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Autor(en): **Al Yafi, Jamil**

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New characters differentiating *Pistacia atlantica* subspecies

JAMIL AL YAFI

Résumé

AL YAFI, J. (1978). Nouveaux caractères différenciant les sous-espèces de *Pistacia atlantica*. *Candollea* 33: 201-208. En anglais, résumé français.

L'auteur présente de nouveaux caractères morphologiques aidant à la distinction des sous-espèces de *Pistacia atlantica* Desf. Les résultats sont exposés et discutés.

Abstract

AL YAFI, J. (1978). New characters differentiating *Pistacia atlantica* subspecies. *Candollea* 33: 201-208. In English, French abstract.

The author presents new morphological characters elucidating the differentiation of *Pistacia atlantica* Desf. subspecies. The results are exposed and discussed.

Introduction

Pistacia atlantica Desf. had been studied by various taxonomists. The most recent works to be mentioned are those of ZOHARY (1952), YALTIRIK (1967) and RECHINGER (1969). Except for Rechinger, most taxonomists consider that there exist the following species within the section *Butmela*, proposed by ZOHARY in 1952. They are:

- *Pistacia atlantica* Desf.;
- *P. mutica* Fischer & C. A. Meyer = *P. atlantica* Desf. var. *latifolia* Zoh.;
- *P. atlantica* Desf. var. *kurdica* Zoh. = *Pistacia eurycarpa* Yalt.;
- *P. cabulica* Stocks = *P. atlantica* Desf. var. *cabulica* Zoh.

In reality within the section *Butmela*, *Pistacia* subspecies are hardly differentiated by their leaves morphological characters only. Many specimens present us intermediate characters for which we have to take into consideration their geographical origin.

In this work the classification presented by RECHINGER (1969) is adopted.

Materials and methods

An extensive revision of leaves morphological characters was carried out on all specimens existing at the Botanical Conservatory and Gardens of Geneva. A summary of characters analysed is presented in Table 1.

Specimens were selected such as to represent a wide geographical distribution and to include as much as possible type specimens. This work is based on the fact that *Pistacia atlantica* Desf. subsp. *atlantica* is represented by specimens of North African origin. Thus, those specimens can be used as a standard as far as the characters discussed here-after are concerned.

Observations

Unicellular and multicellular hairs had been observed on the leaflets of *Pistacia atlantica* Desf. subspecies. The multicellular ones were observed on the leaflets lower surface and rarely on the upper one. They are made up of a number of cells, ranging from four to eight and of an average length of eighty microns. They are attached to the leaf epidermis as shown in Fig. 1.

Unicellular hairs were observed on leaves margins by BOISSIER (1872), KOMAROV (1949), YALTIRIK (1967) and RECHINGER (1969) giving a ciliated appearance. However their presence on the leaf surface had been excluded by YALTIRIK (1967a) in "Flora of Turkey". KOMAROV (1949) indicated the presence of short hairs above and along the midrib in *Pistacia mutica* Fischer & C. A. Meyer.

Careful observations revealed the presence of unicellular hairs on the leaflets upper surface. Having an average length of 0.2 to 0.4 mm and whitish in appearance. Their presence and distribution vary between the various subspecies.

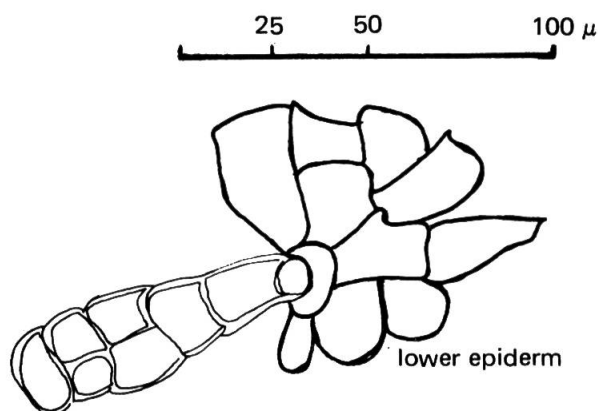


Fig. 1. — Multicellular hair.

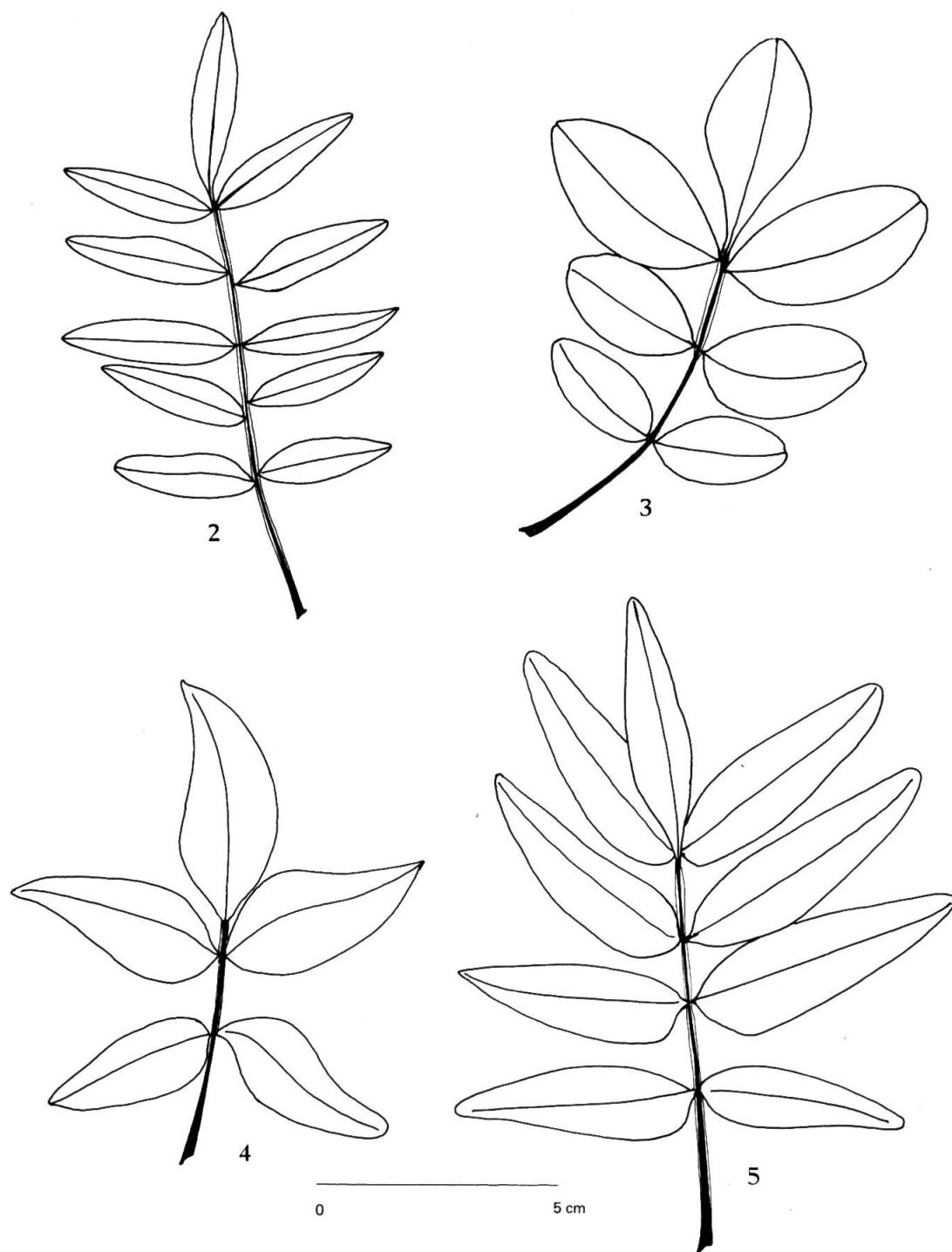


Fig. 2. – *Pistacia atlantica* Desf. subsp. *atlantica*.

Fig. 3. – *Pistacia atlantica* Desf. subsp. *mutica* (Fischer & C. A. Meyer) Rech. fil.

Fig. 4. – *Pistacia atlantica* Desf. subsp. *kurdica* (Zoh.) Rech. fil.

Fig. 5. – *Pistacia atlantica* Desf. subsp. *cabulica* (Stocks) Rech. fil.

Subspecies	Specimen	Site	Pairs of leaflets			
			2	3	4	5
<i>atlantica</i>	G. Desfontaines	Algeria	•	•	+	•
	G. Reboud, Soc. dauph. No. 1151 (1875)	Constantine	•	•	•	+
	G. Chevallier	Laghout	•	•	+	•
	G. Desfontaines	Atlas	•	+	•	+
	G. Romieux 1245	Haut Atlas	•	•	•	+
	G. Sennen & Mauricio 7545	Mt. Quebdana	•	+	+	+
	G. Font Quer 296	Sidi Abd Rahman	•	•	+	+
	G. Wilczek & Dutoit (1923)	Moulay Idris	•	+	•	•
	G. Sennen & Mauricio 8728	Quebdana	•	•	+	+
	G. Webb	Canaries	•	+	+	•
	G. Christ	Teneriffe	•	•	+	•
	G. Castagne	Constantinople	•	+	•	•
	G. Boissier & Reuter (1849)	Oran, Tlemcen	•	+	+	•
	G. Boissier & Reuter (1849)	Oran	•	+	•	+
	G. Gillett 15707	Wadi Butum	•	+	•	•
	G. Röthlisberger (1971)	Tunisia	•	•	+	+
	G. Täckholm & al. 9168	Wadi Butum	•	+	+	•
	G. Täckholm & al. 9168	Wadi Butum	•	+	+	•
	G. Aznavour 539	Turkey	•	+	•	•
	G. Cuénod (1931)	Tunisia	•	+	+	•
<i>mutica</i>	G. Callier, Hb. norm. Dörfler 5021	Krym	+	•	•	•
	G. Bornmüller 13 355	Bithynia	•	+	+	•
	G. Bornmüller 3435	Kerman	+	•	•	•
	G. Bornmüller 3435	Kerman	+	•	•	•
	G. Aucher-Eloy 4321	Ghilan	+	+	•	•
	G. Meyers 9239	Asher	•	•	+	+
	G. Meyers & Dinsmore 6712	Banias*	•	+	•	•
	G. Rechinger & al. 4033	Baluchistan	+	•	•	•
	G. Davis 33 138	Yalta	+	+	•	•
	G. Peyron (1890)	Bila's*	+	+	•	•
	G. Mouterde, P 375	Syria*	+	+	•	•
	G. Delbès 201	Upper Djezire	•	+	•	•
	G. Delbès 201	Upper Djezire	+	•	•	•
	G. Skvorstsov (1967)	Krym	•	+	•	•
	G. Bourgeau (1871)	Rhodes	•	+	•	+
	G. Hoffmann-Grobéty (1934)	Rhodes	•	+	+	•
	G. Aitchinson 1039	Baluchistan	•	+	•	•
	G. Aitchinson 1039	Afghanistan	•	+	•	•
	G. Aitchinson 61	Afghanistan	+	+	•	•
<i>kurdica</i>	G. Guest 3760	Zawita	+	+	•	•
	G. Rechinger 10 834	Mosul	+	•	•	•
	G. Erdtman & Goedemans, Hb. Rechinger 15 623	Irbil	+	•	•	•
	G. Rechinger 11 733	Irbil	+	•	•	•
<i>cabulica</i>	G. Rechinger 29 891	Quetta	•	+	+	•
	G. Zohary (1951)	Lower Galilee	•	•	+	•
	G. Rechinger 29 449	Torkhan	•	•	•	+
	G. Rechinger 29 799	Murgha, Quetta	•	•	+	•
	G. Rechinger 19 192	Herat	•	•	+	•
	G. Rechinger 35 034	Tirin	•	+	•	•
	G. Rechinger 35 637	Khost	•	+	+	•
	G. Rechinger 28 458	Baluchistan	•	•	+	•
	G. Rechinger 28 983	Quetta	•	+	•	•

*Specimens to be marked *Pistacia atlantica* Desf. subsp. *atlantica*.

Tab. 1. — Analysis of leaf morphological characters of *Pistacia* Rech, fil., subsp. *kurdica* (Zoh.) Rech. fil.
Signification: + = existant;

atlantica Desf. subsp. *atlantica*, subsp. *mutica* (Fischer & C. A. Meyer)
and subsp. *cabulica* (Stocks) Rech. fil.
• = non existent; R = rare.

- = non existant; R = rare.

In *Pistacia atlantica* Desf. subsp. *atlantica*, the midrib is found to be covered with hairs, ciliated, while the ribs are rarely to very rarely ciliated.

As for *Pistacia atlantica* Desf. subsp. *mutica* (Fischer & C. A. Meyer) Rech. fil., the midrib and ribs are ciliated while the veins are very rarely seen to have unicellular hairs attached to them. *Pistacia atlantica* Desf. subsp. *kurdica* (Zoh.) Rech. fil. has almost the same characters as far as unicellular hairs are concerned.

However, in *Pistacia atlantica* Desf. subsp. *cabulica* (Stocks) Rech. fil., the midrib, ribs and veins are covered with hairs giving a pubulous appearance to the leaflets' surface.

On the other hand, the presence and width of wings on the rhachis differ within the subspecies. While wings are wide and existant along all the rhachis in *Pistacia atlantica* Desf. subsp. *atlantica*, POST & DINSMORE (1932), ZOHARY (1952), QUÉZEL & SANTA (1963), RECHINGER (1969), they are also existant along all of the rhachis in *Pistacia atlantica* Desf. subsp. *cabulica* (Stocks) Rech. fil. (Figs. 2, 5). They are narrow and exist for the first two pairs in both *Pistacia atlantica* Desf. subsp. *mutica* (Fischer & C. A. Meyer) and subsp. *kurdica* (Zoh.) Rech. fil. (Figs. 3, 4), and tend to diminish for the rest of the rhachis if not entirely absent.

The rhachis in all of the subspecies is rarely ciliated while the wings are densely covered with unicellular hairs.

The terminal leaflet in *Pistacia atlantica* Desf. subsp. *kurdica* (Zoh.) Rech. fil. is subsessile with a short winged petiole, while for all other subspecies the terminal leaflet is always sessile. Only in very rare cases subsessile terminal leaflets were observed on the other subspecies, in these cases the petiole is very widely winged.

The number of pairs of leaflets differs between the various subspecies. As shown in Table 1, it is not a definite character. Only *Pistacia atlantica* Desf. subsp. *kurdica* (Zoh.) Rech. fil. almost has a definite number of pairs, for all of the other subspecies the number of pairs varies from two to five as shown above.

The shape of leaflets is another character which is not stable. Even though certain subspecies have tendencies for certain forms, however we can observe various forms of leaflets on a given specimen.

Conclusion

It is evident that the shape, number of pairs and colour of leaflets are characters greatly affected by surrounding ecological factors. While the number of pairs might change according to the age of the leaf, the colour can hardly be reliable in identifying herbaria materials, YALTIRIK (1967). On the other hand, the form and reticulations of seeds which sometimes are used to facilitate the differentiation of certain subspecies, ZOHARY (1952), are not valid. Almost all forms and types of reticulations were observed within a given specimen.

However, the presence of hairs on leaflets seems to be a stable character unaffected by ecological factors, but could be affected by conservation methods. Badly conserved specimens can lose some of their hairs due to harsh treatment. It should be noted that very young leaflets are covered with hairs which can be easily differentiated from those referred to above by being very long and haphazardly distributed.

Thus, with reference to a combination of characters we are able to differentiate easily between the various subspecies as follows:

Pistacia atlantica Desf. subsp. *atlantica*:

- terminal leaflet sessile;
- leaflets oblong-lanceolate, 3-5 paired;
- rachis widely winged, wings exist along all of the rachis;
- leaflets with ciliated midrib and rarely ciliated ribs.

Pistacia atlantica Desf. subsp. *mutica* (Fischer & C. A. Meyer) Rech. fil.:

- terminal leaflet sessile;
- leaflets oblong-ovate rarely oblong-lanceolate, 2-5 paired;
- rachis winged between the terminal two pairs of leaflets only;
- leaflets with ciliated midrib, ribs but rarely the veins.

Pistacia atlantica Desf. subsp. *kurdica* (Zoh.) Rech. fil.:

- terminal leaflet subsessile;
- leaflets oblong-ovate, two pairs only rarely more;
- rachis winged between the two pairs of leaflets;
- leaflets with ciliated midrib, ribs and rarely the veins.

Pistacia atlantica Desf. subsp. *cabulica* (Stocks) Rech. fil.:

- terminal leaflet sessile;
- leaflets oblong-lanceolate, 3-5 paired;
- rachis winged, wings exist along all of the rachis;
- leaflets with ciliated midribs, ribs and veins.

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