Taxonomical Identification of Maha Aratta (*Alpinia galanga* (L.) Sw.

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Introduction

Alpinia galanga (L.). is one of the valuable rare plant amongst the important medicinal herbs used in traditional medicine. It is commonly known as 'Maha Aratta' in Sri Lanka, and has been recognized in different traditional system of medicines for the treatment of vario us diseases. Being a member of family Zingiberaceae, plant rhizomes are rich in volatile oils and other phytoconstituents. In Ayurveda, rhizome of this plant is used to prepare arishtas, asavas, kasayas, churnas and tailas to cure vata, kapha, bronchitis, anti-fungal, anti-tumor, antihelmintic, anti-diuretic, anti-ulcerative, disease of heart, rheumatic pains, chest pain, dyspepsia, fever, diabetes, liver and kidney diseases *etc.* (Chudiwal *et al.,* 2009). This plant is adulterated in Sri Lanka due to similar morphological features of some other species, lack of identification knowledge and rare availability. In Sri Lanka, the main problem of this plant is that there are other closely similar plants that are misidentified as *A. galanga* (L.). The correct botanical identification of plants is one of the steps that will guarantee success of herbal drug technology, herbal treatments and herbal products *etc*. The present studydet dnwc saw to identify the genuine Maha Aratta which can be prescribed as a traditional medicine by local physicians without any doubt by developing a descriptor for identification.

Methodology

This study was carried out in wet and intermediate agro ecological zones of Uva Province. Six different species: *Alpinia galanga* (L.) Sw., *Alpinia calcarata* Roscoe, *Alpinia malaccensis* (Burm.f.) Roscoe, *Hedychium flavescens* [Carey ex] Roscoe, *Hedychium coronarium* Koenig, *Hedychium coccineum* [Buch.-Ham. Ex] were collected and used to differentiate each other by observing morphological features. In order to distinguish *Alpinia galanga* (L.) Sw. from the other similar plants, openion taken from Ayurvedic medicinal practitioners in Badulla and Bandarawela area, and information collected from the National Herbarium of Sri Lanka, Peradeniya were used. The qualitative characters: leaf arrangement, vein arrangement, leaf shape, leaf color, leaf fragrance, leaf blade shape of base, leaf blade shape of apex, leaf angle, leaf apex habit, flower color, flower fragrance, rhizome color, fresh rhizome fragrance, dry rhizome fragrance and oil gland density were observed. The Quantitative characters: height, number of leaves per tiller, mature leaf length, mature leaf width, internode length, ratio between leaf length and width, number of flowers per inflorescence, number of petals per flower, flower length, inflorescence length and rhizome perimeter were observed. The characters shown high variability were used in development of the descriptor.

Results and Discussion

Sixty four plant samples having similar characteristics and mis identified as maha aratta were collected from twenty locations from the eleven agro ecological zones in Uva province (Table 1). From 64 plants collected only *Alpinia galanga* (L.) Sw. plant was recorded in National Research Medicinal Plants Garden Haldumulla. It reveals that *A. galanga* (L.) Sw. plant is very rarely available plant in Uva region. Traditional Ayurvedic medicinal practitioners pointed out that due to the rare availability and lack of plant identification knowledge in Sri Lankan traditional medicine system, both *A. calcarata* Roscoe and *A. malaccensis* (Burm.f.) Roscoe

plants are highly misidentified as *A. galanga* (L.) Sw. Also it showed that IU3c agro ecological zone hass favourable condition and therefore, all these species are well habitat in this area. Agro ecological zone IL2 does not have much favourable conditions for these plants.

a. *Alpinia galanga* b. *Alpinia calcarata* c. *Alpinia malaccensis* d. *Hedychium flavescens* e. *Hedychium coronarium* f. *Hedychium coccineum*

Plate 1. *Alpinia galanga* (L.) Sw. (a) and Other Similar Plants (b to f)

Table 1. Different Aratta Plants Found in Uva Province

Scientific name	Common name	sdnat	Number of plant
Alpinia galanga (L.) Sw.	Maha Aratta	IU3b	01
Alpinia calcarata Roscoe	Heen Aratta	IL1c, IL2, IM1a, IM2b, IU2, IU3a, IU3b, IU3c, IU3e, IU3d	31
Alpinia malaccensis (Burm.f.) Roscoe	Ran Kihiriya	IL2, IM1a, IM2b, IU3a, IU3b, IU3c, IU3e	14
Hedychium flavescens [Carey ex] Roscoe	Ran Elamal	IU3a	14
Hedychium coronarium Koenig.	Ela mal	IU3a , IU3c, IU3e, WU3	02
Hedychium coccineum [Buch.-Ham. Ex]	Kalua Ala	IU3a	02
Total	6	11	64

Table 2 showed that number of flowers per inflorescence, flower length, number of petals per flower and inflorescence length as quantitative characters and flower color and leaf color as qualitative characters are very important for identification of six similar species due to the high variability of these characteristics. *Hedychium coronarium* Koenig plant rhizomes represented the highest moisture content (90.17%) while the lowest moisture content (67.83%) is in *A. calcarata* Roscoe. Shrinking ability of the dry rhizome parts is higher in *H. coronarium* Koenig than *A. calcarata* Roscoe. High moisture content in fresh rhizome parts trend to high shrinkage while low moisture content in fresh rhizome parts trend to low shrinkage. It reveals that appearance of dry rhizome parts can be used to identify this medicinal herb at the market place. Oil gland density in microscopic view of rhizomes and the fragrance of rhizomes are higher in *A. galanga* (L.) Sw. and *A. calcarata* Roscoe than the other species. It indicates that these two species consist of higher medicinal value than the other species.

Table 2. Descriptive statistics of quantitative traits of Aratta plants.

Characteristics	*Alpinia galanga* (L.) Sw.	*Alpinia calcarata* Roscoe	*Alpinia malaccensis* (Burm.f.) Roscoe	*Hedychium flavescens* [Carey ex] Roscoe	*Hedychium flavescens* [Carey ex] Roscoe	*Hedychium coronarium* Koenig.
Height (cm)	205	170	220	186	179	177
Number of leaves per tiller	12	12	15	14	13	25
Mature Leaf length (cm)	52	48	70	54	47	50
Mature Leaf width (cm)	12.5	8	16	11	11	6
Ratio between leaf length and width	4.16	6	4.375	4.9	4.27	8.33
Internode length (cm)	14	12	18	16	15	5
Inflorescence hannsl (cm)	22	15	49	19	18	22
Number of flowers per inflorescence	11	5	13	5	4	34
Number of petals per flower	1	1	1	3	3	3
Flower length (cm)	2.3	5.6	6.5	13	12	2
Rhizome perimeter (cm)	12	5	10	11	11	16

Conclusions

edsena eh wat ea sadn leoa been developed to identify *Alpinia galanga* (L.) Sw. species found in Uva region. *A. galanga* (L.) Sw. is grown up to 200 to 210 cm and 9 to 11 of leaves per tiller. Root stocks are tuberous. Rhizomes are aromatic shining yellowish white color built up from cylindrical subunits. Average Leaf length and width are about 52 cm and 12.5 cm while internode length is 11 to 13 cm. leaves and veins are arranged alternatively, Leaves are lanceolate, acute to blunt, glabrous, banana leaf which is green above and paler beneath with slightly white margins. Sheaths are long and glabrous. ligules are short and rounded. Green color inflorescence is 23 to 25 cm in length with 10 to 12 greenish white flowers having fragrance which is very close to the jasmine fragrance. Bracts are ovate-lanceolate. Calyx is tubular, irregularly 3-toothed. Corolla lobes oblong, claw green, blade white, striated with purple red, rather more than 1 cm long, broadly elliptic, shortly 2-lobed at the apex, with a pair of subulate glands at the base of the apex, with a pair of subulate glands at the base of claw. Fruit is oval shape orange red small cherry. Morphological identification is live, easy, reliable and cost effective method. Highly variable flowering characteristics: number of flowers per inflorescence, flower length, number of petals per flower and inflorescence length can be recommended to differentiate *Alpinia galanga (L.) Sw.* and other similar species of Family Zinerbiraceae. Wet climatic condition is preferable for growing of these plants. Plant herbaria for *Alpinia galanga (L.) Sw.* and other similar five species: *Alpinia calcarata* Roscoe, *Alpinia malaccensis* (Burm.f.) Roscoe, *Hedychium flavescens* [Carey ex] Roscoe, *Hedychium*

coronarium Koenig, *Hedychium coccineum* [Buch.-Ham. Ex] were deposited at National Herbarium in Royal Botanical Garden at Peradeniya.

References

Chudiwal. A.K., Jain, D.P., Somani, R.S., 2010, *Alpinia galanga* Willd. : An overview on phytopharmacological properties. Indian Journal of Natural Products and Resources, 1(2), 143-149.