File 0 - Plants : introduction

First and foremost, it should be noted that the term « Artemisia » often used by La Maison de l'Artemisia refers to the plant species *Artemisia afra* and *Artemisia annua*. This generic term is not written in italics so as not to confuse it with the genus « *Artemisia* » which comprises several hundred other species.

Distinction between *Artemisia annua and Artemisia afra* :

Artemisia annua is an herbaceous plant that has been used for 2000 years in Traditional Chinese Medicine to prevent and treat intermittent fevers (malaria) and other parasitic diseases. It is an annual pant and must therefore be sown every year in order to be harvested before flowering. This makes it demanding in terms of care.

Artemisia afra is a perennial bush native to South East Africa, used by Traditional Medicine practitioners for centuries to prevent and cure malaria and other parasitic diseases. It is a perennial plant which can be harvested as needed throughout its growth. However, it is difficult to produce viable seeds. This is why it is mainly propagated by layering or cuttings.

Figure 1 : Artemisia afra bush (bottom left), flowering Artemisia annua plant with small yellow blossoms (centre right) and Artemisia annua plants (extreme right and in the background).

Artemisia afra

1. Taxonomy

Artemisia afra Jacq. ex Willd is a species of the Asteraceae family. It has many common names, including "African wormwood", "wild wormwood" in English and "armoise africaine" in French.

Among these many local names are:

Wilde als, als, alsem (Afrikaans) ; Fivi (Kisambaa), Lunyaga (Kisafwa), umhlonyane (Swati, Xhosa, Zulu), um hlonyane (Xhosa), umhlorryane (Xhosa), msuzwane (Xhosa), mhlonyane (Zulu), iliongana (Tsawana), lengana (Pedi, Tswana, Sotho, Setswana), lusanje (Kinyakyusa), zengana (Southern Sotho) ; nthilili (Nyaneka), eliminiomba in Angola, aguppiyaa/agufa (Konta), yesiet kest (Amharic), ttcikkugne, ariti (Amaringa), chukun, jukun (Galinya-harar), kodo (Galinya), kapani (Galinya-bale), chugughee (Gedeoffa), godoguracha (Oromic) in Ethiopia ; olchanipus, sisimwet (Sabaot) in Kenya ; enjani pus, fivi/fifi (Swahili, Sambaa), injanev yoso, inyaga, linyaga, olunjanyioiboru, sumangara, fifi (Shambaa), ushemeli (Sukuma) in Tanzania.

[1-5]

2. Origin and distribution

Artemisia afra Jacq. ex Willd is one of the longest known and most widely used medicinal plants in southern Africa.

It grows naturally in the mountainous areas of East and Southern Africa between 1500 and 3000 m altitude in Ethiopia, Kenya, Tanzania, Uganda, DRC, Zambia, Zimbabwe, Angola, Namibia, Botswana, Eswatini (formerly Swaziland), Lesotho, Malawi, Mozambique and South Africa.

It is the only native species (naturally native to this region) of the genus Artemisia.

[1,3-7]

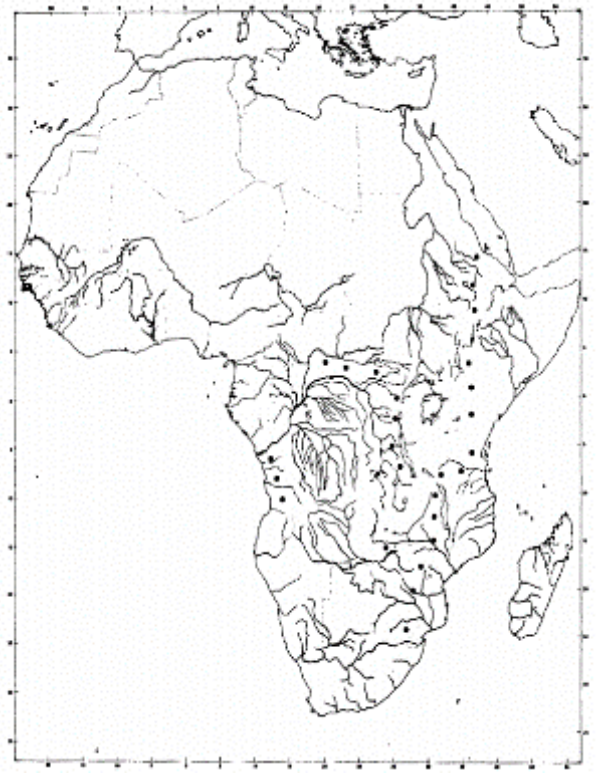

Figure 2 : Distribution Artemisia afra (FAO, 1986)

3. Botanical description

The morphology of *Artemisia afra* varies enormously from one plant to another.

- Woody shrub, forming perennial **bushes** that vary in height from 0.6 to 2.4 m [8].
- **Stems** are pale green to grey, multiple, ridged and hairy [8,9].
- **Thicker** stems becoming **woody at the base** [10].
- Many smaller **lateral branches** grow from the main stems [10].
- **Alternate, petiolate leaves**, finely divided, **similar to *Artemisia annua*** 3-14 cm long and 1.5-6 cm wide.
- Oval lamina[1] with regular cut aspect. Even or dentate edge, slightly folded [8]
- The leaves are **greyish -green** and glabrous on the **upper side**, occasionally hairy [8].
- However, leaves are covered with small white hairs giving a felted aspect and **lighter green** in colour on the **lower side**.
  These hairs also present on the stems give *Artemisia afra* **a characteristic "silver-grey" colour** which differentiates it from *Artemisia annua* [8-11].
- Caniculate leaf (the central ridge is slightly depressed on the upper side, and prominent on the lower side) [8].
- **Easily identifiable aromatic odour** [9].
- Pruning will give multiple branch growth.
- **Inflorescences[2] in yellow-green panicles** that appear on some branches of the plant.
- Tiny y**ellow butter-coloured flowers** arranged in globular capitulums around 3 mm diameter [9,11].
- Fruits 1 mm long.
- Each ovary produces a **very small achene[3]**
- So far, obtaining viable seeds seems difficult.

Figure 3 : Artemisia afra leaf
(left - upper side, right - lower side)

Figure 4 : Artemisia afra leaf
(caniculate, hairy lower side)

[1] Lamina : leaf blade
[2] Inflorescence : cluster of flowers arranged on a stem
[3] Achene : Dry one-seeded fruit that does not open to release the seed

4. Ecological requirements

- **Sun**

Like *Artemisia annua*, *Artemisia afra* likes the sun. Wind appears to impact growth.

- **Temperature**

Average optimum growth temperature: 20-33°C [3].

Growth is slower in the cold season. *Artemisia afra* can withstand quite low temperatures in winter but dies under -7°C. [3,12]

- **Water**

Artemisia afra is more drought resistant than *Artemisia annua* once established. Water requirements thereafter are less frequent. [3]

It needs a rainfall of more than 650 mm/year to grow in abundance. In Tanzania, it occurs naturally in areas where rainfall varies from 900-2400 mm/year. [1]

- **Soil**

Artemisia afra is common on arid soil. In general, it is a hardy plant which grows well on any type of well-drained soil.

Growth is compromised if the pH is not between 5 and 7.5. [3]

It is found in upland wilderness in coastal areas or in steep areas, on wet slopes, along streams and on the edge of forests [9,11].

Important: it is always possible to circumvent any adverse local conditions by selecting better suited varieties

5. Phenology

6 stades of development:

1. Seedling / rosette
2. Elongation and stem branching / pre-flowering
3. Formation of flower buds
4. Flowering
5. Fruiting
6. Senescence

There are overlaps of stages 3, 4, 5 and 6 depending on the parts of the plant.

Only certain branches will go through stages 3, 4, 5 and 6.

Due to its perennial nature, development is much slower than for *Artemisia annua.*

[12]

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