The Morphology and Palynology Study of *Dionysia odora* Fenzl. (Primulaceae) in Iraqi-Kurdistan

R.H.M.Salih ,S. A. Ahmad
Department of Field Crop , College of Agriculture, University of Sulaimani
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Abstract

The present research deals with the species *Dionysia odora* Fenzl. (synoname:*Dionysia michauxii*) it covers all its attributed and detailed. The plants are studied in the college of Agriculture/University of Sulaimaniya Herbarium. The Palynology, Ecology was given also. The specimens of the plant collected and identified by Saman Abdulrahmad Ahmad.

Key words: Kurdistan, Primulaceae*, Dionysia*, taxonomy, Piramagrun Mountain**.**

Introductions

The Primulaceae family comprises predominantly of herbs confined mainly to the North temperate regions of the old world and concentrated in the Himalaya, the Caucasus and the mountains of Europe, including some favorite garden plants and wildflowers. It is also known as the primrose family, [1].

The family contains 22 genera and 1000 species, occurring mainly in temperate and mountainous regions of the northern hemisphere, [2].

Accounts of the family have already been dealt with in various regional works. For instance [3] wrote an account of the family for the Flora Orientalis region; [4] dealt with the various genera of the family for Europe. [5] trated the species occurring in Turkey. Similarly [6] wrote an account of the family for Libya; [7] dealt with the primulaceous taxa of U.S.S.R. and [8] for Malesia etc.[9] and later [10] monographed the family on a worldwide basis. Twenty-two genera and ca. 1000 species; mainly in temperate and mountainous regions of the northern hemisphere; twelve genera and 528 species (373 endemic) are widely distributed throughout China, but are represented mostly in the S and W regions, [2].

The genus *Dionysia* Fenzl is a typically Irano-Turanian genus almost restricted to the rather dry mountains of the Flora Iranica area, from SE Anatolia and W Iran to Tadzhikistan and Afghanistan. Most species are cushion forming chasmophytes – in spring completely smothered in yellow, purple, violet or pink flowers – but some are more lax and "*Primula* looking". Some species are very choosy about their habitat and only grow below overhangs, whereas other species can be found also on slightly sloping rocks. In spite of being difficult to grow, a large number of species are cultivated by devoted specialists or in botanical gardens, [11].

When [12] revised the genus *Dionysia*, he recognized 28 species, but added several more in later publications. 41species were known to science when [13] published his semi-popular account "The genus *Dionysia*", in which all species are described and illustrations

(including several color photographs) and distribution maps are provided.Five new species of *Dionysia* are described in Iran Zagros Mts. were (*D. viva, D. zschummelii, D. crista-galli, D. zetterlundii and D. tacamahaca*) from the Zagros Mountains of W Iran. One subspecies (*D. sarvestanica* subsp. *spatulata*), one variety (*D. gaubae* var.*macrantha*) and two sections (*D. sect. Zoroasteranthos* and *D. sect. Mucida*) are also described as new [11].

Dionysia was first recognized as a genus by [14], based on material of *D. odora* (*D. sintenisii*) collected by Kotschy in Kurdistan. This, however, was not the first *Dionysia* known to science. Already in 1817 Lehmann had described *Primula aretioides* on material collected from North Iran in 1770, but only in 1846 Boissier formally transferred it to *Dionysia*, at the same time described three new species, [14]. In the meantime [9] had treated the Primulaceae for Candolle's Prodromus, in which he included the *Dionysia* species in *Gregoria*, a synonym of *Douglasia*, a rather remotely related genus.[15] published an account of *Dionysia*, recognizing it as a genus separate from *Primula*, as did [3]. [15] merged *Dionysia* into *Primula* as a section. [16] treated *Dionysia* for Engler's Pflanzenreich, recognizing 20 species.

It is present in Wild plants in Iraq the genus *Dionysia* has one species in Iraq and it is *D.odora* [17] and [18], while in the Geographical Distribution of Wild Vascular Plant of Iraq mensioned two species of the genus and they are *D.bormuiieri* Pax. and *D.odora* [19]. It was mentioned in both references above the synonym of the species *D.odora* is *D.aucheri* (DC) Boiss.

Materials and Methods

1- Morphological study:

The material of the current study are based on 9 samples collected from the research area they are collected at spring of 2009 by (Saman Abdulrahman). The specimens were dried and prepared as herbarium specimen to deposit in SUAH, the notes are written on the label including scientific name, family name, dates of collecting, name of collector, altitude, Latitude and Longitude and flowering date were selected.

All parts of plant morphological were studied in the laboratory under dissecting microscope (Motic). The habitat information was obtained from the field studies. The locality information with the coordinates and the coexisting plants were given as well.

2- Palynological Study:

Pollen material of the plant were examined by a light compound microscope. The pollen samples were removed from the anthers of flowers of collected specimens, and put on the slide after that the pollen grains were acetolysed after the method of [20] and mounted in glycerine jelly stained with safranin, and the equatorial and polar view were measured for 25 grains.

Results and Discussions

1- Morphological Descriptions:

Herbs perennial, rarely suffruticose, with glandular and eglandular hairs, plant 9-16 cm height . Plant has erect, smooth, woody steam. 60-140 mm length 4-7 mm width, dark-brown in color, branching started from the base of steam, inter node length 9-13mm and nod width 3-7mm.

Leaves whorled, in basal rosettes, often all basal, simple, stipules absent; blade obovate, light-green color, blade margins entire or denticulate, basal leaves 5-lobed at the top and the

upper leaves 3-lobed at the top, 3-4 mm long 1.5-2 mm width. It is covered in both sides with long glandular hairs. (Fig 1).

Bracts foliaceous, 1.2-2 mm long 0.6-0.9 mm width, green in color. Flowers solitary, sessile, perfect, 5-merous. perianth and androecium hypogynous.

Calyx tubular, sepals 5, connate into tube at the base, campanulate, deeply divided into oblanceolate sepals, acute, entire, apex margin with glandular hairs, light-green color, 3.5×1.5 mm. Sepals 3.5×0.8 mm. (Fig 1) Corolla hypocrateriform, with a slender tube widening at insertion of stamens, corolla 24-28 mm long, gamopetalous, actinomorphic, covered with glandular hairs, yellow, corolla tube 20-22 mm, 5 lobes, 4 – 4.5 × 1.8 – 2 mm, lobes entire. (Fig 1,2).

Stamens 5, included in corolla tube, opposite with corolla lobes, epipetalous, distinct, 13.5-15 mm. Anthers yellow, opening by longitudinal slits, 1.8×0.3 mm. Filaments attached near the throat of corolla, 13.2×0.2 mm, light-yellow in color. (Fig 1,2).

Styles 1, terminal, 22-24 × 0.1-0.2 mm, slightly exserted from corolla tube. Stigma 1, capitate. Ovary superior, 1-1.5 × 0.6-0.8 mm, obovate, light-brown in color. (Fig 1,2)

Fruits capsular, dehiscence by 5 valves.

2- Palynological Study:

Palynology plays a significant role in plant taxonomy, and yet this field has not been used too frequently in systematic work.

The first comprehensive book on palynology was by [21]. Earlier between the years 1926-1934, he also wrote several papers on various aspects of palynology and later (1936) an account of the evolutionary aspects of the pollen grains, [22]. Published his first concise book on pollen morphology pertaining to various angiosperme families. It is largely due to the pioneering work of these two, that pollen morphology has gained important in systematic work, [23].

In connection with the palynology of the Primulaceae, there are three works which are noteworthy; they are by [24 and 25]. The last mentioned work by Punt et al. has very good pollen descriptions to various taxa, obtained by light microscopy and the scanning electron microscope, but the scope of the work is limited to the European flora.

The pollen grains of *D. odora* are solitary, multicolpate, radially symmetrical and isopolar. Mean of equatorial axis = 18.2 µm., mean of polar axis = 13.5 µm. were measured for 25 pollen grain, the equatorial outline is more discoidal to elliptical; and polar outline is spherical. (Fig 3)

3- Ecology Study:

The species *D.odora* grow in the Pira-magrun Mountains near the peak in the sub alpine zone that is very steep and the slope is between 80 - 90%, at spring of 2009.

It is growing on limestone, usually vertically under overhanging rocks. The altitudes where most of these plants are found between 1950-2200 and Cordi.E:35 45 40, N:45 12 50. the picture of the plant and plant habit were taken by Camera Cannon D 400 by M.Saman A.. The important Association plant are *Lamium striatum*, *Rumex ribes*, *Rindera*(*Mattia*) *lanata*, *Euphorbia denticulata*, *Stachys lavandulifolia* and *Viola modesta*. (Fig 2).

References

1- Nasir, Y. J. (1983). A Revision Of The Family Primulaceae From Pakistan. University of Karachi. Karachi. (Thesis).

2- Flora of China,(1996). 15: 39–189.

3- Boissier, E. (1879). Flora Orientalis. 4:4-31.

4- Valentine and Kress, A. (1972). The Genus *Primula* in Tutin et. al. F1. Eur. 3: 15-20.

5- Lamond, J. (1978). The genera *Primula*, *Dionysia* and *Androsace* in Davis, Fl. Turk. 6. 112-127.

6- Ali, S.I. (1976). Primulaceae in Ali and Jafri Fl. Libya No. 1: 1-15.

7- Federov, An. (1952). The genera *Primula* and *Cortusa* in Bobrov and Schisckin Fl. URSS. 18: 111-202; 242-249.

8- Bentvelzen, P.A.J. (1962). Primulaceae in Van Steenis et. al., Fl. Males. 1 (6): 173-192.

9- Duby, J. (1844), Primulaceae. – Pp. 33-74 in: Candolle, A. P. de (ed.), Prodromus systematis naturalis regni vegetabilis 8. – Paris, etc.

10- Lidén, M. The genus *Dionysia* (Primulaceae), a synopsis and five new species. – Willdenowia. 37: 37-61. – ISSN 0511-9618; © (2007). BGBM Berlin-Dahlem. doi:10.3372/wi.37.37102 (available via http://dx.doi.org/) Magnus Lidén, Uppsala University Botanic Garden,Villavägen 8,75236 Uppsala, Sweden; e-mail: Magnus.Liden@botan.uu.se.

11- Wendelbo, P. (1961)a, Studies in Primulaceae I. A monograph of the genus *Dionysia*. – Aarbok. Univ. Bergen, Mat.-Naturvitensk. Ser. (3).

12- Grey-Wilson, C. (1989) The genus Dionysia. – Woking.

13- Fenzl, E. (1843), Plantarum generum et specierum novarum decas prima. – Flora 26: 389-404.

14- Bunge, A. (1871), Die Arten der Gattung *Dionysia* Fenzl.-Bull.Acad. Imp. Sci. Saint-Pétersbourg 16: 547-563.

15- Kuntze, O. (1891), Revisio generum plantarum 2. – Leipzig, etc.

16- Knuth, R. (1905),*Dionysia*. – Pp. 160-168 in: Engler, A. (ed.), Das Pflanzenreich 22. – Leipzig.

17- Al-Rawi, A. (1964). Wild Plant of Iraq with their Distribution. Min. of Agr. And Irridation – National Herb. Of Iraq, Bagh. P. 43,47,51.

18- Al-Mashhadani, A.N.; Ahmmad, S.A. and Muhammad, R.H., (2009). List of Sulaimani District Vegetation. University of Sulaimani. College of Agriculture-Department of Field Crops. (Unpublished).

19- Ridda, T.J. and Daood, W.H. (1982). Geographical Distribution of Wild Vascular Plant of Iraq. Nat. Herb. Of Iraq, Un Publ. 44-49.

20- Erdtman, (1966). Pollen Morphology and Plant Taxonomy. reprinted. Angiosperms. Stockholm. 553.

21- Wodehouse, R.P.(1935). Pollen grains. Their Structure, Identification and Significance in science and medicine. New York and London.

22- Erdtman, (1952). Pollen Morphology and Plant Taxonomy. Angiosperms. Stockholm.

23- Rabeler, Richard K. and Hartman, Ronald L. (2007). Flora of North America. (From Internet).

24- Spanowsky, W. (1962). Die bedeutung der pollenmorphologie fur die Taxonomie der Primulaceae-Primuloideae. Fedded Repert 65: 149-215.

25- Punt, W.; Weenan, J. ;de Leeuw and Oostrum, W.A.P. van. (1974). Primulaceae in Jannssen, Punt and Reitsma editors. The N.W. Eur. Pollen flora 3, Rev. of Palebotany and palynology, 17 (3/4): 31-70.

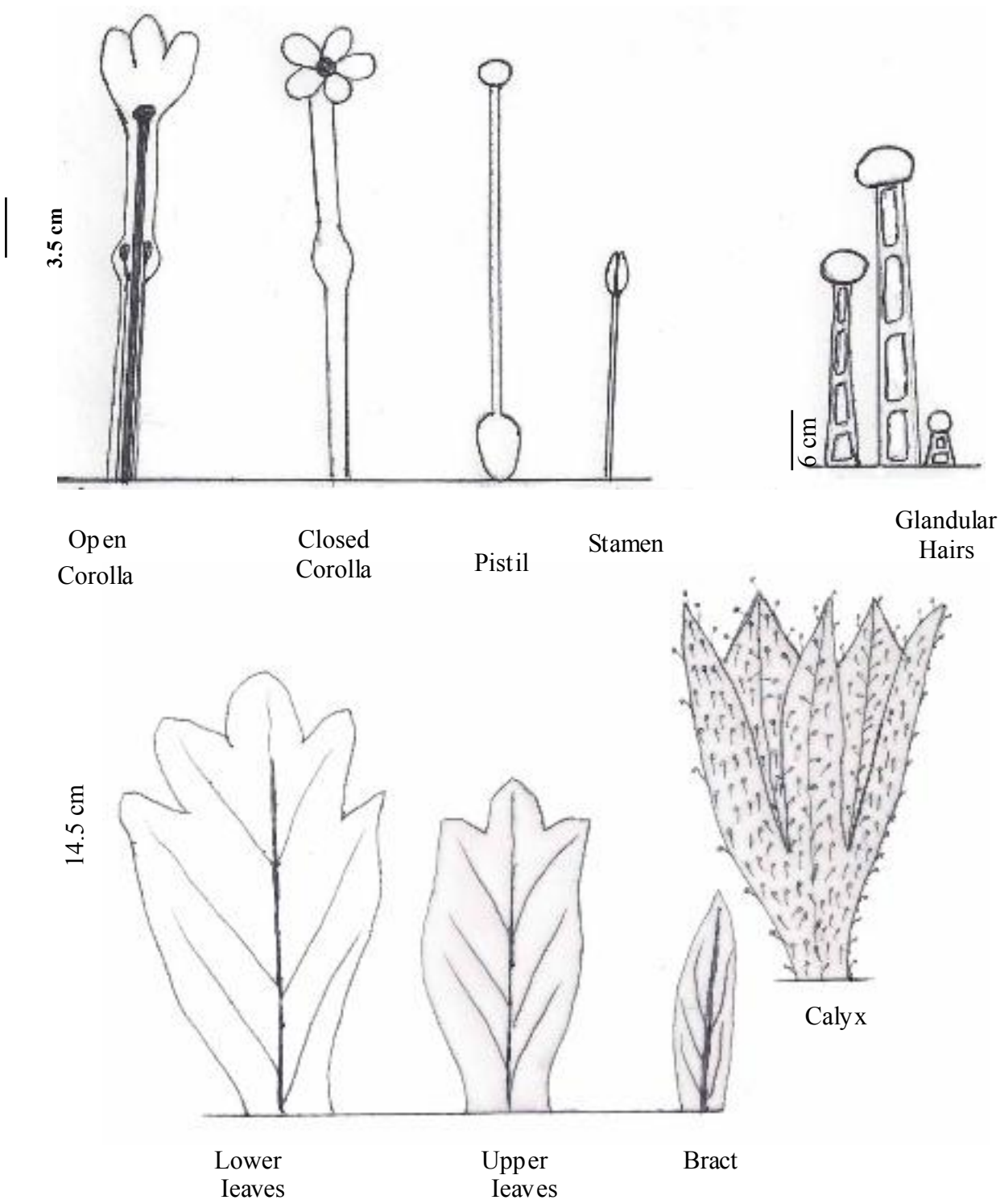
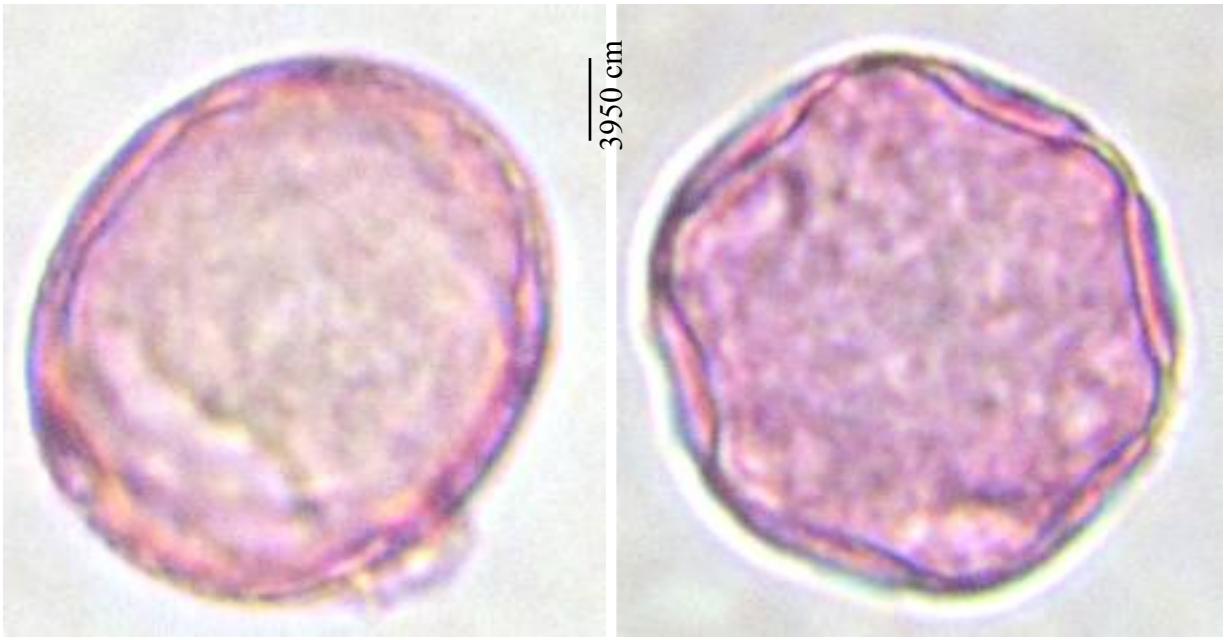


Fig (2): The Morphological Character for *Dionysia odora* plant parts.

Photo by: Suman A.Ahmad

Fig. (2): The *D.odora* plant in its Natural Habit.



Equatorial view Polar view

Fig. (3): Pollen grain

دراسة المظهر الخارجي وحبوب اللقاح للنوع *Dionysia odora* Fenzl. (Primulaceae) في كوردستان –العراق

روبار حسين محمد صالح، سامان عبدالرحمن أحمد
قسم محاصيل الحقلية، كلية الزراعة، جامعة السليمانية

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الخلاصة

يهتم البحث الحالي بدراسة النوع *D. odora* وذلك بعرض صفاته المورفولوجية بشكل مفصل ودقيق. أجريت الدراسة في معشب كلية الزراعة/جامعة السليمانية. لحبوب اللقاح، والبيئة التي يعيش فيها النبات أيضآ. جمعت النماذج وشخصت نباتات النوع من سامان عبدالرحمن أحمد.

الكلمات المفتاحية : Kurdistan, Primulaceae, *Dionysia*, taxonomy, Piramagrun Mountain.