

Chapter 2

Ruellia tuberosa L.: a medicinal plant of India

Sandhya Sharma¹, Jeline Rani J², Sohan Lal³, Harpal Singh⁴ and Sugimani Marndi^{5*}

¹Department of Botany, Govt College Patharia, Damoh, Madhya Pradesh, India

²Department of Botany, Bishop Heber College, Tiruchirappalli, Tamil Nadu, India

³School of Studies in Botany, Shaheed Mahendra Karma Vishwavidhyalay Bastar, Jagdalpur, Chhattisgarh, India

⁴University Institute of Agricultural Sciences, Chandigarh University, Mohali, Punjab, India

⁵Ambika Prasad Research Foundation, Odisha, India

*Email-Id: sugimani2marndi@gmail.com

ABSTRACT

Ruellia tuberosa L. is an herb belonging to the family Acanthaceae. Due to the presence of active chemical compounds such as alkaloids, flavonoids, triterpenoids, etc., it cures different ailments such as gonorrhea, eye diseases, diabetes, and bronchitis. It also attracts many pollinators and has significant economic value. Therefore, the present study highlights its pharmacological, ethnomedicinal, ecological, and economic importance.

Keywords: *Ruellia*, traditional knowledge, secondary metabolites, pharmacological uses

INTRODUCTION

Acanthaceae is a taxon of dicotyledonous flowering plants containing almost 250 genera and about 2500 species (Elgindi et al. 2015). The *Ruellia* genus, which comprises 250 species, is found in both tropical and temperate regions of both hemispheres. Most people use *Ruellia tuberosa* for ornamental purposes worldwide. Its origins can be traced back to tropical America and Southeast Asia, specifically Thailand, Peninsular Malaysia, and Java, as well as the tropics of India, Sri Lanka, and Africa (Chothani et al. 2020; Sharma et al. 2024). *Ruellia tuberosa* L. is an herb with tuberous roots. It belongs to the family Acanthaceae. It is commonly known as the Mexican bluebell, a large bellflower. The flowering and fruiting period is from June to February. It is easily identifiable due to its striking funnel-shaped, violet-colored, 5-lobed corolla flower. It primarily inhabits moist and shady areas. It grows near the roadside, in grasslands, cultivated fields, and in xerophiles. It is widely distributed in Southeast Asia. It also attracts many pollinators such as butterflies and insects. Some butterflies like lemon pansy (*Junonia lemonias*) and mangrove buckeye (*Junonia genoveva*) pollinate *R. tuberosa* (Harinath et al. 2016).

Apart from ecological significance it also holds medicinal value such as in diabetes, gonorrhea, urinary problems, and analgesic (Pandey and Singh 2018). Flowers of *R. tuberosa* are light bluish-purple due to the presence of the flavonoid pigment of anthocyanin which is used as a natural dye in industries (Kampeerappun et al. 2010).

DESCRIPTION

It is a glabrous or glabrescent herb up to 30-40 cm, much branched from a rootstock of numerous fleshy tubers. Leaves elliptic- obovate, obovate – oblong or elliptic-oblong, entire or undulate- crenate; petiole 1-2.2 cm long. Flowers are blue and 3 cm long in axillary and terminal cymes; bracts and bracteoles are narrow. Calyx segments are long-setaceous, hairy or glandular. Capsule linear, 2- 2.8 cm. Fruits a pod with 7-8 seeds (Saxena and Brahmam 1995; Figure 1 & 2).

BIOACTIVE COMPOUNDS

It possesses bioactive compounds such as alkaloids, benzoxazinoids, flavonoids, lignans, phenolic compounds, saponins, tannins, triterpenoids, and sterols (Pandey and Singh 2018; Samy et al. 2015; Ariridran et al. 2011). These reported bioactive compounds are responsible for therapeutic uses. Details are listed in Table 1.

Table 1: Some bioactive compounds reported from the *R. tuberosa* and their probable utilization.

Bioactive Components	Utilization	References
Flavonoids	Antioxidants help reduce oxidative stress and have anti-inflammatory and anti-cancer potential.	Wagner et al. (1971) Teng et al. (2005) Lin et al. (2006) Chen et al. (2006) Xu et al. (2020)
Alkaloids	These are known for their analgesic (pain-relieving) and anti-inflammatory effects.	
Tannins	Possess astringent properties, which are beneficial for wound healing and treating infections.	
Saponins	Known for their immune-boosting properties and may help reduce cholesterol levels.	
Steroids	Exhibit anti-inflammatory and antimicrobial effects	
Phenolic acids	These have strong antioxidant properties, which may help protect against cellular damage	

ETHNOMEDICINAL USES

Researchers use the leaves to treat diabetes (Xu et al. 2020). Rajan et al. (2012) uses the roots to treat kidney diseases and whooping cough. Pandey and Singh (2018) use the leaves' decoction to treat gonorrhea and ear diseases. Karle et al. (2022) use it to treat abdominal pain. People use the dried and ground root to treat sore eyes. You can use the decoction of leaves to treat bronchitis. You apply a paste of leaves externally to treat skin diseases, wounds, and boils. People use the seeds to treat spermatorrhea and leucorrhoea. Chothani et al. (2010) use the whole plant to treat bladder diseases. Alam et al. (2009) use the root to reduce toxicity and heal urinary tract inflammation.

PHARMACOLOGICAL ACTIVITY

It possesses anti-diabetic, antipyretic, analgesic, antioxidant, anti-hypertensive, anti-ulcer, anti-microbial, antinociceptive, anti-inflammation, and gastroprotective (Afzal et al. 2015; Samy et al. 2015; Pandey and Singh 2018). Flowers of *R. tuberosa* possess anticancer activity (Guha et al. 2024).



Figure 1: Habit and habitat of *Ruellia tuberosa*



Figure 2: Flower of *Ruellia tuberosa*

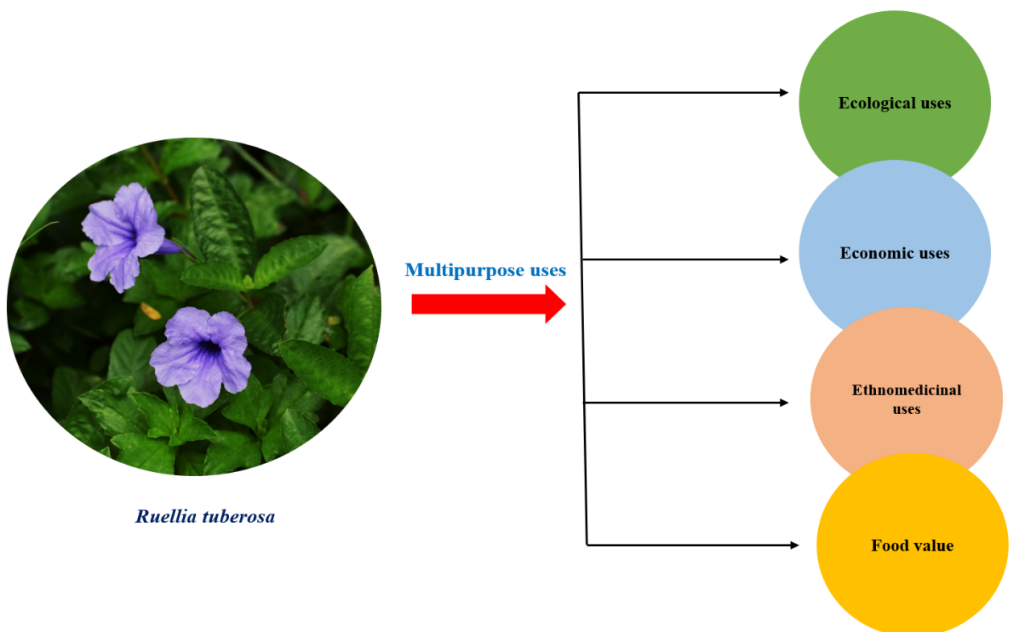


Figure 3: Uses of *R. tuberosa*

OTHER USES

The flower is used as a natural dye for textiles ([Kampeeraappun et al. 2010](#)). In Taiwan, it is used as an herbal drink ([Arirudran et al. 2011](#)).

CONCLUSION

Ruellia tuberosa L. is a medicinal plant widely recognized for its bioactive components and potential therapeutic uses. Also known as *Cracker Plant* or *Minnieroot*, this herb is native to tropical areas and is often found in regions of Asia, South America, and Africa. Here's an overview of its bioactive components and medicinal uses ([Figure 3](#)). In traditional practices, *Ruellia tuberosa* is used as a tea or poultice, depending on the intended therapeutic effect. More research is ongoing to validate these medicinal uses and potentially expand its applications in modern medicine.

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