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Review of Yemeni Endemic Aloes

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Abstract:

For thousands of years, plants have been an important source of medicine in pharmaceutical biology. As per WHO, 80% of the population today relies on traditional medicine. The genus Aloe, family Asphodelaceae (Xanthorrhoeaceae), is a collection of flowering succulents consisting of over 500 known species, including *Aloe vera*, *Aloe barbadensis*, *Aloe ferox*, *Aloe chinensis*, *Aloe indica*, *Aloe perryi*, etc. *A. perryi*, also known as Perry's aloe, is endemic to the island of Socotra in Yemen. Its natural habitat is the dry rocky areas. Chemically, Aloe possesses various pharmacologically important compounds, such as essential oils, alkaloids, amino acids, anthraquinone glycosides, glycoproteins, vitamins, minerals, and lectins.

INTRODUCTION

Aloe is a plant in the *Liliaceae* family that has long been utilized in traditional medicine (Jangra *et al.*, 2022). Aloe is a widely distributed genus in eastern and southern Africa that extends north to Sudan, but it is only known from southwest Arabia in Asia. Several studies confirmed that plants can be used to produce therapeutics (Iqbal and Ashraf, 2018; Shahzad *et al.*, 2017). There is a lot of diversity, as seen by the numerous documented species (Table 1). One of the difficulties of studying Aloe has been the shortage of herbarium material (Bachman *et al.*, 2020). Most collectors avoid Aloe because of the succulent leaves, and many of those who have tried to make specimens have only collected inflorescences (Martínez-Sánchez *et al.*, 2020; Wood, 1983).

Description

It is very distinct species with a stout, erect stem to 3 m high and long (60-80 cm) pendulous leaves with whitish teeth. The inflorescence is branched with broad, red-brown perianths. *Aloe squarrosa* has smooth, green, spotted leaves that curve backward. These recurved leaves are kept only around the head or top of each stem, with dead leaves falling off the lower parts of the stem. The inflorescence is short and simple, and the flowers are light orange with green tips (Wood, 1983; Egli *et al.*, 2001; Carter *et al.*, 2011).

It has a trailing stem up to 1 m in length and broad red-violet leaves with distinctive deflexed tips. The inflorescence is sparingly branched, and the racemes are very dense with short pedicels. Aloe with underground sucking ability creates colonies of bright yellow-green, very upright, plants on little stalks, the leaf is relatively thin for aloe and only slightly tooth along the margins. The flower is simple, tall dark pink in winter (Govaerts, 2011; Grace *et al.*, 2011). The leaves are green in color, succulent and thick, and with spines. The roots are fibrous and the flowers are yellow to orange-red (Retief, 2013; Govaerts, 2011).

Plant with sub-distichous leaves, narrowly finger-like, sheathed, and scattered along the stem.

The flowers are yellow, hanging down from the ascending peduncle. A small plant with decumbent or pendant stems up to 20 cm long, often suckering (Wood, 1983; Egli *et al.*, 2001).

It is a stemless, non-pendulous plant, its leaves are large, slightly channeled, recurved at the tips, and strongly toothed (dentate) along their margins. The flower color is brick-red with greenish-yellow tips. Short-stemmed, with massive leaf rosettes recalling those of *A. tomentosa*. Inflorescence branched; perianths red with yellowish tips, white-pubescent; bracts 8-10 mm long (Blitzke *et al.*, 2001). Inflorescence comprises 3-5 branches, flowers dull red or pink with a conspicuous waxy bloom. Main flowering period-October November flowers are distinctly fuzzy and plants sometimes sucker both blooms at the same time of year with the same-colored flowers. Leaves are a dull grey, green normally, with a brownish tinge. Leaves are flattish, wide at the base, and have sharp teeth (Egli *et al.*, 2001).

Aloe jawiyon leaves are curved, and canaliculate, and have a creamy, greenish-yellow khaki color. The inflorescence is short, unbranching, and starts horizontally. The flowers are orange with green tips. A very distinct species; acaulescent or with a short stem up to about 30 cm, often suckering to form small groups. The entire, light-green leaves are strongly distichous when young. The inflorescence is much branched with red or yellow perianths which are strongly constricted above the ovary (Wood, 1983; Egli *et al.*, 2001).

Aloe fleurentinorum is called Yemeni Brown Aloe, a stemless plant up to 2 feet tall with rosettes to 2 to 3 feet wide thick recurving very dark olive-green leaves. Flowering is a branched inflorescence holding reddish-pink flower stemless, usually solitary, to somewhat suckering (less often) rosettes of very stiff, inflexible pale green to yellowish, upright leaves. Full sun drought-tolerant species. Solitary, stemless, leaves 35x10 cm, unspotted, grey-green, brown sharp teeth max 4 mm and 10-15 mm apart. Inflorescence 40-70 cm, 3-5

branches, flowers scarlet (Retief, 2013; Govaerts, 2011).

Aloe austroarabica is distinguished by its very short bracts (5 cm long) and perianths which are coarsely hirsute towards the apex. Unlike all other species in the group, both red and yellow color forms are about equally frequent. Aloe with mostly solitary or dichotomously branching rosette leaves that have green teeth that darkens with age. The inflorescences, bear waxy

greenish-yellow flowers this is a stemless, unspotted aloe (though spotted when very young sometimes), yellow flower species. The flower starts out pointing horizontally but droops very close to the stem once it matures (Wood, 1983; Egli *et al.*, 2001; Carter *et al.*, 2011). Table 2 and Figure 1 illustrate different Aloe plants found in Yemen.

Table 1. Yemen Endemic Aloes.

| | |
|---|---|
| <i>Aloe abyssicola</i> Lavr. & Bilaidi | <i>Aloe menachensis</i> (Schweinf.) Blatter |
| <i>Aloe austroarabica</i> Lavr | <i>Aloe niebuhriana</i> Lavr. |
| <i>Aloe castellorum</i> J.R.I. Wood | <i>Aloe perryi</i> Baker |
| <i>Aloe doei</i> var. <i>lavranosii</i> (<i>Aloe splendens</i>) | <i>Aloe pendens</i> Forssk |
| <i>Aloe eremophila</i> Lavr. | <i>Aloe rivierei</i> Lavr |
| <i>Aloe fuller</i> Lavr. | <i>Aloe rubroviolacea</i> Schweinf. |
| <i>Aloe inermis</i> Forssk | <i>Aloe serriyensis</i> Lavr. |
| <i>Aloe irafensis</i> Lavranos, Al-Gifri & McCoy | <i>Aloe squarrosa</i> Balf.f. |
| <i>Aloe jawiyon</i> Christie, Hannon (<i>soqotri</i>) | <i>Aloe splendens</i> Lavr. |
| <i>Aloe lavranosii</i> Reynolds | <i>Aloe tomentosa</i> Deflers. |
| <i>Aloe until</i> Baker | <i>Aloe vacillans</i> Forssk. (<i>A. audhalica</i> , <i>A. dhalensis</i>) |

Table 2. Yemen endemic aloes.

| Name of Aloe | <i>Aloe abyssicola</i> Lavranos et. S Bilaidi | <i>Aloe austroarabica</i> Lavr | <i>Aloe castellorum</i> J.R.I. Wood 1983 | <i>Aloe doei</i> Lavranos 1965, J. South Afr |
|--------------|--|-----------------------------------|---|---|
| Kingdom | Plantae | | | |
| Order | Asparagles | | | |
| Genus | Aloe | | | |
| family | Xanthorrhoeaceae | | | |
| Species | <i>A. abyssicola</i> | <i>A. austroarabica</i> | <i>A. castellorum</i> | <i>A. does</i> |

| | | | | |
|---------------------|--|--|---|---|
| Distribution | Yemen, Jabal Al Arrays | Yemen | Yemen and Saudi Arabia Hajjah, Mahabishah, Shahrarah, Razih and Marran | in South Yemen |
| Cultivation | rare plant but easy to grow | _____ | _____ | _____ |
| Reference | (Wood, 1983; Egli <i>et al.</i> , 2001; Carter <i>et al.</i> , 2011) | (Govaerts, 2011; Grace <i>et al.</i> , 2011) | (Wood, 1983; Egli <i>et al.</i> , 2001) | |
| | | | | |
| Name of Aloe | <i>Aloe eremophila Lavranos (1965)</i> | <i>Aloe fulleri Lavranos 1967</i> | <i>Aloe fleurentinorum Lavranos 1977</i> | <i>Aloe irafensis Lavranos (2008)</i> |
| Kingdom | Plantae | | | |
| Order | Asparagles | | | |
| Genus | Aloe | | | |
| Family | Xanthorrhoeaceae | | | |
| Species | <i>A. Eremophila</i> | <i>A. Full</i> | <i>A. Fleurentinorum</i> | <i>A. Irafensis</i> |
| Distribution | Yemen (Hadramaut) | Yemen | Yemen, Wadi Dahr | Yemen |
| Cultivation | Common, but easy to grow. | Very rare in cultivation | _____ | Very attractive and rare. |
| Reference | (Wood, 1983; Egli <i>et al.</i> , 2001) | | | Govaerts, 2011; Grace <i>et al.</i> , 2011) |

| | | | | |
|---------------------|---------------------------------|--|--------------------------------------|-------------------------------|
| Name of Aloe | <i>Aloe inermis Forssk 1775</i> | <i>Aloe jawiyon Christie, Hannon (soqotri)</i> | <i>Aloe lavranosii Reynolds 1964</i> | <i>Aloe luntii Baker 1894</i> |
| Kingdom | Plantae | | | |
| Order | Asparagles | | | |
| Genus | Aloe | | | |
| | Xanthorrhoeaceae | | | |

| | | | | |
|---------------------|---|--|-----------------------------------|--|
| Species | <i>A. inermis</i> | <i>A. jawiyon</i> | <i>A. lavranosii</i> | <i>A. luntii</i> |
| Distribution | Yemen, Taiz | It is endemic to the island of Socotra, Yemen. | native of Yemen | Oman, Somalia, Yemen |
| Cultivation | _____ | _____ | _____ | Rare |
| Reference | (Wood, 1983; Eggli <i>et al.</i> , 2001) | (Govaerts, 2011; Grace <i>et al.</i> , 2011) | (Retief, 2013; Govaerts, 2011) | (Grace <i>et al.</i> , 2011). |
| | | | | |
| Name of Aloe | <i>Aloe menachensis</i> (Schweinf.) Blatt. 1936 | <i>Aloe niebuhriana</i> Lavranos 1965 | <i>Aloe pendens</i> Forsskål 1775 | <i>Aloe perryi</i> Baker 1881 |
| Kingdom | Plantae | | | |
| Order | Asparagles | | | |
| Genus | Aloe | | | |
| Family | Xanthorrhoeaceae | | | |
| Species | <i>A. menachensis</i> | <i>A. niebuhriana</i> | <i>A. pendens</i> | <i>A. perry</i> |
| Distribution | Yemen (Hadramaut) | Yemen | Hadiyah and Kusmah, Yemen | Perry's aloe is endemic to the island of Socotra in Yemen. |
| Cultivation | Yemen, Haraz, Murmur | _____ | _____ | _____ |
| Reference | (Eggli <i>et al.</i> , 2001) | | | (Wood, 1983; Eggli <i>et al.</i> , 2001; Park and Lee, 2006) |

| | | | | |
|---------------------|--|---|--|--|
| Name of Aloe | <i>Aloe rivierei</i> Lavranos & L.E.Newton 1977 | <i>Aloe rubroviolacea</i> Schweinf 1894 | <i>Aloe serriyensis</i> Lavranos 1965 | <i>Aloe squarrosa</i> Baker 1883 |
| Kingdom | Plantae | | | |
| Order | Asparagles | | | |
| Genus | Aloe | | | |
| | Xanthorrhoeaceae | | | |
| Species | <i>A. riviera</i> | <i>A. rubroviolacea</i> | <i>A. serriyensis</i> | <i>A. squarrosa</i> |
| Distribution | Yemen ,Taiz cites , Hujariyah ,Sumarah ,Shaharah | Yemen, the summit of Jabal Shibam, Manaka | Yemen. (Jebel Arrays) | endemic to the island of Socotra, Yemen |
| Cultivation | _____ | _____ | _____ | It is relatively rare to cultivating |
| Reference | (Wood, 1983; Eggli <i>et al.</i> , 2001) | (Blitzke <i>et al.</i> , 2001) | (Eggli <i>et al.</i> , 200). | (Govaerts, 2011; Grace <i>et al.</i> , 2011) |
| | | | | |
| Name of Aloe | <i>Aloe sabaea</i> Schweinf 1894 | <i>Aloe tomentosa</i> Deflers 1889 (hairy green Aloe) | <i>Aloe vacillans</i> Forssk. 1775 | <i>Aloe yemenica</i> J.R.I. Wood 1983 |
| Kingdom | Plantae | | | |
| Order | Asparagles | | | |
| Genus | Aloe | | | |
| Family | Xanthorrhoeaceae | | | |
| Species | <i>A. sabaea</i> | <i>A. tomentosa</i> | <i>A. vacillans</i> | <i>A. yemenia</i> |
| Distribution | Yemen, Wadi Madar | Yemen | Yemen | Yemen, Mahwit |
| Cultivation | _____ | _____ | _____ | _____ |
| Reference | (Wood, 1983; Eggli <i>et al.</i> , 2001) | (Wood, 1983; Eggli <i>et al.</i> , 2001) | (Wood, 1983; Eggli <i>et al.</i> , 2001) | |



Aloe abyssicola Lavranos et. S Bilaidi



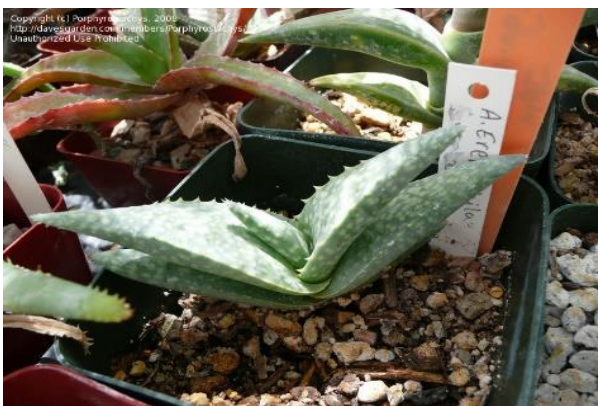
Aloe austroarabica Lavr



Aloe castellorum J.R.I. Wood 1983



Aloe doi Lavranos 1965, J. South Afr



Aloe eremophila Lavranos (1965)



Aloe fullerii Lavranos 1967



Aloe fleurentinorum Lavranos 1977



Aloe irafensis Lavranos (2008)



Aloe inermis Forssk 1775



Aloe jawiyon Christie, Hannon (soqotri)



Aloe lavranosii Reynolds 1964



Aloe luntii Baker 1894



Aloe menachensis (Schweinf.)



Aloe niebuhriana Lavranos 1965



Aloe pendens Forsskål 1775



Aloe perryi Baker 1881



Aloe rivierei Lavranos & L.E.Newton 1977



Aloe rubroviolacea Schweinf 1894



Aloe serriyensis Lavranos 1965



Aloe squarrosa Baker 1883



Aloe sabaea Schweinf 1894



Aloe tomentosa Deflers 1889



Aloe vacillans Forssk. 1775



Aloe yemenica J.R.I.Wood 1983

Figure 1. Plants of Yemen endemic Aloe.

CONCLUSION

Family Alliaceae is a genus of about 500 species of flowering succulent plants. They are commonly found in Southern Africa and on the eastern side of the continent. Many other species are found in the Arabian Peninsula and Madagascar. There are about 33 Aloe species found in Yemen, 17 of which are considered endemic. *Aloe irafensis* is one of the Aloe species endemic to Yemen, particularly in the city of Taiz where it is found in many parts of the city.

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CONFLICT OF INTEREST

The authors declare that they have no competing interests.

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