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In a first, rare species *Echiochilon fruticosum* Desf. with white flowers found in desert rangelands of Tunisia

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Contribution :

In a first, rare species *Echiochilon fruticosum* Desf. with white flowers found in desert rangelands of Tunisia

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Abstract

Fieldwork, particularly if it is frequently, did provide an opportunity to explore further plant diversity and extending knowledge. In this study, we illustrate the two individuals of *Echiochilon fruticosum* Desf. that differ from each other by the color of flowers. *Echiochilon fruticosum* Desf., which is characterized by giving a blue color of flowers, this time was found with impressive white flowers. What's up with that ? Albinism is not too common but is certainly possible.

Keywords : Corolla color, mutation, albinism

يقدم العمل الميداني، خاصة إذا كان متكررًا، فرصة لإستكشاف المزيد من التنوع النباتي وتوسيع المعرفة. في هذا المقال نقدم فردين من Echiochilon fruticosum يختلفون عن بعضهم البعض من حيث لون الأزهار. في هذا العمل الميداني، تم العثور على Echiochilon fruticosum، و الذي يتميز بأزهار زرقاء اللون، ولكن هذه المرة الأولى بأزهار بيضاء صافية البياض و رائعة. ما الأمر في ذلك؟ المهق الكامل لدى النباتات ليس شائعًا جدًا ولكنه ممكن بالتأكيد.

Résumé

Le travail de terrain, en particulier s'il est fréquent, a permis d'explorer davantage la diversité végétale et d'étendre les connaissances. Dans cette étude, nous illustrons les deux individus d'Echiochilon fruticosum, qui diffèrent les unes des autres par la couleur des fleurs. Echiochilon fruticosum, qui se caractérise par la couleur bleue de ses fleurs, cette fois, a été trouvé avec superbe fleurs blanches. Qu'est-ce qui se passe ? L'albinisme n'est pas trop commun chez les plantes, mais est certainement possible.

Introduction

Echiochilon is a genus that belongs to the Boraginaceae family in the major group of Angiosperms. They include 16 species that grow in arid habitats distributed from Mauritania to India. In Tunisia, just one species of Echiochilon is found, it's Echiochilon fruticosum Desf. This species is native to Morocco, Algeria, Tunisia, Libya, Egypt, Palestine, Jordan, Lebanon, Syria and Saudi Arabia, and widely distributed in the sandy and stony soil (Täckholm, 1974, Lebrun, 1979). Based on material from Tunisia, E. fruticosum Desf. was described for the first time by Desfontaines in his Flora Atlantica. It is a shrubby perennial species growing on sandy or rocky soil, having woody stems and branches, prickly ; subulate leaves, prickly ; flowers sessile, axillary. In the nature, variations in wildflowers' color are always striking to see, and the variation in the same species would be more amazing.

In 2018, rangelands of southern Tunisia are well known for an abundance of spring wildflowers among which E. fruticosum, but with one notable exception where one individual species has attractive white flowers. ‘Natural’ mutations or albinism is uncommon among wildflowers in arid and desert rangelands, but this is not impossible after it was reported during the spring of 2018.

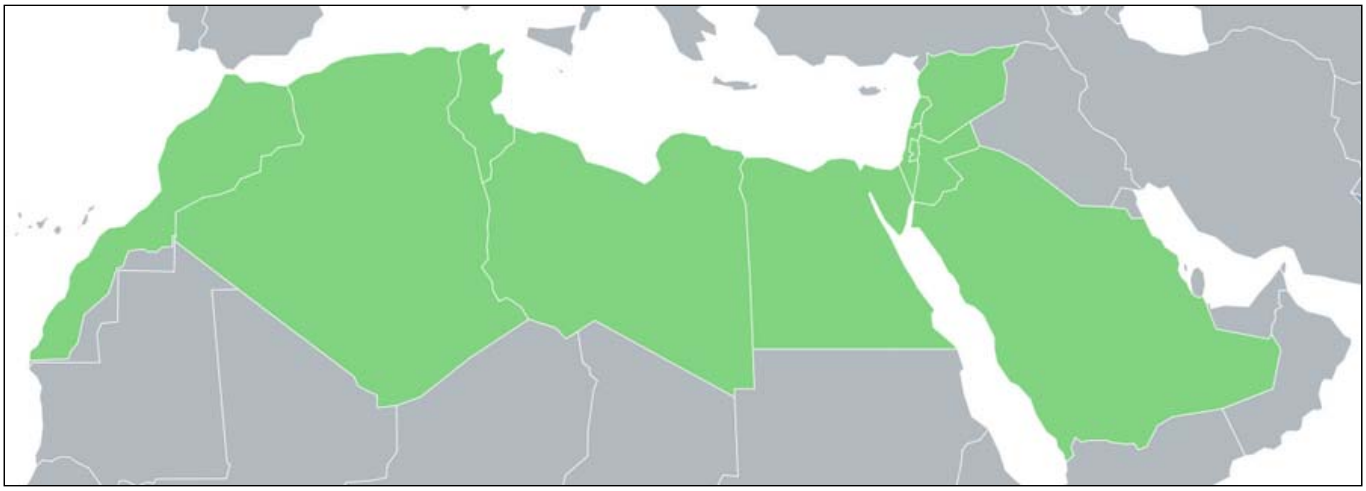

Figure 1. Distribution of *Echiochilon fruticosum* Desf.

Methodology

The plant grows about 30 cm high, erect, very branchy from the base. Branches are thin, smooth, alternate, unequal, often twisted, covered by short white hairs. Leaves are sessile, linear and scattered. Flowers axillary, solitary, sessile. The calyx is deeply divided into unequal lobes. Corolla blue, hispid externally, 6-8 mm long, with a more or less sinuous tube, throat bare, zygomorphic bilabiate leaf blade. Achene 1.5-2 mm, nipple-shaped, grayish brown, hunchbacked at the base, finely rough.

As a result of frequent and intensive fieldwork along the desert and arid rangelands of southern Tunisia during a project to document the botanical composition and species diversity of Tataouine (Gamoun and Louhaichi 2021), result in the discovery of interesting plants in terms of flower color. The newly found was a shrub of *E. fruticosum* with white flowers located just beside other shrubs of *E. fruticosum* with blue flowers, on sandy soil. This plant was the only one that was found after doing a completed survey of the area. The plant is the same, but all the corolla lobes are white. It appears to be albinos that can occur as a result of natural mutation.

Figure 2. *Echiochilon fruticosum* Desf. growing on sandy soil

Figure 3. Leafy branches with zygomorphic flowers

Figure 4. The only individual plant of *Echiochilon fruticosum* Desf. having white flowers

Figure 5. *Echiochilon fruticosum* Desf., showing the typical blue flowers on the left and white flowers on the right.

Discussion

Flowers are the magnificent and vital organ of plants with their brilliant colors that provide eye-catching attributes for amateurs of plant sciences, botanists and pollinators. For botanists, petal color is a valuable feature for plant identification. For instance, the petal color of Boraginaceae may be purple, pink, yellow, or white, but is predominantly blue. Flower color change or mutation results from the effects of several physical and chemical factors and even interactions between them. Variation in flower color is mainly driven by the production of anthocyanins, as their presence provides colors of petals like blue (Clegg et al., 2000 ; Sullivan and Koski 2021).

Like many other changes occurring in nature that deviate from the usual, the white color is the result of a genetic mutation (Ramkissoon, 2021). Kaul and Koul (2012) found that a rare mutation of the color of *Commelina benghalensis* L. flowers from blue to white in nature must have been in response to eco-habitat conditions, stress and selection pressures.

Many plant species have a natural mutation that causes flowers' color to become white due to a lack of color pigment, mainly anthocyanins. *Hyacinthoides non-scripta* is a common bluebell with one white bluebell only occurring in one of every 10,000 flowers (Harbod, 2015).

Soil pH can play an important role in the color of plants (Zhao and Tao, 2015). Acidification of soil can enhance the color of plant leaves by affecting anthocyanin synthesis (Sun et al., 2008), while no effect on flower color (Liu et al. 2011).

In the arid and desert rangelands of Tunisia, as far as we can remember, we've never seen a white *E. fruticosum* that is normally blue, but abnormal white flowers have been reported in a single species in close proximity to plants with blues flowers. Albinism in plants is characterized by the white color of organs (leaves, stem, flowers) due to partial or complete loss of photosynthetic pigments. Popular literature indicates that albinism in plants is a very rare phenomenon that has been reported in more than 50 plant species (Silva et al., 2020). Maybe also, *E. fruticosum* has been failed to produce flower pigmentation and as a result, its flowers are becoming abnormally white. The references do not include albinism in *E. fruticosum*, some research should be conducted, to discover that the flowers were an albino or a new variety of Echiochilon.

Conclusion

An extremely rare *Echiochilon fruticosum* Desf. with white flowers has been sighted first time in the desert areas in Tataouine in the year 2018. We are delighted to have such gifts bestowed by nature because it seems albinism and the data of albinism in desert plants, especially shrubs, are scarce. Additionalresearch is needed to find answers to other key questions such as, “Is it really an albinism or a new variety of Echiochilon“.

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