasons why a lower-income family could access a healthy diet and nutrition. Many of the nutraceutical plants and their parts stimulate the immune system and prevent several health issues. A recent report of the World Bank Global Food and Nutrition Security 2023 revealed high food inflation occurring worldwide, affecting 63.2 % of low-income countries, 79 % of lower middle-income countries, 67 % of upper middle-income countries, and 78.9 % of high-income countries. The current scenario of hunger prevalent worldwide is about 9.2 % in 2022, as stated in the report of FAO's 2023 State of Food Insecurity and Nutrition. It has also revealed that 29.6 % of the global population has been affected by moderate or severe food insecurity problems, with 11.3 % of the population affected by severe food insecurity. In 2021, more than 42 % of the global population will be unable to afford a healthy diet (<https://www.worldbank.org/en/topic/agriculture/brief/food-security>).

Urbanisation in every nook and corner of the world has driven many challenges in healthy food availability, agricultural systems, mode of food production, unhealthy diets, shrinking of natural forests and agricultural lands, use of fertilisers and pesticides, adulteration, high food price inflation, etc. The genus *Plantago* comprises about 200 species, mostly small herbs commonly termed plantains. Plantains like *Plantago major* have been reported for their therapeutic uses as an antioxidant agent, wound healing agent, and preventer of infection. It is also used to treat diarrhoea and as an anti-inflammatory agent. Plantains are considered rich sources of nutrients

like calcium, vitamin A, C, and K (Miraj 2016). However, *Plantago asiatica* subsp. *erosa* is native to the Indian subcontinent and south-central China. Globally, it is distributed in India, the East Himalaya, South-central China, Bhutan, and Sri Lanka. In India, it is distributed in Northeastern states like Manipur, Nagaland, Sikkim, Meghalaya, etc., and other parts like West Bengal (Sankara et al. 2020). Exploration of wild edible foods and nutraceutical plants with indigenous traditional knowledge could be helpful to inform people about the alternative source of expensive healthy diets and medicines. Such plants could be cultivated and valued as an option affordable to lower-income sections of society. The ethnobotanical uses of *Plantago asiatica* subsp. *erosa* in the Meitei community of Manipur (Devi et al. 2022) in the Northeast part of India and neighbouring countries are described here with morphological characters for easy identification in the field.

Methodology: The ethnobotanical information has been collected from different people in the Meitei community of Manipur about the uses of *Plantago asiatica* subsp. *erosa*, and different modes of use have been listed (Kumar et al. 2021). Also, a comparative account of the ethnobotanical data on the uses of the same plant that has been reported from other Northeast states is given in Table 1. A brief description of *Plantago asiatica* subsp. *erosa* is also given hereunder.

Results and discussion

Plantago asiatica subsp. *erosa* (Wall.) Z.Yu Li

It is a swamp or moist loving perennial herb of the family Plantaginaceae. Leaves are simple, elliptic, subacute, attenuate at the base, sometimes with oblong or oblanceolate lobes or dentate structure, mostly glabrous and sometime puberulous, 3-5 parallel veins, broad channeled and long petiole; inflorescence dense spikes, flowers subsessile, bracts ovate or elliptic, sepal oblong to elliptic, concave, keel projecting, corolla white, salvar shape, obtuse to narrowly triangular, slightly lobed at the apex; fruit capsule, seeds many, oblong and black when matured (Figure 1).

Ethnobotanical Uses: The ethnobotanical survey at the present study for the Meitei community of Manipur revealed that it is locally known as Yempat. The leaves are slightly roasted over a direct flame and then applied externally

to treat boils and swellings. The soup of the leaves is taken to reduce high blood pressure. People collect the leaves, semi-cook them, and mix them with spices and fermented fish to prepare a delicacy called Kangsu (semi-cooked salad). Although it is edible and used for therapeutic purposes, it is not available in Imphal. Hoakip and his coworkers recently reported on the wild edible foods of Tengnoupal District of Manipur and revealed that the leaves are cooked as leafy vegetables by the Thadou Kuki tribe of Manipur and are available in local markets ([Haokip and Panmei 2022](#)). The leaves are considered as medicinal agent, so people cook and eat them to treat various ailments like stomachaches, dysentery, and kidney problems. The fresh plant paste can be applied to cuts and wounds ([Chetri et al. 2018](#); [Lea and Limasenla 2020](#)). Again, the decoction of the whole plant is used to reduce high fever ([Shiddamallayya et al. 2018](#); [Table 1](#)). The different medicinal and food uses are shown in [Figure 2](#).

Table 1: Ethnobotanical uses of *Plantago asiatica* subsp. *erosa*

Plant part used	Ethnobotanical uses	Place	Source
Leaves	Slightly roasted directly on fire and applied externally for treatment of boils and swellings	Manipur, India	Present study
Leaves	Soup is taken to reduce high blood pressure	Manipur, India	Present study
Leaves	Eaten as semi-cooked salad (Kangsu)	Manipur, India	Present study
Whole plant	Plant paste is applied to cuts & wounds	Bhutan	Chetri et al. (2018)
Leaves	Fresh leaf paste applied to cuts and wounds	Nagaland, India	Lea and Limasenla (2020)
Whole plant	Cooked and taken to treat stomachache,	Nagaland, India	Lea and Limasenla (2020)

	dysentery & kidney problems		
Whole plant	Decoction of the whole plant is used to reduce high fever	Sikkim, India	Shiddamallayya et al. (2018)
Leaves	Cooked as leafy vegetables	Manipur, India	Haokip and Panmei (2022)



Figure 1: *Plantago asiatica* subsp. *erosa* (Yempat) in its habitat

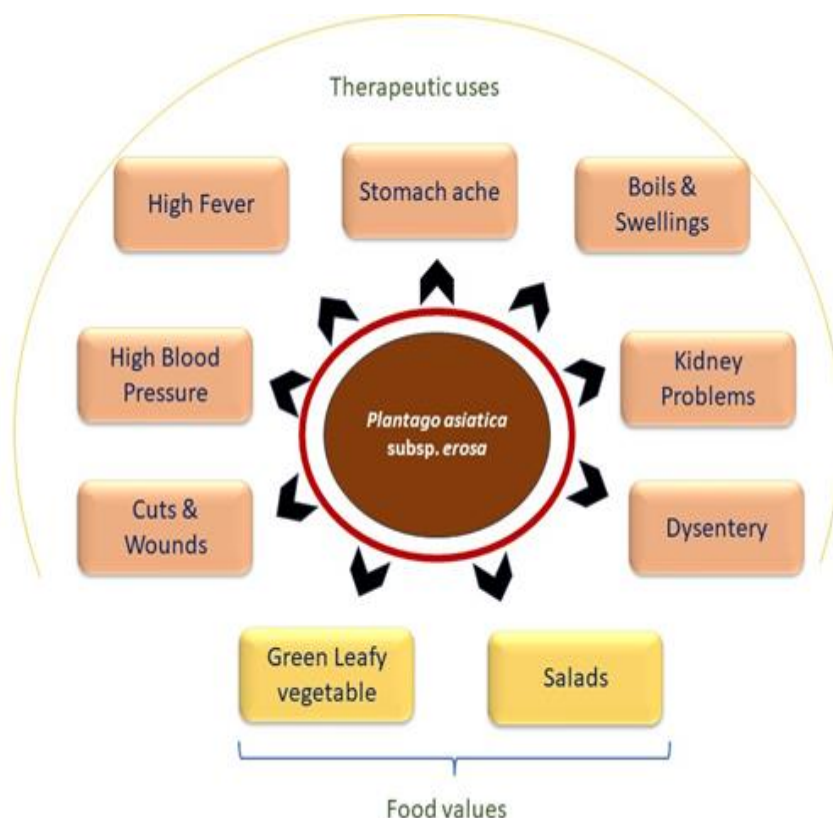


Figure 2: Therapeutic uses and food values of *Plantago asiatica* subsp. *Erosa*

Conclusion: Indigenous traditional knowledge of wild food and medicinal plants is unique for the same or different plant species from varied tribal and indigenous communities in Northeast India. This is applicable to other parts of India, where a single plant species may have numerous modes of use in their respective cultures and traditions. Here, the exploration of the ethnobotanical uses of *Plantago asiatica* subsp. *erosa* from the Meitei community and the comparative account of the different modes of use from different states of Northeast India as a nutraceutical could help people all over the world become aware of its edibility and therapeutic uses. This also draws the attention of the researchers to work more into the pharmacological aspects of the species for future drug development. On the other hand, cultivation of the species and value addition of the product can be taken up and made available at affordable prices as an alternative nutraceutical plant.

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