

***Gloriosa Superba* – an Endangered plant spotted for the first time from forest of Topchanchi, Hazaribag (Jharkhand) India**

Hari Shankar Lal and P K Mishra

P. G. Dept of Botany, Vinoba Bhave University, Hazaribag, Jharkhand- 825301
lal_harishankar@yahoo.com

ABSTRACT

Gloriosa Superba is generally found in western parts of Tamilnadu and Kerela India. It is critically endangered hence IUCN has placed it in “red data book” recently this species has been spotted for the first time in Topchanchi and Hazaribag District. This is first report of this endangered plant from Jharkhand. *Gloriosa superba* is one of the poisonous plants. Ingestion of *Gloriosa superba* tubers causes severe and potentially fatal toxic effects.

Keywords: *Gloriosa superba*, endangered plant

INTRODUCTION

Gloriosa superba derives its name *Gloriosa* from the word “Glorious”, which means handsome and *superba* from the word “superb” Means splendid or majestic kind. This plant has been a source of medicine right from the ancient time. So many books and articles have been written so far on the medicinal and other values of this plant. It is one of the most popular herbs.

Study area

The Topchanchi Wildlife Sanctuary covers a sprawling plot that measures approximately 8.75 square kilometers. The latitudes of Topchanchi is 23° 54' 0" N and latitudes 86° 12' 0" E. Hazaribagh wild life sanctuary is situated in Hazaribagh dist of Jharkhand state. It lies 20 km from district Head quarter on NH33. The sanctuary spreads 186.25 Sq km areas and lies Latitude 23°17'00":24°22'30" Longitude 85°03'00": 85°25'45".

Plant profile

Gloriosa superba L. Sp. Pl. 305. 1753; Wight, Ic. 6: 25. t. 2047. 1853; Hook. f. Fl. Brit. India 6: 358. 1892; Duthie, Fl. Gangetic Pl. 3: 262. 1920.



Family: Liliaceae

Taxonomic Description: Erect perennial, tuberous, scandent or climbing herbs; grasp with tendrils formed at the tip of the leaves. Stem soft, Leaves sessile, spirally arranged or sub-opposite, 6-7 x 1.5-1.8 cm, lanceolate, acuminate, entire, glabrous; the upper ones with cirrhose tips. Flowers axillary, solitary, large, borne on long, spreading pedicels, actinomorphic, hermaphrodite; perianth segments 6, free, lanceolate, keeled within at base, long-persistent, yellow in lower half, red in upper half; stamens 6, spreading, hypogynous; anthers extrose, medifixed, versatile, opening by longitudinal slits; ovary superior, 3-celled; ovules numerous; style deflected at base, projecting from the flower more or less horizontally. Capsule 2-3 cm long, oblong. Seeds numerous, subglobose, black (Smith 1979; Floridata 2004) The fruit is oblong containing about 20 globose red colored seeds in each valve (Huxley 1992; Neuwinger 1994; Burkill 1995). Fl. & Fr.: September-March.

English Name: Climbing-lily, Creeping-lily, Flame-lily, Glory-lily, Gloriosa lily, Tiger claw

Sanskrit Names: Langli, Kalikari, Ailni, Agnisikha, Garbhaghatini, Agnimukhi

Local Names in India: Kalihari, Kathari, Kulhari, Languli (Hindi); Bishalanguli, Ulatchandal (Bengali); Dudhio, Vacchonag(Gujarati); Indai, Karianag, Khadyanag (Marathi); Karadi, Kanninagadde (Kannada); Adavinabhi, Kalappagadda, Ganjeri (Telugu); Mettoni, Kithonni (Malayalam); Kalappai-Kizhangu, Kannoru (Tamil); Ognisikha, Garbhoghhatono, Panjangulia, Meheriaphulo (Oriya); Kariari, Mulim (Punjabi) (CSIR,1948-1976).

Common Names in World: Flame lily, Isimiselo, Vlamlelie, Riri vavai-moa.

Habitat

The plant grows in sandy-loam soil in the mixed deciduous forests in sunny positions. It is very tolerant of nutrient-poor soils. It occurs in thickets, forest edges and boundaries of cultivated areas in warm countries up to a height of 2530 m. It is also widely grown as an ornamental plant in cool temperate countries under glass or in conservatories (Neuwinger 1994, Inchem 2004).

The sap from the leaf tip is used for pimples and skin eruptions. Tribals of Jharkhand apply the powder of rhizome with coconut oil in skin eruptions and related diseases for 5 days. This combination is said to be effective in snake and scorpion bites too. Tribals crush roots of the plant in water and apply on head for curing baldness. To avoid painful delivery, Birhors of Jharkhand, apply rhizome extract over the navel and vagina. It induces labour pain and performs normal delivery. Viadhyas (local healers) generally prescribe 250 to 500 mg of the rhizome as dosage. According to viadhyas of Jharkhand, this dose may lead to abortion if given to a lady with pregnancy of 1 or 2 months. Since the rhizome is having abortive action, this is prescribed for normal delivery. Duke (1985) has also reported the abortifacient action of the plant rhizome. In Gaidubba, juice of the leaves is given to kill the lice.

In traditional medicine system, tuber is used for the treatment of bruises and sprains (Rastogi and Mehrotra 1993), colic, chronic ulcers, hemorrhoids, cancer, impotence (Nadkarni 1978), nocturnal seminal emissions and leprosy. Many cultures believe the species to have various magical properties (Watt and Breyer-Brandwijk 1962, Neuwinger 1994, Burkill 1995). The plump roots of the plant have been used in the treatment of parasitic skin infections, leprosy, and internal worms (Mutshinyalo 2001, Dhushara 2004). In Ayurveda and Yunani systems of medicine, the tuber of plant is well known due to its pungent, bitter, acrid, heating, anthelmintic, laxative, alexiteric and abortifacient nature. It is widely used in the treatment of ulcers, leprosy, piles, inflammations, abdominal pains, intestinal worms, thirst, bruises, infertility and skin problem (Kirtikar and Basu 1935, THDC 2002). However, ingestion of all parts of the plants is extremely poisonous and can be fatal (Senanayake and Karalliedde 1986).

Chemical components:

Studies reveal that all parts of the plant, especially the tubers are extremely toxic due to the presence of a highly active alkaloid, Colchicine. The species also contains another toxic alkaloid, Gloriosine (Gooneratne 1966, Angunawela and Fernando 1971). Other compounds such as lumicolchicine, 3-demethyl-N-deformyl-N-deacetylcolchicine, 3-demethylcolchicine, N-formyldeacetylcolchicine have been isolated from the

plant (Chulabhorn *et al.* 1998). Another important alkaloid called gloriosine is also found in tubers (Gooneratne 1966).

Colchicine:

CAS number: 64-86-8
Molecular formula: C₂₂H₂₅NO₆
Molecular weight: 399.44
Structural name: colchicine

Toxic effect:

A pale yellow to greenish yellow alkaloid Colchicine is mainly responsible for the toxic effect. The toxins in *G. superba* have an inhibitory action on cellular division resulting in diarrhoea, depressant action on the bone marrow and alopecia. After ingestion of tubers, initial symptoms develop within two to six hours. Intense vomiting, numbness and tingling around the mouth, burning and rawness of the throat, nausea, abdominal pain and bloody diarrhoea leading to dehydration etc. are some of the primary symptoms developed initially in the victim. The other important complications include respiratory depression, shock, hypotension, marked leucopenia, thrombocytopenia, coagulation disorders, oliguria, haematuria, confusion, seizures, coma and ascending polyneuropathy. Alopecia and dermatitis are the late manifestations that develop about one to two weeks after poisoning (Inchem 2004). Clinical and toxicological observations were made by various workers time to time (Gooneratne, 1966; Dunuwille *et al.* 1968, Angunawela and Fernando 1971, Murray *et al.* 1983, Kimberly 1983, Saravanapavanathan 1985, Craker and Simson 1986, Wijesundere 1986, Ellenhorn *et al.* 1996, Inchem 2004). All parts of the plant, especially the tubers, are extremely poisonous. Colchicine, an alkaloid, is responsible for the toxic effect of *G. superba*. The species also contains another alkaloid 'gloriosine'. The toxic properties of the plant are essentially due to the highly active alkaloid colchicine.

Colchicine occurs as pale yellow to greenish yellow, odourless crystals or amorphous scales or powder. It darkens on exposure to light. Other physico-chemical characteristics Melting point is 157°C Solubility in water is about 1/20. It is freely soluble in alcohol and chloroform (Windholz 1983).

In addition to colchicine and gloriosine, *G. superba* also contains other compounds such as 3-desmethyl colchicine, beta-lumicolchicine, N-Formyldeacetyl-colchicine, 2-desmethyl colchicine, chelidonic acid and salicylic acid (Duke 1985).

Colchicine affects cell membrane structure indirectly by inhibiting the synthesis of membrane constituents (Craker and Simson 1986). It binds to tubulin (the structural proteins of microtubules)

preventing its polymerization into microtubules. This antimiotic property disrupts the spindle apparatus that separates chromosomes during metaphase. Cells with high metabolic rates (e.g. intestinal epithelium, hair follicles and bone marrow) are the most involved by the arrest of mitosis. The variable effects of colchicine may depend on its binding to the protein subunit of microtubules with subsequent disruption of microtubule function (Ellenhorn *et al.* 1996). Colchicine also has an inhibitory effect on various phosphatases (Craker and Simson 1986). Gloriosine also has an antimitotic effect (Gooneratne 1966).

Conclusion:

G. superba produces two important alkaloid colchicine and gloriosine, which are present in seeds and tubers. It is conventional drug for gout obtained from corms of *G. superba*.

Gloriosa superba is a commercially imperative medicinal plant which has diverse medicinal applications and eventually due to over-exploitation this plant is facing local extinction. It has been affirmed as endangered plant by IUCN and hence there is a pressing need to conserve the plant by *in situ* and *ex situ* multiplication in general and micropropagation in particular so as to meet the ever increasing demand from the industries.

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There is a greater need of a Community-based Approach in conservation. Awareness among the local community is one the most important task. For this, various activities like poster presentation, campaigns, educational pamphlets and slogans can be applied. A society can be made in the villages that will look after the conservation of important medicinal and economical plants. Universities, Colleges, NGOs and other agencies should come forward and adopt a village of their respective region. These organizations can play a vital role in conservation of important medicinal plant. A medicinal plant garden/ herbal garden and green house can be made in the village itself. At one side there is need of *Ex-situ* and *in-situ* conservation, on the other hand, preservation of traditional Ethno-medicinal-botanic knowledge is highly needed. Local healers of targeted area should be encouraged and given support time to time.

Gloriosa superba is believed as most important herb that is exported, and collection of seeds and roots for the foreign market is causing a shortage of raw material for local drug industries in India. If endangered plants like *G. superba* are allowed to become damaged through excessive collection, a whole series of traditional medicines and plants which have been in use for thousands of years will be threatened. It is therefore need of the hour to come forward and rescue this important glorious herb of Jharkhand. Active participation from everyone is highly needed specially people from Hazaribag, Giridih and Dhanbad district.

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