Chapter Two
Plant Review
&
Literature Review

Figure 2.1: *Ampelocissus barbata* plant

2.1 Scientific name

- *Vitis barbata* [35]

2.2 Synonym

- Ampelocissus barbata wall. Planch
- Vitis barbata wall. Planch
- Vitis latifolia- Ham. ex Wall. [35]

2.3 Information about *Ampelocissus barbata*

Ampelocissus barbata, a species of liana in the grape family Vitaceae, is a fascinating subject of study in the realm of botany. This plant species was originally described from Sylhet, presently in Bangladesh, by Nathaniel Wallich and was formerly classified in the genus Vitis. In 1884, the species was reassigned to the Ampelocissus genus by Jules Émile Planchon. [36]

2.4 Common name

- Lepcha - Mikrum-rik
- Nepali - Jarila laha [37]

2.5 Taxonomy

Ampelocissus barbata	
Scientific classification	
Kingdom:	Plantae
Clade:	Tracheophytes
Clade:	Angiosperms
Clade:	Eudicots
Clade:	Rosids
Order:	Vitales
Family:	Vitaceae
Genus:	*Ampelocissus*
Species:	***A. barbata***
Binomial name	
Ampelocissus barbata (Wall.) Planch.	

2.6 Location

Within Bangladesh, the plant grows widely in the forests of Chittagong, Chittagong Hill Tracts, Tangail and Sylhet (Flora of Bangladesh, 2019). [37]

2.7 Distribution Area

- Global Distribution

India, Bhutan, Bangladesh, Myanmar, Thailand, Laos and Vietnam.

- Indian Distribution

Assam, Uttar Pradesh, West Bengal, Arunachal Pradesh, Nagaland, Mizoram, Tripura, Meghalaya, Sikkim, Andaman Isl. (Middle Andaman Isl., South Andaman Isl.), Nicobar Isl. (North Nicobar Isl.) [38]

2.8 Morphology

Trees up to 15 m tall; bark smooth, grey; branches stiff and stout; young shoots, petioles and main nerves strigose. Leaves simple, alternate distichous; stipular spines 1 or 2, ca. 0.4-0.6 cm, erect, caducous; petiole ca. 0.5-1.1 cm, brownish pilose; lamina ca. 5.5-14 x 2-6 cm, ovate or ovate-oblong, rounded or acute at base, acute to acuminate at apex, margin serrulate with hard brown point, unequal, glabrous, shining above, hairy on nerves beneath, membranous, black on drying; secondary nerves 5 pairs. Inflorescences in dichotomous cymes with 5-10 flowers; peduncles ca. 1.5 cm long; Flowers ca. 0.5 cm across; pedicels ca. 0.2 cm long; bract ovate; calyx lobes ca. 0.2-0.25 cm long, deltoid, keeled up to the middle, acute, rusty tomentose without, glabrous within; petals ca. 0.1-0.15 cm long, subcucullate, convex at distal end; stamens equal to petals; anthers dorsifixed; disc 10-lobed, glabrous; ovary bicarpellary; stylar arms straight. Drupe ca. 1-1.2 × 0.8-1.1 cm, red-brown at maturity, subglobose or globose-ellipsoid, glabrous, with persistent calyx tube and disk at base; fruiting pedicel ca. 0.4-1.1 cm, pilose; mesocarp thin; endocarp ca. 0.3 cm, thickly cartilaginous, 2-loculed. Seeds 1-2, black-brown, shiny, smooth, compressed. [39]

Branches petioles and peduncles covered with numerous long spreading glandular capitate hairs, leaves cordate-ovate membranous, peduncle flattened 4-8 in . bearing a long forked slender tendril above its middle, cymes regularly paniculate as long as the peduncle. Branches stoutish, hollow, dark brown or nearly black. Leaves 8 in.-1 ft. or more, roundly cordate-ovate, sinuate-dentate, sometimes sublobed, at length glabrous above, puberulous or densely tomentose beneath. Flowers sessile in large lax ovate paniculate cymes. Fruit the size of a large currant, black, shortly pedicellate. Seed 2/5 by 1/4 in., elliptic, the back flattish and shallowly grooved, the face rather sharply ridged, nearly smooth. --- A very distinct species, known at once by the long spreading black hairs. Wallich describes the flowers as being 4-cleft, but although they may be so sometimes it is certain that they are generally pentamerous. [39]

2.9 Natural history

Flowering & Fruiting: March-September. [39]

2.10 Traditional uses

Ampelocissus barbata (Wall.) Planch. Climber. Vitaceae. Jarila lahara (Li). Plant: Juice given to treat sores in mouth and tongue of milk sucking baby. *Ampelocissus barbata* is used as a medicinal plant by the tribes of the Island. [40]

2.11 Habitat

Ampelocissus barbata is native to eastern North America, from southern Quebec to Florida and west to Texas. It can be found in a range of environments, including woodlands, forests, thickets, and riverbanks. [40]

2.12 Literature Review

The Phytotoxic potential of plants and their constituents against other plants is being increasingly investigated as a possible alternative to synthetic herbicides to control weeds in crop fields.

(Md Monirul Islam et al., 2020) shows that *Ampelocissus Barbata (Wall.)* that the methanolic extract of the plant has DPPH Radical Scavenging, Reducing Power and Antioxidant activity as compared to standard Ascorbic acid. Phenolic compounds are present in plants, have antioxidant activity due to their redox properties, and therefore play a vital role in counterbalancing the free radicals.

With regards to reducing capacity, higher reducing powers might be attributed to higher amounts of Total Phenolic and low Flavonoid, and the Reducing Power of a compound may reflect its Antioxidant potential.

Further comprehensive Phytochemical study for the isolation and characterization of the specific compound is required to get a more potent agent with significant activity. Since the Polyphenol compounds as well as other components with potent Antioxidant activity are not known, thus advanced level of work should be performed for the isolation and identification of the Antioxidant components in *Ampelocissus barbata.*

Stress and pertaining counterbalance mechanism are actively working in the living organisms. The overproduction of Reactive Oxygen Species (ROS) in the ongoing equipoising process requires to be compensated by strong Antioxidants. Plants as a rich source of Antioxidants not only reduce oxidative stress but also possess cytotoxic, thrombolytic and phytochemical potentials. Assessment of the in vitro Antioxidant activity of extract was carried out using DPPH Radical Scavenging Assay, determination of Reducing Power Capacity and Total Phenolic Content. Phytochemical Reagent test for alkaloids; Dragendroff's test, test for Reducing Sugar; Benedict's Reagent, Fehling's Solution A & B reagent, test for carbohydrates; Ferric Chloride (5%) Solution, Potassium Dichromate (10%) Solution, test for

Flavonoids; Froth tests, test for Saponins, test for Carbohydrates/ Gums and test for Proteins-Xanthoprotein.

Statistical analysis used: The statistical analysis was carried out using GraphPad Prism and Microsoft excel. Appreciable DPPH radical scavenging activity of the extract was observed with the IC_{50} value of 23.87 µg/ml. A significant correlation was found between the standard ascorbic acid (AA) and the plant extracts at the $p<0.05$ for the reducing power assay where, the activity increased with the concentration of the extracts and the highest absorbance value was 3.025±0.15 and 1.826±0.006 for the AA and the extracts respectively. The plant also accommodates a considerable amount of Polyphenols, reflected in the value of gallic acid equivalent 277.397±0.419 mg/ml. The study revealed the presence of Phytochemicals namely Tannins (Ferric Chloride) & Proteins & Xanthoprotein.

The study disclosed the promising in vitro activity of the *Ampelocissus barbata* plant, which necessitates the further analysis for the isolation and evaluation of the active principles.