

## دو گونه جدید از جنس ختمی از ایران

Two new species of *Alcea* from Iran

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دریافت: ۱۳۸۴/۶/۳۰

پذیرش: ۱۳۸۴/۹/۲۷

دو گونه جدید از جنس ختمی (*Alcea* L.) از تیره پنیرک (Malvaceae) در ایران به اسامی: *Alcea iranshahrii* از استان فارس و *A. mazandarunica* از استان مازندران معرفی می‌شوند. شرح و ارتباطات تاکسونومیک آن‌ها مورد بررسی قرار گرفت. همچنین ریزساختار سطح پوسته بذر با استفاده از میکروسکوپ الکترونی (SEM) بررسی شد. الگوی مشاهده شده از ریزساختار پوسته بذر اندکی یکسان بود. این ساختار ساده، مشبک و منظم بود و تعدادی منفذ با ساختاری ویژه در سرتاسر پوسته بذر دیده می‌شد. تعداد، اندازه و ضخامت حاشیه و تعداد یاخته‌های احاطه کننده منفذ از نشانی‌های گونه‌ها بود. در *A. mazandarunica* منافذ بزرگتر با حاشیه نازک دیده شد. همچنین تعداد آن‌ها بیشتر از آنچه در *A. iranshahrii* وجود دارد بود. بحث پیرامون ارزش تاکسونومیک ریزساختار پوسته بذر و تمایز دو گونه فوق‌ارایه شده است.

متن کامل مقاله در قسمت انگلیسی‌ارایه شده است.

**واژه‌های کلیدی:** ختمی، ریزساختار پوسته بذر، ایران، سیستماتیک

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## TWO NEW SPECIES OF *ALCEA* FROM IRAN

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Received: 21.09.2005

Accepted: 18.12.2005

### Abstract

Two new species of *Alcea* L. (Malvaceae) in Iran, namely, *A. iranshahrii* from Fars Province and *A. mazandaranica* from Mazandaran Province are described. Their descriptions and taxonomic relationships are also given. In addition, seed coat microsculpturing is examined using Environmental Scanning Electron Microscope (ESEM). The seed coat patterns observed are fairly uniformed among the genus. It was simple reticulate and regular, but there were pores distributed throughout seed coats with specific structures. The numbers, size, thickness of margins and the number of the cells surrounding the pores are characteristics for the species. In *A. mazandaranica* pores are bigger and thin at margins and also their number are more than that of the *A. iranshahrii*. A discussion on the taxonomic value of the seed micromorphology is also provided.

**Key words:** *Alcea*, Seed microsculpturing, Iran, Systematics

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## Introduction

The genus *Alcea* consists of approximately 75 species world wide distributing mainly in mainly from S.W. Asia. Among these, 33 species grow in Iran (PAKRAVAN & GHahreman 2002, 2003; PAKRAVAN 2003) while 16 species are endemic to the country (RIEDL 1976). During our work on taxonomy of *Alcea* for the flora of Iran, two new species were found from Fars and Mazandaran Province.

Seed and fruit characters have long been employed as major consideration in distinguishing of plant taxa at various levels (WILKINSON 1980, GUNN 1981). A perusal of the literature, however reveals that there is only a few scanning electron microscopic (SEM) studies on spermoderms of Malvaceae (KHUSHK & VAUGHAN 1987, PAUL & NAYAR 1987) in general and *Alcea* in particular. In the present study, scanning electron microscope was used for examining the micromorphological characteristic of the seed coat as a taxonomic tool for specifying *Alcea* species distributing in Iran.

## Materials and Methods

Several herbarium specimens of *Alcea* were studied, deposited in different herbaria (IRAN, TARI, W, BM, P, JE and E). For SEM studies, mature seeds were taken from herbarium specimens and after removal from the carpels, they were directly observed at 20 KV with a Philips XL30 ESEM. At least seven mature seeds of each sample were examined and measured by ESEM. The terminology followed is after BARTHLOTT (1981) and LERSTEN (1981).

## Results

### 1. *Alcea iranshahrii* Pakravan, Ghahreman & Assadi, sp. nova (Fig. 1)

Type: Iran, Fars, Kuh-e Dena, Gardaneh-e Bijan, 2500 m, 1.8.1978, Assadi and Mozaffarian 31162 (holotype TARI!).

*Alcea iranshahrii* is closely related to *A. fasciculiflora* Zohary in having similar inflorescence but different from it by having white to bright yellow petal,



Fig. 1. *Alcea iranshahrii*: (A) Habit, below left: hairs from upper side of leaves, below right: lower surface of leaves, (B) Carpel, (C) Seed.

while petal is pink in *A. fasciculiflora*, also leaves are palmatisect in *A. fasciculiflora* but is shallowly lobed in *A. iranshahrii*.

Planta perennis, indumento dense piloso. Folia longissime petiolata; petioli laminis 2.5-3-plo longiores; lamina suborbicularis, integra vel 3-5-lobata; lobis subobovatis vel triangularibus. Inflorescentia racemosa; flores fasciculati. Pedicelli 3.5-4 cm longi. Flores albi. Involucri lacinae 6-8, anguste triangulares, in dimidio inferiore connatae; dimidium longitudinis calycis attingentes, 6-8 mm longae. Carpella 5 mm longa 4 mm latae, in sulco dorsali laxe pilosa, pilis simplicibus, stellatis; alae anguste membranaceae, 0.3 mm latae; margine radialiter rugoso; carpella circa sinum farinosa, in lateribus pilis sparsis simplicibus.

Perennial, rather densely covered with stellate hairs. Basal leaves with petiols 2.5-3 times as long as blade, cauline leaves rather orbicular, entire or with 3 or 5 subovate or triangular lobes. Inflorescence has solitary flowers at the lower part and fascicled flowers at the middle and the upper parts. Pedicel (-2)3-4 cm long, flowers are white. Epicalyx *ca* half of the calyx, divided to the half into 6-8 narrowly triangular segments, 6-8 mm long, without veins. Calyx 19 mm long, divided to two-thirds into triangular lobes. Petals 35-40 mm long. Fruit 16-17 mm broad; Carpel 30-35, elliptic, 5 mm long and 4 mm broad, shallowly channeled and stellate, hairy along dorsal line except at the lower end, the margins narrowly winged; wings *ca* 0.3 mm broad, radially and shallowly wrinkled on the both sides, the lateral faces around the notch convex, smooth and farinuous, in the middle part with scattered appressed hairs.

## **2. *Alcea mazandarunica* Pakravan & Ghahreman, sp. nova** (Fig. 2)

Type: Iran: Mazandaran, Kelardasht, Rudbarak, 1650 m, 9.9.1983, Mozaffarian 45495 (holotype TARI!).

*Alcea mazandarunica* is very closely related to *A. karsiana* Litw., but in *A. karsiana*, inflorescence is leafy, carpel is winged with nerved seeds while in *A. mazandarunica*, inflorescence is not leafy, carpel is wingless with smooth seeds.





Fig. 2. *Alcea mazandaranica*: (A) Habit, above left: hairs from lower side of leaves, below right: hairs from upper side of leaves, (B) Carpel.

Planta biennis vel perennis, 100-120 cm longa, tota planta dense pilis stellatis, fragilibus. Folia longissime petiolata; petioli laminis 1.5-5 plo longiores; lamina suborbicularis vel ellipticas, breviter obtuse 7 lobata, margine minute dentata, supra laxe subtus dense pilis stellatis fragilibus pauciradiatis vestita. Racemus laxis, flores solitari, petala flava. Involucrum 6-7 lobatum, 2/3 fere longitudinis calycis attingens. Fructus e carpellis 30-33 compositus; carpella 4.5 mm longa, in dorso secus sulcum latum pilosa, exalata, margine radialiter rugosa, inter sinum et marginem usque ad rugam distinctam incipientes pilis obsitis.

Biennial or perennial, 100-120 cm tall, total plant covered with dense stellate-fragillate pilose. Petiol 1.5-5 times as long as the blade. Leaves semicircular to elliptic with seven shallowly lobes, less than 1/3 as long as blade length. Inflorescence is a loose raceme, with solitary flowers. Pedicel 5 mm long. Epicalyx 6-7. Calyx three times longer than the epicalyx, 15 mm long, with some veins on both calyx and epicalyx, with dense stellate velutinose hairs. Petals yellow, 40 mm long, 3-3.5 times longer than calyx. Fruit with 30-34 carpels, 4-4.5 mm broad, without wing, shallowly channeled and hairy along the dorsal part, margin slightly radially veined, densely hairy on the lateral side.

### **Result of SEM**

Spermoderm (seed coat) pattern is simple reticulate and regularly formed by polygonal to elliptic cells in both new species. In *A. mazandaranica*, pores are 23  $\mu\text{m}$  in diameter but in *A. iranshahrii* 15  $\mu\text{m}$ . The margin of pores in *A. mazandaranica* are thinner than in *A. iranshahrii* and the number of pores (25-28) in *A. mazandaranica* are more than of the *A. iranshahrii* (15-18) in the 0.015 mm squares. The cell numbers surrounding the pores are nine in *A. mazandaranica* while is 11 in *A. iranshahrii* (Figs 3 & 4).

### **Discussion**

The present study on the mature seeds of *Alcea*, reveals characteristic features of their seed coat. The results of this study show that the seed structures in both



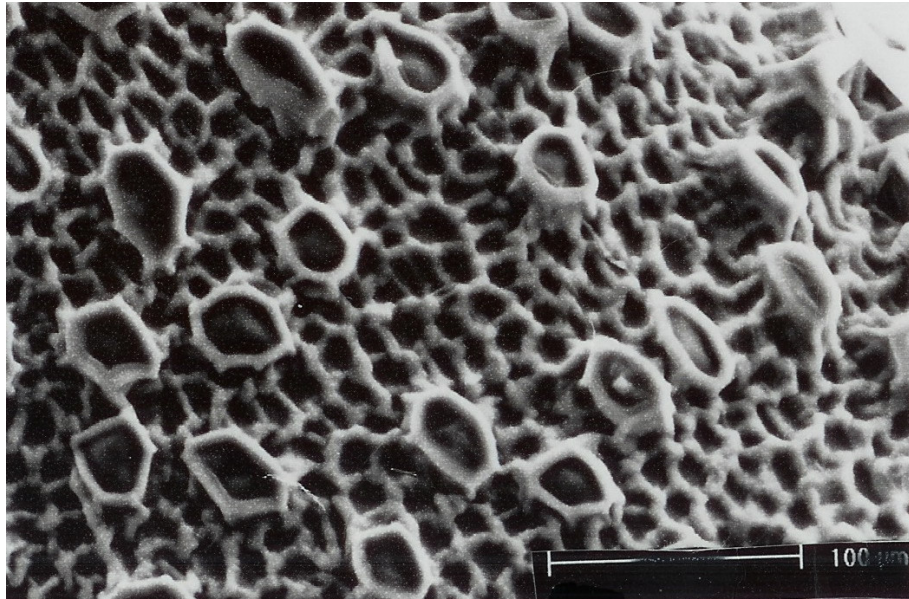


Fig. 3. Scanning electron micrograph of the seed coat surface in *A. mazandarunica*.

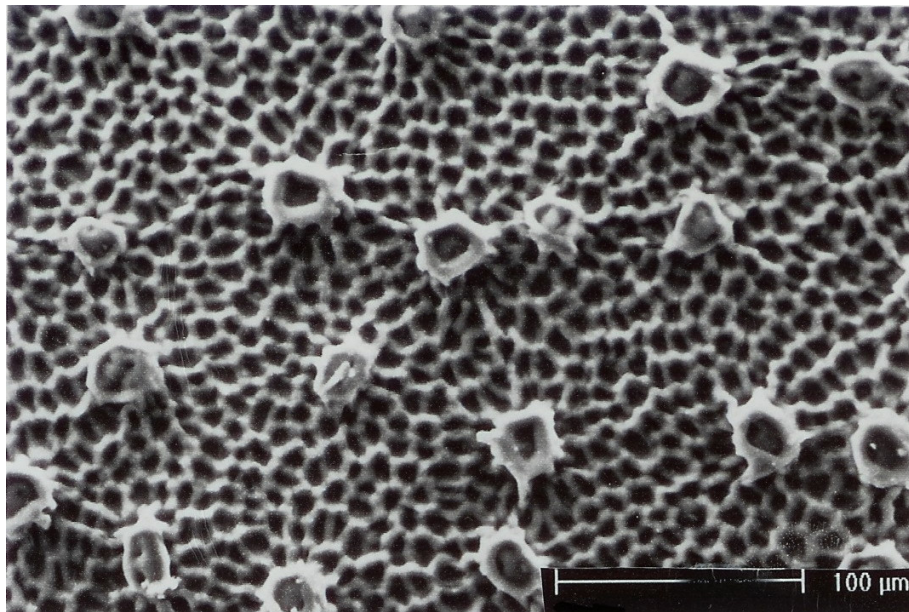


Fig. 4. Scanning electron micrograph of the seed coat surface in *A. iranshahrii*.

species mostly confirms the general features of *Alcea* (PAKRAVAN 2001). Spermoderm patterns is relatively uniformed in different species, but the form and size of pores and their numbers plus the number of cells surrounding them vary in different species.

The main following questions are yet remained to consider:

1. Whether the seed characters typical to each examined species have adaptive value.
2. Whether these characters are phenotypic, resulting from the conditions prevailing in their habits or genotype.

According to BARTHLOTT (1981), the epidermal and seed or fruit characters of angiosperm taxa are surprisingly little affected by the environmental conditions in which a plant grows. There is evidence for a strong genetic control over these characters.

### **Acknowledgements**

The authors are grateful to M. Nobakht for drawing the illustrations and to M. Bahary for providing the scanning electron micrographs.

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