Notes on the genus *Halothamnus* jaub. and Spach Chenopodiaceae in Yemen

[1]Abdul Nasser A. Al-Gifri, [2]Othman S. S. Al-Hawshabi, [3]Hassan Ibrahim, [4]Hana A. Al-Quhbi, [5]Zamilah Masdus and [6]Abeer A. S. Albukili

1,4,6Dept. of Biology, Collage of Education- Aden, University of Aden.
[2]Dept. of Biology, Collage of Science, University of Aden.
[3]Dept. of Biology, Collage of Science, Sana'a University, Yemen.
[5]Dept. of Biology, Collage of Education, Sana'a University, Yemen.
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Abstract

There is no comprehensive flora of Yemen, therefore we as individual botanist at Aden and Sana'a Universities decided to go for such flora in portions. We are going to start with less known genera. The genus *Halothamnus* Jaub. & Spach *(Chenopodiaceae)* in Yemen is represented with one species and two subspecies, all are endemic to Arabia and Yemen. A detailed description of the genus and the species occurring in Yemen are given.

Key words: Yemen, Arabia, endemic species, *Halothamnus*.

Introduction:

Chenopodiaceae includes c. 102 genera and 1400 species of world-wide distribution, but with center in xerophytic and halophytic areas (14). In Yemen, this family is represented by 37 species in 16 genera (2). *Halothamnus* is one of the genera in Chenopodiaceae, including about 25 species distribution from tropical NE Africa through the Arabian Peninsula to S Pakistan and through the Near and Middle East countries, Middle Asia to the western most parts of China (1, 2, 3, 4, 5, 7, 8, 9, 11, 15, 16, 18, 19, 20 & 21). The genus *Halothamnus* Jaub. & Spach is a monotype genus in Yemen. There is very less information and nearly not enough knowledge about genus *Halothamnus*. Some of Arabian flora, such as Flora of Kuwait (6), still using *Aelliena* instead of *Halothamnus.* The genus of *Halothamnus* was mentioned in many floras of Arabian Peninsula without his two endemic subspecies (2, 5, 10, 12, 15 & 17), while Hamood (11) in his study on flora of Toor Al-Baha district, Lahej governorate, mentioned that the genus with one subspecies endemic to Yemen is *H. bottae* subsp. *niger*. The aim of the present study which reveals the presence of one species and two subspecies is to contribute to a better understanding of the genus *Halothamnus*.

Materials and Methods

This study is carried out on herbarium material obtained from herbarium of the University of Aden, from 1987 -1992 and 2014 from (Aden governorate) and 2015 from (Aland- Aqaan, Lahej governorate), Othman is samples (2012) from Toor Al-Baha district, Lahej governorate, Masdus is collection (2007) from Mudia district, Abyan governorate and all herbarium collection of *Halothamnus* at Sana'a University Herbarium was studied by Ibrahim.26 herbarium sheets of *Halothamnus* were studied from both herbaria of Aden and Sana'a. All the measurements were made directly from fresh and dried specimens. Detailed description, synonyms, type specimens, habitat, distribution and flowering period were provided. The infraspecific classification of *Halothamnus* bottae, following in this study is after Kothe (13). The references (5, 13 & 17) were used for the identification of the taxa.

Results and Discussion

***Halothamnus* Jaub. & Spach**, 1845, Ill. Pl. Or. 2: 50.

Aellenia Ulbr., in Engler & Prantl, 1934, Nat. Pflanzen fam. Ed.2, 16c: 567.- *Aellenia* emend. *Aellenia,* 1950, Verh. Naturf. Ges. Basel 61: 172.- *Salsola* sect. *Sphragidanthus* Iljin, 1936, Flora SSSR 6: 245.- *Halothamnu*s emend. Botsch., 1981, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSR 18: 146.

Type of species: *H. bottae* Jaub. & Spach

Taxonomy Descriptions

Most *Halothamnus* species are sub shrubs or small shrubs, two species are summer annuals. Very often, the plants have an unpleasant smell, like rancid butter. The spike-like inflorescences bear small and inconspicuous flowers sitting solitary in the axil of a green bract and two green bracteoles. The 5 tepals are green with scarious margins above a transverse zone and colorless below. In fruits, the wings develop from this transverse zone. The genus can easily be distinguished from its close relative *Salsola* by the lower part of the fruit: below the wings, the fruit forms a thick and lignified tube with a truncate base. The bottom side has 5 pits arranged in ring around the central abscission zone. In flower, all species of the genus can be recognized by two flat stigmas sitting on the thick style. The genus is relatively poor in characters which can be used for the infra-generic classification. The flowers are much alike, and the leaf shape is extremely variable, depending on soil conditions and water supply. Even on the same plant the spring and summer leaves may look quite different. The fruit proves to show the most important diagnostic characters: shape and height of the tube, location, outline and deepness of the pits, presence or absence of a prominent ridge around the base. Other useful characters are growth form, structure of inflorescence, bracts and bracteoles. Specimens without fruits are sometimes very different to determine.

Habitat: The species of *Halothamnus* are plants of deserts and semi deserts. They grow in most type of dry habitats: on rocky, gravelly, clay or sandy soils. Very many tolerate saline conditions.
The name *Halothamnus* was first introduced in 1845 by Jaubert and Spach in describing *Halothamnus bottae* as new species from Arabia.

Represented in Yemen by one species

Halothamnus bottae Jaub. & Spach, 1845, Ill. Pl. Or. 2: 50, tab. 136.

Syns. *Caroxylon bottae* (Jaub. & Spach) Moq., 1849, in DC. Prodr. 13, 2: 178; *Salsola bottae* (Jaub.& Spach) Boiss., 1879, Fl. Or. 4,2: 964.

Type: Arabia, Taifa, 1838, Bottae; lecto, 4 iso P. The selected specimen corresponds with tab. 136 in Jaubert & Spach.

Distribution: Saudi Arabia, Yemen, Oman, United Arab Emirates, endemic (13 & 17).

Habitat: foothills and mountain slopes, especially on dry stony habitat (rocky slopes, rigs, debris, Wadis and on thin sand sheets covering stony ground); in semidesert Acacia-shrubland.

Fl. Per.: February – April and September – October.

Specimens examined: Sheikh Othman (G 1101) July 1988, Desert plain towards Masabeen (G 1836) August 1989, towards Lahej (G 1126) November, 1988. El-Hiswa (G 1273) January, 1989, Bir Ahmed (G 1201),Tower of Silence, Jabal Shamsan, 12.12.14 (G 7493) Aland – Aqan Road, Lahej, N 13 18 59.2 E 044 44 21.90,3.01.15 (G 75 24) and N 13 19 17.6 E 044 44 23.09 , (G 7533), 5.1.2015 ,Wadi Maran, Mudea district, Abyan (Masdus 13) 24.12.2007, Toor Al-Baha district, Lahej, N 13 07 50.7 E 044 19 90.4 (Othman 1118) 6.7.2009; N 13 03 873 E 044 21 469 (Othman 2791) 7.11.2009; N 13 00 569 E 044 18 288 (Othman 4052) 21.3.2010.

Halothamnus bottae represented in Yemen by two subspecies as followed:

1. *Halothamnus bottae* Jaub. & Spach subsp. *bottae*

Type: Arabia, Taifa, 1838, Bottae; lecto, 4 iso P. The selected specimen corresponds with tab. 136 in Jaubert & Spach.

Endemic to Arabian Peninsula (Saudi Arabia, Oman, Yemen and UAE).

2. *Halothamnus bottae* Jaub. & Spach subsp. *niger* Kothe-Heinrich
Type: Arabia (Yemen). Presqu'iled' Aden, vallée de Kusaf. 23.05.1886.
A. Deflers. (holo, iso: P)
Endemic to Yemen.

Diagnostic features

H. bottae subsp. *niger* differs from subsp. *bottae* by the following characters:
twigs and flowers green, soon becoming black, even on live plant; twigs thinner (1.3-2.6 mm in diameter, lateral twigs of first order 0.9-1.6 mm, of second order 0.5-101 mm in diameter); bracts less broad (0.6-0.9 (1.5) mm), bracteoles somewhat smaller (0.8-1.5 mm long, 1.0-1.7 mm wide);wings of fruit dark brown ; fruit tube smaller (0.8-1.0 mm long, 1.0-1.8 mm in diameter at base), with less prominent tepals margin.

Fig. 1. Habit of *H. bottae* subsp. *niger*
(The photo taken by Othman Al-Hawshabi).

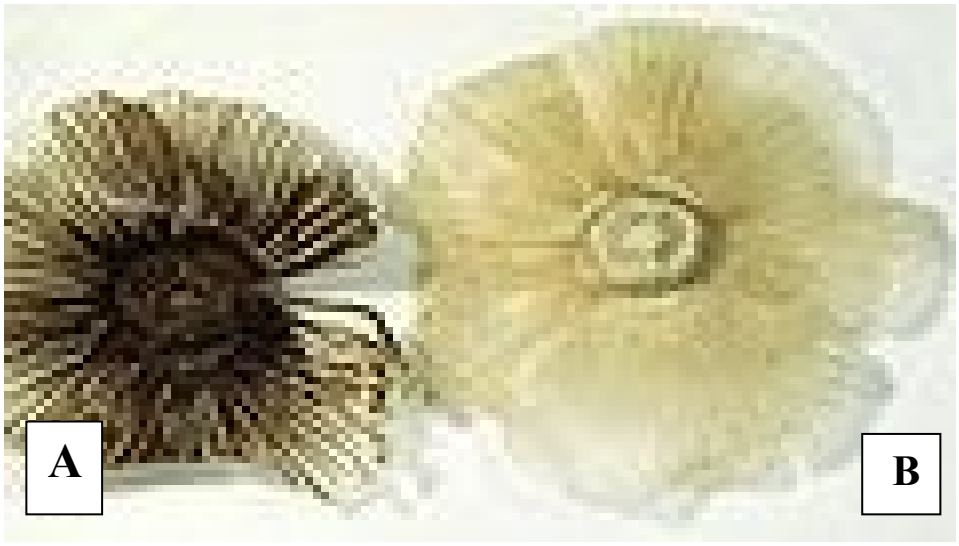

Fig. 2. The *H. bottae* fruits; **A:** subsp. *niger* **B:** subsp. *bottae*
(The photo taken by Hassan Ibrahim).

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ملاحظات على جنس الهالوثامنس من الفصيلة الرمرامية في اليمن

عبدالناصر عبدالله الجفري[1]، عثمان الحوشبي[2]، حسن ابراهيم[3]، هناء عبدالرحمن القهبي[4]، ، زميلة مسدوس[5] وعبير علي سعيد البغيلي[6]

[1،4، 6] قسم الأحياء كلية - العلوم، جامعة عدن.

[2]قسم الأحياء كلية التربية- زنجبار، جامعة عدن.

[3]قسم علوم الحياة كلية العلوم، جامعة صنعاء

[5]قسم الأحياء – كلية التربية – جامعة صنعاء.

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الملخص

لا توجد دراسة تفصيلية عن فلورة اليمن، ولا يوجد مشروع وطني داعم لدراسة الفلورة، ولذا قرر فريق من العاملين بجامعتي عدن وصنعاء على المستوى الشخصي للعمل على دراسة الفلورة بشكل تفصيلي ولكن على اجزاء. ولذا قررنا البدء بالأجناس الأقل شهرة واقل معلومات متوفرة عنها. ولقد كان جنس الهالوثامنس من الفصيلة الرمرامية، الأول في هذه السلسة. يتمثل في اليمن بنوع واحد وتحت نوعين احدهما متوطن اليمن و الآخر متوطن اليمن والجزيرة العربية، مع توضيح الموقع التقسيمي مع وصف كامل للجنس والنوع وتحت النوعين.

الكلمات المفتاحية: اليمن، الجزيرة العربية، نوع متوطن، الهالوثامنس.