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BIODIVERSITY OF MOSSES IN THE MOUNTAIN REGION IN NORTHERN IRAQ (AMADIYAH DISTRICT)

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ABSTRACT

In the best growing period, March-May of the year (2020), (2225) moss specimens have been collected using the scientific methods used in such cases, from (35) different locations, these specimens located within one Iraqi Physiogeographic region (district of Amadiyah) is located in the far north of Iraq, the mountain region. It consists of a group of mountains, valleys and some plains, (65) existing mosses of (30) genera have been identified. Its existence was first identified in Amadiyah district, although its presence was recorded in other Iraqi districts. Each of these species of existing mosses has been referred to in detail, in addition to their location and prosperity, not to mention the other existing species of mosses recorded by previous studies on this district. The species *Syntrichia intermedia* was recorded for the first time within the moss flora of Amadiyah district and Iraq in general.

Keywords : Moss specimens, Amadiyah district, the mountain region, *Syntrichia intermedia*, valleys and some plains.

Introduction

The scientist Linnaeus (1753) referred to the first class of plants to (24) class using only one trait, which is "the number, shape and arrangement of stamens." Fungi, Bryophytes and Pteridophytes, and after Linnaeus, many botanists appeared, each of whom developed a classification system for its own. The location of mosses differed in these systems.

The scientist DeJussieu (1777-1699) proposed a new system for classifying the plant kingdom and in his book "Genera Plantarum" (1789). Acotyledons, dicotyledons and finally monocotyledons, which consisted of a single row that included algae, fungi and mosses (Smith, 1938). The scientist Braun (1864) was the first to use the term Bryophyta to a group of low-grade plants, which at that time meant fungi, algae and lichens as well as mosses, and not long after that Schimper (1879) placed Bryophyta mosses at the level of (Division) Since then mosses have remained the same taxonomic rank to this day (Geet, 2006).

Many developed countries in the world, in various continents, have been witnessing for more than two decades an increasing interest in various branches of knowledge related to mosses, such as classification, environment, genetics, physiology, pharmacology, and so on, resulting in a large accumulation and updating of information, all of which are accessible to researchers. As for Iraq, as well as the rest of the neighboring Arab countries, the group of bryophytes did not encourage a real and wide interest in the field of scientific research, and this is evidenced by the lack of research and studies, in addition to the books written about them.

Among the most important pioneering contributions that included Iraqi moss flora were those of Juratzka & Milde

and Schiffner published at the end of the nineteenth century (1870 and 1897). However, throughout the twentieth century there was little research written by different authors, and that was published separately. They are Schiffner (1913); Handel-Mazzetti (1914); Froelich (1959); Vondracek (1962 & 1965); Agnew & Townsend (1970); Agnew (1973); Agnew & Vondracek (1975) Long (1979); Al-Ni'ma (1994) (2003); Almashadany (2012), was one of the most comprehensive of these works. The work "Moss Flora of Iraq", which was accomplished by Agnew & Vondracek., (1975), and included a description of 52 genera and 145 species with an identification key in addition to notes on soil topography and climate. This study included large parts of Amadiyah district that included each of the following regions and Both sides of the roads leading to it, Sarsing, Ashawa, Janki, Barwari Bala, Bamerni, Atrush, KaniMasi, Heise, Mankish, Brochke, Kofli, Koremi, Panda, Mujlmakht, Bisvki, Derbenik, Karbal, Panh Sora, Shaoriki, Anishki, chamanki, Deraluk, Kali Shirana, Shiladze, Bekova, KaniBlavi, Prevka, Dinarah, Bijel, Karda Sen, Mount Kara, Matin Mountain, Kani Balanda located between Mount Matin and Mount Shirin.

This study sheds light on the classification of the existing moss species present in the vast mountainous district of Amadiyah, in addition to the species recorded by previous researchers and scholars who have been referred to, as it is not possible to enumerate and classify all the species present in the high endless mountains due to the difficulty of accessing them and that requires more time and the effort made by specialized research teams in this field. Only one species of moss based on the flora of Amadiyah district and the Iraqi flora in general has been recorded: (*Syntrichia intermedia*). Many areas of Amadiyah district were surveyed that were not covered by previous studies.

Arrangement of the list:

- The present list includes (8) orders with (15) families, (53) genera and a total of (150) species,
- Mosses were arranged following that of Agnew & Vondracek (1975).

Each taxon followed by an abbreviated citation including collectors' names and the abbreviated symbol for collection of specimens is moss flora Amadiyah district (MAM).

Collectors' names and their abbreviation

1. Schiffner (1897).....(S18)
2. Schiffner (1913).....(S19)
3. Handel – Mazzitti (1914)(Han)
4. Froelic (1959)(Fro)
5. Vondracek (1962)(V62)
6. Vondracek (1965)(V65)
7. Agnew (1973)(Agn)
8. Agnew&Vondracek (1975).....(A & V)
9. Long (1979)(Lon)
10. Al- Ni'ma (1994)(Aln)
11. Al- Ni'ma (2003)(Aln)
12. Al-Mashahadany (2012) (Al M)

Material and Methods

The present study area included only one of the four physio geographical regions in Iraq, which is the region of the mountains, During the field work in the year (2020), nearly (2225) specimens were collected, starting from the end of February (2020), and the collection operations continued until the end of May of the same year, and because of the prevailing climate in the study areas, the collection operations were limited to these The time period coinciding with the period of growth and prosperity of mosses, the current study area included only one of the four physio geographical regions in Iraq, which is the mountain region, which was confined between the two longitudes. 37° 5'32 "N, 43° 29'16" E, and among the districts of this region, Amadiyah district, specimens were collected from an altitude of 1000 meters to an altitude of 2667 meters above sea level. The collected specimens have been dried, labeled, numberedThe specimens were identified depending on the artificial keys mentioned in.

1. British Mosses and Liverworts by Watson & Richard (1968).
2. The Moss flora of Britain and Ireland by Smith (1978).
3. The Moss flora of Britain and Ireland by Smith (2004).
4. Zander, R.H. (1994). Timmiella. In: A. J. Sharp *et al.*, eds. The moss flora of Mexico. Mem. New York Bot. Gard. 69: 243-246.

Kingdom:	Plantae
Division:	Bryophyta
Class:	Bryopsida
Subclass:	Dicranidae

I. Order : Fissidentales

I.a- Family : Fissidentaceae

Genus : *Fissidens*

- 1.1- *Fissidens arnoldi* Ruthe [For:MAM; A&V: MAM]
- 1.2- *F. crassipes* Wils. [A&V:MAM]
- 1.3- *F. bryoides* Hedw. [in this study : MAM]
- 1.4- *F. viridulus* (Web. Et Mohr) [in this study : MAM]
There is in the area of Kali Shirana, Kani Balanda, Mount Kara, Kani Balanda

I.b-Family: Bryaceae

Genus: *Rhodobryum* (Schimp.) Limpre

- 2.1- *Rhodobryumroseum* (Hedw) Limpre. [Aln 2003]

II. Order : Dicrinales

I.a- Family Ditrichaceae

Genus : *Distichium*

- 3.1- *Distichium capillaceum* (Hedw.) B. S. G. [in this study : MAM] There is in the area of Kali Shirana, Shiladze, Mujlmakht, KaniBlavi, Matin Mountain.
- 3.2- *D. capillaceum* var. *compactum* [in this study :MAM] There is in the area of Panda, Mujlmakht, Bisvki, KaniMasi, Barwari Bala.
- 3.3- *D.heteromallum* (Hedw) [Aln 2003]

Genus : *Cheilothela*

- 4.1- *Cheilothela chloropus* (Brid.) Lind. [in this study :MAM] There is in the area of, Ashawa, Janki, Barwari Bala, Bamerni, Atrush.

II.b- Family Dicranaceae

Genus : *Anisothecium*

- 5.1- *Anisothecium varium* (Hedw.) Mitt. [in this study : MAM] There is in the area of Derbenik, Karbal, Panh Sora, Shaoriki,

III. Order Pottiales

III. a. Family Encalyptaceae

Genus : *Encalypta*

- 6.1- *Encalypta intermedia* Jur. [S19;MAM]
- 6.2- *E. vulgaris* Hedw. [A&V ; MAM]
- 6.3- *E.streptocarpa*Hedw. [M. al M]

III. b. Family Pottiaceae

III. b/i Subfamily Trichostomea

Genus: *Didymodon*

- 7.1- *Didymodon revolutus* (Cardot) R.S. Williams. [M.al M]

Genus : *Timmiella*

- 8.1- *Timmiella crassinervis* (Hampe) L.F.Koch.[M.al M]

Genus: *Barbula*

- 9.1- *Barbula acuta* (Brid.) Brid. [Han:*; A&V: Diyala province (Jebel Hamrin & Diyala Weir ; MAM]
- 9.2- *B. fallax* Hedw. [Han:*;A&V:MAM]

- 9.3- *B. hornschurchiana* Schultz [in this study : MAM] There is in the area of Kali Shirana, Mount Kara, Matin Mountain, Kani Balanda, Derbenik, Karbal, Panh Sora.
- 9.4- *B. hornschurchiana* var. *pseudorevoluta* Reim. [in this study :MAM] There is in the area of Kali Shirana, Sarsing, Ashawa, Shaoriki, Anishki, chamanki.
- 9.5- *B. icmadophila* Schimp [in this study :MAM] There is in the area of Bekova, KaniBlavi, Prevka, Janki, Barwari Bala, Bamerni,
- 9.6- *B. rigidula* (9Hedw.) Mitt. [MAM] According to Smith (1978) they mentioned the synonyme *Didymodon rigidulus* Hedw.
- 9.7- *B. tophaceae* (Brid.) Mitt. [in this study :MAM] Mount Kara, Matin Mountain, Kani Balanda.
- 9.8- *B. tophaceae* f. *lingulata* Moenk. [in this study :MAM] There is in the area of Kali Shirana, Mount Kara, Matin Mountain, Kani Balanda.
- 9.9- 6.10- *B. trifaria* (Hedw.) Mitt. [in this study :MAM] There is in the area of Bijel, Karda Sen, Mount Kara, Shiladze, Bekova, KaniBlavi.
- 9.11- *B. trifaria* var. *desertorum* (Froehlich) S. Agnew Comb. Nov [in this study :MAM] There is in the area of Shiladze, Bekova, KaniBlavi, Mount Kara, Matin Mountain, Kani Balanda. st author mentioned the synonym *Barbula rigidula* var. *desertorum*.
- 9.12- *B. unguiculata* Hedw. [in this study :MAM] There is in the area of Mujlmakht, Bisvki, Derbenik, Karbal, Panh Sora, Shaoriki, Sarsing, Ashawa, Janki.
- 9.13- *B. vianalis* Brid. [S19; Han:*;A&V; MAM]
- 9.14- *B. vianalis* var. *cylindrica* Boul. [A&V: MAM]
- Genus: *Hydrogonium*
- 10.1- *Hydrogonium ehrenbergii* (Lorentz) Jager et Sauerb. [Han:*; A&V: MAM] the 1st author mentioned the synonym *Didymodon ehrenbergii*.
- Genus : *Streblotrichum*
- 11.1- *Streblotrichum convolutum* (Hedw.) P. Beauv. [A&V: MAM]
- Genus : *Hymenostylium*
- 12.1- *Hymenostylium recurvirostrum* (Hedw.) Dix. [in this study :MAM] There is in the area of Kali Shirana, Shiladze, Bekova, Kani Balanda, Mankish, Brochke, Kofli.
- Genus : *Anoetangium*
- 13.1- *A. handelii* Schiffn [Han:*; A&V: MAM]
- Genus : *Eucladium*
- 14.1- *Eucladium verticillatum* (Brid.) B. S. G. [Fro: MAM]
- 14.2- *E. verticillatum* var. *angustifolium* Jur. [in this study :MAM] There is in the area of Sarsing, Ashawa, Janki, Barwari Bala, KaniMasi, Heise, Mankish.
- Genus : *Hymenostomum*
- 15.1- *Hymenostomum tortile* (Schwaegr.) B. S. G. [in this study :MAM] There is in the area of Ashawa, Janki, Barwari Bala, KaniMasi, Heise, Koremi, Panda.
- Genus : *Weissia*
- 16.1- *Weissia controversa* var. *amblydon* (Brid.) C. Jens. [in this study :MAM] There is in the area of Kali Shirana, Shiladze, Bekova, Bamerni, Atrush, KaniMasi, Heise.
- 16.2- *Weissia fallax* Sehm. [A&V: MAM]
- Genus : *Gymnostomum*
- 17.1- *Gymnostomum aeruginosum* Smith. [in this study :MAM] There is in the area of Sarsing, Derbenik, Karbal, Panh Sora, KaniBlavi, Prevka, Dinarah.
- 17.2- *G. calcareum* Nees & Hornsch. [in this study :MAM] There is in the area of Sarsing, Ashawa, Janki, Barwari Bala, Bamerni, Mount Kara.
- 17.3- *G. mosis* (Lor.) Jur. at Milde. [A&V: MAM]
- Genus : *Gyroweisia*
- 18.1- *Gyroweisia tenuis* (Hedw.) Schimp. [S19: MAM; Han:*;A&V:MAM]
- Genus : *Timmiella*
- 19.1- *Timmiellabarbulooides* (Brid.) Moenk. [S19:MAM]
- Genus : *Trichostomum*
- 20.1- *Trichostomum crispulum* var. *elatum* Schimp. [A&V: MAM]
- Genus : *Tortella*
- 21.1- *Tortellatortuosa* (Hedw.) Limpr. [V62: MAM]
- Genus : *Pleurochaete*
- 22.1- *Pleurochaetes quarrosa* (Brid.) Lindb. [A&V: MAM]
- III. b/ii Subfamily Pottiae
- Genus : *Acaulon*
- 23.1- *Acaulon triquetrum* (Spruce) C. Mull. [in this study :MAM] There is in the area of Kali Shirana Koremi, Panda, Mujlmakht, Bisvki, Derbenik, Karbal, Barwari Bala, Bamerni.
- Genus : *Pteryoneurum*
- 24.1- *Pteryoneurum ovatum* (Hedw.) Dix. [in this study :MAM] There is in the area of KaniMasi, Heise, Mankish, Brochke, Kofli, Koremi, Panda.
- Genus : *Pottia*
- 25.1- *Pottia lanceolata* (Hedw.) C. Mull. [in this study :MAM] There is in the area of Sarsing, Ashawa, Janki, Barwari Bala, Bamerni, Atrush, KaniMasi, Heise, Mankish, Brochke.
- 25.2- *P. davalliana* (Smith) Broth. [in this study :MAM] There is in the area of Sarsing, Ashawa, Prevka, Dinarah, Bijel, Karda Sen, Mount Kara, Matin Mountain.
- 25.3- 23.4- *P. muticaven.* [in this study :MAM] There is in the area of Kali Shirana, Shiladze, Bekova, KaniBlavi, Barwari Bala, Bamerni, KaniMasi, Heise
- Genus : *Phascum*
- 26.1- *Phascum cuspidatum* Hedw. [in this study :MAM] There is in the area of Kali Shirana, Shiladze,

- Bekova, KaniBlavi, Atrush, KaniMasi, Heise, Mankish, Brochke, Kofli.
- 26.2- *Phascumcuspidatum* var. piliferum.[Aln 2003]
- 26.3- *Phascumcurvicolle* Hedw. [Aln 2003]
- Genus : Aloina
- 27.1- *Aloinaambigua* (B.S.G) Limpr. [A&V:MAM]
- 27.2- *A. rigida* (Hedw.) Kindb. [in this study :MAM] There is in the area of Sarsing, Ashawa, Janki, Barwari Bala, Bamerni, Shiladze, Bekova, KaniBlavi.
- Genus : Crossidium
- 28.1- *C. squamigerum* (Viv.) Jur. [in this study :MAM] There is in the area of Karda Sen, Mount Kara, Matin Mountain, Kani Balanda, KaniMasi, Heise, Mankish, Brochke.
- 28.2- *C. squamigerum* var. pottioideum (De Not.) Moenk. [A&V: MAM]
- Genus : Trichostomopsis
- 29.1- *Trichostomopsisaaronis* (Lor.) S. Agnew & Townsend [A&V: MAM]
- Genus : Tortula
- 30.1- *Tortulaalpina* (B.S.G.) Bruch.[in this study :MAM] There is in the area ofKoremi, Panda, Mujlmakht, Mount Kara, Mtatin Mountain, Kani Balanda.
- 30.2- *T. atrovirens* (Smith) Lindb. [in this study :MAM] There is in the area ofSarsing, Ashawa, Janki, Barwari Bala, Bamerni, Atrush, Kani Mas i, Heise, Mankish, Koremi, Panda, Mujlmakht, Derbenik.
- 30.3- *T. inermis* (Brid.) Mont.. [in this study :MAM] There is in the area ofSarsing, Ashawa, Mount Kara, Mtatin Mountain, Kani Balanda.
- 30.4- *T. marginata* (B.S.G.) Spruce. [in this study :MAM] There is in the area of Barwari Bala, Bamerni, Atrush, KaniMasi, Heise, Mankish, Shiladze,Kani Balanda.
- 30.5- *T. montana* (Nees) Lndbg. [Han: *; Fro: MAM]
- 30.6- *T. muralis*Hedw. [Han: MAM]
- 30.7- *T. muralis* var. aestiva (P. Beauv) Brid. Han: MAM] The 1st author mentioned the synonyme Tortulaaestiva
- 30.8- *T. princeps* De Not. [Frp: MAM]
- 30.9- *T.sp.*[Aln 2003]
- Genus : Syntrichia
- 31.1- *Syntrichiaalpina* (B. S. G.) Jur.. [in this study :MAM] There is in the area ofSarsing, Ashawa, Mtatin Mountain, Kani, Balanda, Barwari Bala, Bamerni, Atrush, KaniMasi, Heise.
- 31.2- *S. desetorum* (Broth.) Amann. [in this study :MAM] There is in the area of, chamanki, Deraluk, Mujlmakht, Bisvki, Derbenik, Barwari Bala, Bamerni, Atrush, KaniMasi.
- 31.3- *S. handelii* (Schiffn.) Podp. [A&V: MAM]
- 31.4- *S. inermis* (Mont.) Huben. [A&V: MAM]
- 31.5- *S. laevipila* Brid.[A&V: MAM]
- 31.6- *S. montana* Nees et Esneb. [V62: MAM]
- 31.7- *S. montana* var. calva (Dur. Et Sag.) Amann. [in this study :MAM] There is in the area of Prevka, Dinarah, Mount Kara, Mtatin Mountain, Kani Balanda, Sarsing, Ashawa, Janki, Barwari Bala, Bamerni
- 31.8- *S. papillosissima* (Coppey) Loeske. [in this study :MAM] There is in the area of, Mount Kara, Mtatin Mountain, Kani Balanda, Shaoriki, chamanki, Kali Shirana.
- 31.9- *S. princeps* (De Not.) Mitt. [A&V: MAM]
- 31.10- *S. pulvinata* (Jur.) Jur.. [in this study :MAM] There is in the area of, Mount Kara, Mtatin Mountain, Kani Balanda, Ashawa, Sarsing, Janki, Barwari Bala, Bamerni, KaniMasi.
- 31.11- *S. ruralis* Brid. [A&V: MAM]
- 31.12- *S.latifolia*. (Bruch ex Hartm.) Huebener. [M al M]
- 31.13- *S. Intermedia* [New record in this study] There is in the area of Mount Kara, Mtatin Mountain, Kani Balanda , KaniMasi, Heise, Mankish, chamanki, Kali Shirana, Sarsing, Ashawa, Barwari Bala, Bamerni.
- III.b/iii Subfamily Cinclidoteae
- Genus : Cinclidotus
- 32.1- *Cinclidotus fontinaloides* (Hedw.)P. Beauv. [A&V: MAM]
- 32.2- *C. nigricans* (Brid.) Loeske. [A&V: MAM]
- IV. Order Grimmiales**
- IV. a. Family Grimmiaceae
- Genus : Schistidium
- 33.1- *Schistidiumapocarpum* var. atrofusum (Schimp.) Husnot. [Han:*;V62: MAM]. The 1st & 2nd authorsmentioned the synonym
- Genus : Grimmia
- 34.1- *Grimmia anodon* B. S. G. [in this study :MAM] There is in the area ofMtatin Mountain, Kani, Balanda, KaniMasi, Heise, Panda, Mujlmakht, Sarsing, Barwari Bala, Bamerni.
- 34.2- *G. apiculata* Hornsch. [in this study :MAM] There is in the area of Mount Kara, Mtatin Mountain, Kani Balanda, Dinarah, Bijel, Karda Sen, Barwari Bala, Bamerni.
- 34.3- *G. commutata* Hub. [in this study :MAM] There is in the area ofKaniMasi, Heise, Mankish, Brochke, Kofli, Koremi, Panda, Mujlmakht, Bisvki, Derbenik, Karbal, Panh Sora.
- 34.4- *G. laevigata* (Brid.) Brid. [in this study :MAM] There is in the area ofKaniMasi, Heise, Mankish, Kali Shirana, Shiladze, Barwari Bala, Bamerni.
- 34.5- *G. orbicularis* Bruch [S19 On calcareous rocks. It is the most abundant mosses in North mesopotamia and Kurdistan 400-1250 m; Fro: MAM]
- 34.6- *G. ovalis* var. simplex Vondracek. [in this study:MAM] There is in the area of Kali Shirana, Shiladze, Mount Kara, Mtatin Mountain, Kani Balanda, KaniMasi.
- 34.7- *G. pulvinata* (Hedw.) Sm. [Han: MAM]

34.8- *G. lergestina* Tomm.. [in this study :MAM] There is in the area of Mount Kara, Mtatin Mountain, Kani Balanda, Karbal, Panh Sora, chamanki, Kali Shirana, KaniMasi

Genus : *Racomitrium*

35.1- *R. affine* (Web & Mohr) Lindh. [Aln 2003]

V. Order Funariales

V. a. Family Funariaceae

Genus : *Entosthodon*

36.1- *Entosthodon. handelii* Schiffn. [S19: mentioned the synonym *Funaria handelii* on calcareous rock. in North East mesopotamia and middle Kurdistan 250-1800 m; [MAM]

36.2- *E. templetoni* (Smith) Schwaegr. [A&V: MAM]

Genus : *Funaria*

37.1- *Funaria hygrometrica* Hedw. [Han: *; A&V: MAM]

37.2- *F. mediterranea* Lindb. [in this study :MAM] There is in the area of Mount Kara, Mtatin Mountain, Kani Balanda, chamanki, Bekova, KaniBlavi, Prevka, Dinarah, Bijel, Barwari Bala, Bamerni.

VI. Order : Eubryales

a Family Bryaceae

Genus : *Mniobrium*

38.1- *Mniobrium albicans* (Wahib.) Limpr. [in this study :MAM] There is in the area of Sarsing, Ashawa Karda Sen, Mount Kara, Mtatin Mountain, Kani Balanda, KaniMasi, Heise, Koremi, Barwari Bala, Bamerni.

38.2- *Mniobriumdelicatrulum* (Hedw.) Dix [A&V: MAM]

38.3- *M. latifolium*Schiffn. [in this study :MAM] There is in the area of Mount Kara, Mtatin Mountain, Kani Balanda, KaniMasi, Kali Shirana, chamanki, Barwari Bala, Bamerni.

Genus : - *Bryum*

39.1- *Bryum. alpinum* Brid. [Fro: MAM]

39.2- *B. argentum* Hedw. [in this study :MAM] There is in the area of Kali Shirana, Shiladze, Mount Kara, Mtatin Mountain, Kani Balanda, KaniMasi

39.3- *B. argentum* var. *lanatum* (P. Beauv.) B.S.G. [in this study :MAM] There is in the area of Mount Kara, Mtatin Mountain, Kani Balanda, Kali Shirana, Shiladze, Barwari Bala, Bamerni, KaniMasi.

39.4- *B. badium* Bruch ex Ruthe [Han:MAM]

39.5- *B. caespiticum* Hedw. [Han: *; Fro: MAM]

39.6- *B. capillare* Hedw. [Han: *; A&V: MAM]

39.7- *B. capillare* f. *flaccidum* B.S.G. [in this study :MAM] There is in the area of Mount Kara, Mtatin Mountain, Kani Balanda, Barwari Bala, Bamerni, Atrush, KaniMasi, Heise, Mankish.

39.8- *B. capillare* var. *torquescens* (B.S.G.) Husn. [A&V: MAM] The 1st & 2nd author mentioned the synonyme *Bryumtorquescens*

39.9- *B. funkii* Schwaegr. [in this study :MAM] There is in the area of Mount Kara, Mtatin Mountain, Kani

Balanda, Sarsing, Ashawa, Janki, Barwari Bala, Bamerni, Atrush, KaniMasi, Heise.

39.10- *B. pallens* (Brid.) Rohl. [in this study :MAM] There is in the area of Mount Kara, Mtatin Mountain, Kani Balanda, Mujlmakht, Bisvki, Derbenik, KaniMasi, Heise, Mankish.

39.11- *B. syriacum* Lor. [in this study :MAM] There is in the area of Shaoriki, Anishki, chamanki, Deraluk, Kali Shirana, Shiladze, Koremi, Panda, Sarsing, Ashawa.

39.12- *B. gemmiparum* De Not [M. al M]

39.13- *B. uliginosum* (Brid) Bruch&Schimp. [M. al M]

VI. b. Family Mniaceae

Genus : *Mnium*

40.1- *Mnium longirostrum* Brid. [in this study :MAM] There is in the area of KaniMasi, Heise, Mujlmakht, Bisvki, Barwari Bala, Bamerni, Dinarah, Bijel, Karda Sen, Mount Kara, Mtatin Mountain, Kani Balanda.

VII.c. Family Bartamiaceae

Genus : *Philonotis*

41.1- *Philonotiscaespitosa* Wils. [A&V: MAM]

41.2- *P. calcaera* (B. S. G.) Schimp. [Han:*; V62: MAM]

41.3- *P. fontana* (Hedw.) Brid. [in this study :MAM] There is in the area of Kofli, Mount Kara, Mtatin, Mountain, Kani Balanda, Kali Shirana, Shiladze, Barwari Bala, Bamerni.

41.4- *P. fontana* f. *laxifolia* Moenk. ap. Loeske. [in this study :MAM] There is in the area of Mount Kara, Mtatin Mountain, Kani Balanda, Panda, Mujlmakht, Bisvki, Derbenik, Karbal, Panh Sora, Shaoriki.

41.5- *P. seriata* (Mitt.) Lindb. [Fro: MAM; rementioned in A&V]

VIII.d. Family : Orthodontaceae

Genus : *Orthodontium*Schwagr

42.1- *Orthodontiumlineare*Schwagr. [M. al M]

VII. Order Isobryales

VII. a. Family Orthotrichaceae

Genus : *Orthotrichum*

43.1- *Orthotrichumafine* Brid. [A&V: MAM]

43.2- *O. cupulatum* Brid. [Fro: MAM]

43.3- *O. lyellii* Hook et Tayl. [A&V: MAM]

43.4- *O. octoblephare*. [in this study :MAM] There is in the area of, Sarsing, Ashawa, Shiladze, Bekova, KaniBlavi, Prevka, Dinarah, Bijel, Karda Sen, Mount Kara, Mtatin Mountain, Kani Balanda

43.5- *O. rupestre* Schleich. [in this study :MAM] There is in the area of Kani Balanda, Shiladze, Barwari Bala, Bamerni, Koremi, Panda, Mujlmakht, Bisvki, Derbenik, Karbal, Heise, Mankish.

43.6- *O. schimperi* Hammar. [A&V: MAM]

43.7- *O. soeciosum* Nees. [in this study :MAM] There is in the area of Sarsing, Ashawa, Janki, Barwari Bala, Matin Mountain, Kani Balanda.

VIII. Order Hypnobryales

VIII. a. Family Fabroniaceae

Genus : Fabronia

44.1- *FabroniapusillaRadi* [A&V: MAM]

VIII. b. Family Hypnaceae

VIII. b/i. Subfamily Amblystegiaceae

Genus : Cratoneuron

45.1- *Cratoneuroncommutatatum* (Hedw.) Roth. [Han:*; A&V: MAM]45.2- *C. commutatatum* var. *falcatum* (Brid.) Moenk. [in this study :MAM] There is in the area of Barwari Bala, Bamerni, Atrush, KaniMasi, Heise, Mankish, Brochke, Kofli.45.3- *C. commutatatum* var. *sulcatum*(Lindb.) Monk. [in this study :MAM] There is in the area of KaniMasi, Kani Balanda, Bijel, Karda Sen, Mount Kara, Matin Mountain.45.4- *C. filicinum* (Hedw.) Roth. [Fro :MAM]

Genus : Amblystegium

46.1- *Amblystegium juratzkanum* Schimp. [in this study :MAM] There is in the area of KaniMasi, Heise, Janki, Barwari Bala, Bamerni.46.2- *A. serpens* (Hedw.) B. S. G. [A&V: MAM]46.3- *A. varium* (Hedw.) Lindb. [in this study :MAM] There is in the area of KaniMasi, Heise, Mankish, Brochke, Kofli, Koremi.

VIII. b/ii Subfamily Brachytheciaceae

Genus: Brachythecium

47.1- *Brachythecium rutabulum*. [Aln 2003]

Genus : Homalothecium

48.1- *Homalotheciumphilippeanum* (Spruce) B.S.G. [Han: *; A&V: MAM]48.2- *H. serecium* (Hedw.) B.S.G. [in this study :MAM] There is in the area of Kali Shirana, Sarsing, Ashawa, Janki, Barwari Bala, KaniMasi, Heise, Mankish.

Genus : Scorpiurum

49.1- *Scorpiurumcircinnatum* (Brid.) Fleisch.[in this study :MAM]There is in the area of Kali Shirana, Ashawa, Janki, Bamerni, Atrush, KaniMasi, Heise, Shaoriki, Anishki, chamanki, Deraluk.

Genus : Camptothecium

50.1- *Camptotheciumlutescns* (Hedw.) B.S.G. [Fro:MAM]

Genus : Brachythecium

51.1- *Brachytheciumcollinum* (Schleich.) B.S.G. [Han: *; A&V: MAM]51.2- *B. rivulare* (Bruch) B.S.G. [A&V: MAM]51.3- *B. rutabulum* (Hedw.) Br. Eur. [Han: *] [MAM]51.4- *B. salebrosum* Web. Et Mohr B.S.G. [A&V:MAM]51.5- *B. trachypodium* [Han: *][MAM]51.6- *B. velutinum* (Hedw.) B.S.G. [A&V: MAM]

Genus : Euryhynchium

52.1- *Euryhynchiumconfertum* (Dicks.) Milde [MAM]52.2- *E. riparioides* (Hedw.) P.W. Richards. [A&V: MAM]52.3- *E. speciosum* (Brid.) Milde. [A&V: MAM]

Genus : Rhynchostgiella

53.1- *Rhynchostgiellacurviseta* (Brid.) Limpr. [in this study :MAM] There is in the area of Koremi, Panda, Mujlmakht, Bisvki, Derbenik, Barwari Bala, Bamerni, Atrush, KaniMasi, Heise, Mankish.*Syntrichia intermedia* (the new record)

Class: Bryopsida

Subclass: Dicranidae

Order: Pottiales

Family: Pottiaceae

Genera: *Syntrichia*Species: *Syntrichia intermedia*

1. (Diocious) sex is separate, meaning that the male reproductive organs are located on one plant and the female reproductive organs are located on another plant.
2. It grows on limestone, on concrete walls, on old building walls, on rooftops, and to a small extent on stony ground. It also grows on acid tree trunks and acid rocks.
3. It is in the form of a loose cushion, meaning that the growing plants are disassembled and separated
4. It features white or gray color in dry condition
5. It is characterized by a grayish brown color when the plant is wet



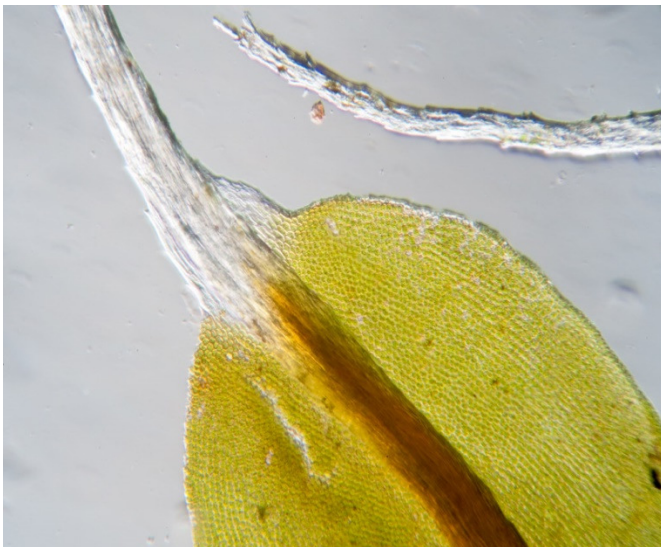
6. The height of the plant ranges from 1-4 cm, Plant stems usually lack a specialized tissue to carry water from the central strand, The leaves are compressed on the stem

and curled, and the leaf is bent outward, incurved when the plant is dry. The leaves on the stem are curved downward when the plant is in the soft state.

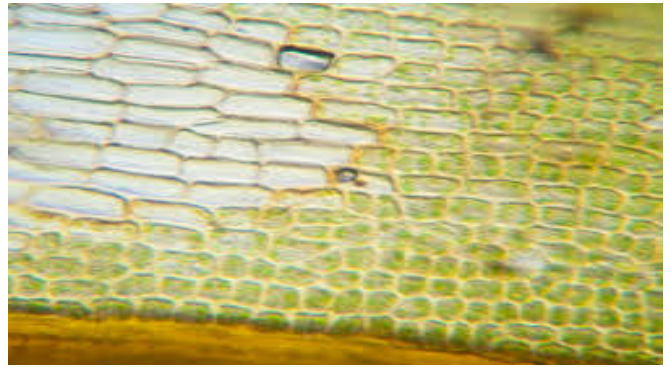
7. The leaf has a broadly spatulate shape



8. The top of the leaf is rounded, and sometimes it takes an emarginate shape, meaning that the round top of the paper is separated by a slit with a very little distance.



9. The edges of the leaf are curved outward and recurved in the area from the middle of the paper to the beginning of the last third of the leaf, Leaf cells contain papillae and appear as protrusions extending from the leaf surface, The midsection of the costa sheet has a strong reddish color, The vein (costa) of the leaf extends outside the leaf blade from the top by a distance of $1 - \frac{3}{4}$ of the length of the leaf, Cells in the lower or basal part of the leaf are of the narrowly rectangular type and are hyaline-transparent. Their length is usually $50 = 80 \mu\text{m}$, The cells get shorter and narrower as you move towards the two ends of the leaf, The cells on top are hexagonal and contain papillose, opaque and cells width $8-12 \mu\text{m}$.



10. The sporophyte is shortly cylindrical, slightly or not tilted, and 2-3 mm in length



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