



FIELD GUIDE: IDENTIFICATION AND ASSESSMENT OF ALOE ANKOBERENSIS

*A Technical Reference Manual for
Conservation Experts and Development
Agents (DAs)*

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April 2026

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1. Background

The genus *Aloe*, which includes about 400 species, has its main distribution in Africa, south of the Sahara, including Madagascar and the Mascarenes. Few species reach the Arabian Peninsula and Socotra. The genus was introduced by man to the Mediterranean region and the West Indies a long time ago. Several species are now very widely grown.

Aloe ankoberensis has most recently been assessed for the IUCN Red List of Threatened Species and the species is listed as Endangered under criteria B1ab(iii,v)+2ab(iii,v). The specific epithet *ankoberensis* refers to the town of Ankober in the Shewa Floristic Region, where the type collection (Ash 2353, K) was made by Mrs. Jonquil Ash. The species was subsequently described by Gilbert and Demissew (1997).

The habitat and populations of *A. ankoberensis* are also decreasing. The habitat is home to many endangered and endemic plants and animals in addition to the target species and it is under various threats such as agriculture and settlement. The Afroalpine and sub-Afroalpine environments are highly fragile due to extreme climatic conditions (low temperature, harmful shortwave radiations, etc).

A. ankoberensis is used in traditional Ethiopian medicine to treat a variety of conditions, including wounds and burns, skin conditions, digestive problems, and infections. There is some scientific evidence to support the traditional uses of *A. ankoberensis*. For example, studies have shown that *A. ankoberensis* can promote wound healing, reduce inflammation,

and kill certain types of bacteria and fungi. However, more research is needed to confirm the safety and efficacy of *A. ankoberensis* for all of its traditional uses.

2. Classification

- ✓ **Kingdom:** Plantae
- ✓ **Phylum:** Streptophyta
- ✓ **Class:** Equisetopsida
- ✓ **Subclass:** Magnoliidae
- ✓ **Order:** Asparagales
- ✓ **Family:** Asphodelaceae
- ✓ **Genus:** *Aloe*
- ✓ **Species:** *Aloe ankoberensis* M.G. Gilbert & Sebsebe

3. Description/Biology

Pendent shrub, mostly unbranched (Fig. 1).

- ✓ **Stem** up to 6 m long, hanging down cliffs.
- ✓ **Leaves** numerous, dense, 20–30 × 7–17.5 cm, dull greyish to bluish-green.
- ✓ **Marginal spines** 7–9 per 10 cm, 2–3 mm long, pale, often with minute dark reddish brown tips.
- ✓ **Capsule** 28–30 mm long.
- ✓ **Seeds** ± 3 sided with winged margins ca. 0.5 mm wide, 4 mm long overall, dark brown with pale round spots.
- ✓ The main **flowering period** is from October to February.



Figure 1. *Aloe ankoberensis* leaves (Picture Courtesy: Prof. Sebsebe D.)

Phenological Calendar for DAs

Flowers offer the most definitive identification criteria during reproductive cycles (Fig. 2).

Inflorescence with 1–6 racemes;.

- ✓ **Peduncle** $\pm$ U-shaped
- ✓ **Racemes** cylindrical, 6–18 cm long, dense.
- ✓ **Bracts** ovate-lanceolate, 14–23(–25) $\times$ 5–6.5 mm, with acute tips.
- ✓ **Pedicels** (6–)10–25(–30 in fruit) mm.

- ✓ **Perianth** cylindrical, 35–40 mm long, 6–10 mm wide when pressed, bright orange red; outer lobes free for 12–22 mm.
- ✓ **Branching Pattern:** Features **7 to 8 secondary branches** spreading out from the central axis.



Figure 2. *Aloe ankoberensis* flowers (Picture Courtesy: Prof. Sebsebe D.)

Development Agents should align field surveys with the peak flowering window to maximize tracking accuracy (Table 1).

Table 1. Phenological stages and DA field actions required.

Season / Month	Phenological Stage	DA Field Action Required
September – October	Vegetative Growth / Early Budding	Check rosette health after the main rainy season (<i>Kiremt</i>), as required.
November – January	Peak Flowering (Anthesis)	Primary Census Window. Count open inflorescences.
February – March	Fruit Set / Seed Ripening	Collect wild seed capsules for conservation in Genebanks.
April – August	Dormancy / High Rain Resilience	Monitor cliff stability and landslide impacts on colonies, as required.

4. Distribution and Micro-Habitat Suitability

4.1 Geo-spatial distribution

Steep rocky slopes and cliff-faces, often near seasonally running water.

- ✓ **Elevation Belt:** Strictly restricted to sub-Afroalpine and Afroalpine zones between **3,000 and 3,500 meters** above sea level.
- ✓ **Administrative Locality:** Exclusively found in the **North Shewa Zone** of the Amhara National Regional State, Ethiopia. Highly concentrated around the historic **Ankober** escarpment, Tarmaber, Debresina and neighboring cliff faces. **Not known elsewhere (Endemic)**. *Ash* 3723; *Friis et al.* 1356; *W. de Wilde* 9623

4.2 Microhabitat requirements

Aloe ankoberensis is an extreme specialist:

- ✓ **Substrate:** Vertically oriented, sheer volcanic basalt rock slabs and ignimbrite cliffs.
- ✓ **Soil Profiles:** Restricted to thin, organic-matter-rich soils trapped within narrow rock crevices, ledges, and cliff pockets.
- ✓ **Aspect & Exposure:** Thrives on high-exposure, mist-shrouded escarpments. It relies on ambient moisture from montane clouds to survive during dry seasons.

4.3 Associated plant communities

The presence of the following indicator species signifies a highly suitable habitat matrix for *A. ankoberensis* in Ankober and nearby areas. Note that the presence of indicator species in other areas does not necessarily mean that *A. ankoberensis* is present and careful observation is required. The indicator species are most

conveniently indicators of Afroalpine and Subafroalpine ecosystem in Ethiopia.

Cliffs/Crags —> Associated with:

- *Lobelia rhynchopetalum* (Giant Lobelia)
- *Erica arborea* (Tree Heath)
- *Kniphofia foliosa* (Torch Lily)
- *Festuca macrophylla* (Tussock Grass)

4.4 Climatic vulnerability profile

- ✓ **Temperature:** Adapted to extreme diurnal fluctuations (frosts at night down to 0°C, daytime highs of 20°C).
- ✓ **Moisture:** Highly adapted to high-elevation moisture interception. It cannot tolerate waterlogged soils at its roots, which is why it is strictly confined to vertical, fast-draining cliff faces.

5. Field Assessment and Monitoring Protocol

5.1 Step-by-step population census protocol

When auditing an *Aloe ankoberensis* site, DAs and conservation experts must execute the following field checklist:

1. **Establish spatial baselines:** Set up a 50-meter linear transect parallel to the cliff edge. Use a GPS device to log exact latitude, longitude, and altitude coordinates.

2. **Remote Canopy Inspection:** Because plants grow on sheer cliffs, use high-power binoculars or commercial drones to count out-of-reach rosettes safely.
3. **Demographic Categorization:** Classify every observed plant into one of three age classes:
 - ✓ ***Seedling/Juvenile:*** Rosette diameter < 15 cm; no visible stem.
 - ✓ ***Immature Sub-adult:*** Rosette diameter 15–35 cm; trailing stem < 50 cm; no signs of historical flowering.
 - ✓ ***Mature Adult:*** Rosette diameter > 35 cm; elongated trailing stem; presence of current or old dried flowering stalks.

5.2 Habitat degradation scoring sheet

Assign a visual degradation score (0 to 3) to every monitored colony sector:

1. **Score 0 (Pristine):** No signs of human foot traffic; cliff face is intact; no sheared or cut leaves; abundant seedlings present.
2. **Score 1 (Mild Impact):** Noticeable livestock tracks along the cliff edge; minor grazing on accessible seedling leaves.
3. **Score 2 (Moderate Degradation):** Evident manual cutting of leaves for local medicinal use; invasive weeds starting to establish in rock crevices.
4. **Score 3 (Severe Degradation / High Risk):** Significant clearing of cliff-edge vegetation for farming; severe soil erosion and rockfalls; zero seedling survival observed.

5.3 Mandatory conservation directives for DAs

1. **In-situ conservation:** Work with local communities to establish "No-Grazing Core and Buffer Zones" extending at least 20 meters back from cliff edges where *A. ankoberensis* is actively growing.
2. **Ex-Situ Conservation:** Collect mature seed capsules. Transfer them immediately to the Ethiopian Biodiversity Institute (EBI) or local regional nurseries for propagation and *ex-situ* conservation in genebanks.

5.4 Ethnobotanical Value Assessment

Local communities heavily harvest wild *A. ankoberensis* populations for traditional applications. Experts must evaluate the intensity of these extractions during assessments:

1. **Antimicrobial Processing:** Crude leaf extracts are highly valued for active **in-vitro antibacterial and antimicrobial treatments**.
2. **Malaria Treatment:** Indigenous medical practitioners crush mature leaves and mix the bitter juice with water to treat **acute malaria symptoms**.
3. **Dermatological / Wound Healing:** The raw exudate is applied directly to open skin wounds, burns, and infectious lesions to accelerate **tissue repair**.

6. Field Data Collection Spreadsheet

This standardized field data sheet is optimized for printing on a single sheet of landscape A4 paper or deploying digitally on mobile data collection apps (such as KoboToolbox or ODK Collect) used by Development Agents (DAs) and conservation experts (Table 2).

6.1 Survey Metadata Block

1. **Date (DD/MM/YYYY):** _____
2. **Surveyor Name(s) / Team:** _____
3. **Woreda / Kebele:** _____ / _____
4. **Site / Locality Name:** _____
5. **Transect / Plot ID:** _____

Table 2. Field data recording format

OBI	GPS	ALT	CLA	STL	RSD	AGC	RPS	HRD	DGS	FIN
001										
002										

Note: OBI-Observation ID, GPS-GPS coordinates (Lat/Long), ALT-Altitude (masl), CLA-Clif Aspect (N/S/E/W), STL-Stem Length (cm), RSD-Rosete Diameter (cm), AGC-Age class, RPS-Reproductive state, HRD-Harvesting damage, DGS-Degradation score, FIN-Field notes (associated species).

6.2 Field coding and quick reference guide for DAs

To keep data consistent across different survey teams, use only the authorized abbreviations and standardized metrics as detailed below:

A. Age Class Matrix:

1. Juv (Juvenile): Rosette diameter under 15 cm. No visible hanging stem.
2. Sub-Ad (Sub-Adult): Rosette diameter 15–35 cm. Stem present but under 50 cm. No reproductive history.
3. Adult: Rosette diameter over 35 cm. Elongated hanging stem. Active flowers or old dry stalks present.

B. Reproductive Phenology:

1. **Veg:** Purely leafy growth. No flowering structures.
2. **Bud:** Emerging floral spikes or closed green/red buds.
3. **Flow:** Active anthesis. Bright orange-red tubular flowers fully open.
4. **Fruit:** Flowers dropped. Green or brown dry seed capsules hanging from the U-shaped stalk.

C. Habitat Degradation Quick Index:

1. **0: Pristine cliff environment.** Zero human or livestock footprint.
2. **1: Minor livestock tracks** or small grazing signs on low-hanging seedlings.
3. **2: Visible leaf-cutting** for local medicine or invasive weed pressure on ledges.
4. **3: Severe degradation.** Active agricultural encroachment, soil erosion, or major rockfalls.

7. Safety Measures

- ✓ Avoid direct descent on unstable cliffs.
- ✓ Maintain safe observation distance.
- ✓ Use binoculars or drones when possible.
- ✓ Work in teams of minimum two persons.
- ✓ Conduct surveys during daylight and stable weather.
- ✓ Wear protective boots and helmets where necessary.

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