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# Distribution and diversity of the Hungarian Spergularia species (Caryophyllaceae)

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ABSTRACT: The authors collected and mapped the distribution data of the three Hungarian Spergularia species in the Carpathian Basin and the Great Hungarian Plain. They analyzed the distribution and diversity of specimens per species according to habitats, life-forms and altitudes. All the three species are more frequent in the lowland in different salinity habitats, but S. rubra is common in other different localities also. The S. salina is mostly therophytonous, S. rubra hemicryptophytonous and S. media chamephytonous.

In connection with the plan of the description of Central-European flora we as members of this international floristic group also, have collect the data of flowering plants listed by EHRENDORFER (1973), and have mapped there data according to NIKLFELD (1971) into grids. Our herbaria (BP) contain numerous herbarium sheets refering to the Carpathian Basin and the Great Plain also. With respect to the data of herbaria the localities were taking into consideration only in their geographical unit. Our herbaria contain very different sheets also on the age of collected data, collector (s), the language of labels and loci respectively.

The flora and partly the vegetation of the Hungarian National Parks have been elaborated by the Botanical Department of the Hung. Nat. Hist. Museum. First we found in widespread territories the population of Spergularia species in Hortobágy National Park (cf. SZUJKÓ-LACZA et al., 1980) and since two years also in Kiskunság National Park. The identification and nomenclature problems which arose were connected with these species, therefore we decided to carry out a revision and numerical evaluation of Hungarian Spergularia species (SZUJKÓ-LACZA- KOVÁTS - RAJCZY, 1979) and in the enumeration of the distribution of this species the Central-European flora.

The common occurrence of this species has been referred to by Jávorka (1925), SOÓ-JÁVORKA (1951), SOÓ-KÁRPÁTI (1968), SOÓ (1970), but the detailed data have not been published yet. With respect to the identification problem, we studied every herbarium sheet, in our herbaria Budapest and every sample of it, from the seeds to the architecture (SZUJKÓ-LACZA - SZŐCS, 1975) of plants.

MATERIAL AND METHODS - The data of labels are listed below and the other information is collected in Table 1, 2, 3. The enumeration of localities is ordered in a, b, c, followed by the code number of grid(s) according to NIKLFELD (l. c.) if the data refer to the area of Central-European flora and the Hungarian territory today. The name of the county is in brackets, in accordance with the data of the label and irrespective of the change in the name of the village and country after the 1st World War in different countries. But we did not given code numbers outside of the grids, that in beyond Central Europe. After this, the loci are given (inverted commas) bordering the village(s) if these were such. The name of collector(s) are in shortened form and follow the date. Data of localities are mapped.

The labels in many cases contain information, referring to the habitat, ant the altitude of localities. By the examinations of examplars we can establish the life-form according to RAUNKIAER (1907).

The three groups of data were analysed with a diversity index, elaborated by SHANNON (1948) and the evennes was calculated respecting PIELOU (1975) informations.

Abbreviations of collector's name

| | | | |
|---|---|---|---|
| Andreánszky G. | Andr. | Filarszky N. | Fil. |
| Andrasovszky | Andrs. | Gelencsér S. | Gelencsér |
| Baksay L. | Baksay | Gombocz E. | Gomb. |
| Barth J. | Barth | Gönczy | Gönczy |
| Bánó L. | Bánó | Győrffy I. | Győrffy |
| Bányai J. | Bányai | Hazslinszky F. | Hazsl. |
| Bársony | Bársony | Jávorka S. | Jáv. |
| Bäumler J.A. | Bäumler | Jurányi L. | Jurányi |
| Bernátszky J. | Ber. | Karkovány A. | Karkovány |
| Borbás V. | Borb. | Károlyi Á. | Kár. |
| Boros Á. | Bs. | Kárpáti Z. | Ká. |
| Borza Al. | Borza | Kmet A. | Kmet |
| Budai J. | Budai | Kocsis I. | Ko. |
| Cholnoky ? | Cholnoky | Kovács G. | Kovács |
| Chyzer C. | Chyzer | Kováts D. | K. |
| Csapody V. | Csap. | Kümmerle J.B. | Kümm. |
| Csató J. | Csató | Latzel A. | Latzel |
| Debreczy Zs. | D. | Lengyel G. | Le. |
| Degen Á. | De. | Lojka H. | Lojka |
| Dietz S. | Dietz | Magyar A. | Magyar |
| Feichtinger M. | Feich. | Mágócsy S. | Má. |
| Fekete G. | F. | Márton J. | Márton |

| | | | |
|---|---|---|---|
| Máthé I. ..... | M. or Máthé | Soó R. ..... | Soó |
| Moesz G. ..... | Moesz | Steffeck ..... | St. |
| Moldvai R. ..... | Moldvai | Szabó L. ..... | Sz. |
| Németh F. ..... | Né. | Szemkó ..... | Szemkó |
| Nyárády E.I. ..... | Nyárády | Szépligeti L. ..... | Szé. |
| Paál H. ..... | Pa. | Szlovák ..... | Szlovák |
| Pap F. ..... | Pap | Sztechlo ..... | Sztechlo |
| Papp J. ..... | Papp | Szujkó-Lacza J. ..... | SzL. |
| Pax F. ..... | Pax | Tamássy G. ..... | Tam. |
| Perlaky G. ..... | Per. | Tauscher J. ..... | Tausch. |
| Pénzes A. ..... | Pénzes | Thaisz L. ..... | Th. |
| Pillich ..... | Pill. | Trautmann R. ..... | Tr. |
| Pintér I. ..... | P. | Tscherning ..... | Tsch. |
| Pócs T. ..... | Pócs | Tuzson J. ..... | Tuzs. |
| Polgár S. ..... | Po. | Ujvárosi M. ..... | Ujv. |
| Porutin R. ..... | Porutin | Vajda L. ..... | V. |
| Prodán Gy. ..... | Prodán | Vágner J. ..... | Vágner |
| Rapaics R. ..... | Rpcs. | Vágner L. ..... | Vág. |
| Richter L. ..... | R. | Vrabélyi ..... | Vrabélyi |
| Rosemberszky Ö. ... | Rosemberszky | Wanbuken ..... | Wanbuken |
| Rossi L. ..... | Rossi | Zádor ..... | Zád. |
| Schultes ..... | Schult. | Zólyomi B. ..... | Zo. |
| Simkovics L. ..... | Simk. | Zsák Z. ..... | Zsák |
| Simonkai L. ..... | Simk. | Zsigmond K. ..... | Zsigmond |
| Siroki Z. ..... | S. | Zsilinszky ..... | Zsil. |

Other abbreviations:

at l. = at lake
Com. = Comitat (County)
DE: = Herbarium of Debrecen
HAD: = Herbarium of the Agricultural University of Debrecen
HT: = Herbarium of Tápiószele
Soó-Máté 1938, in literature

## Spergularia media (L.) Presl

Apahida (Com. Kolozs) at l. "Büdös-tó", Bs. 14,06,1942 - Bábolna 8373 (Com. Komárom), Feich. 08,1858 - Balmazujváros 8393-94 (Com. Hajdu-Bihar), HT; Sz. - Budapest 8480, 8580 (Com. Pest), R. 09;1878; at salinity and bitter spring "Hunyadi János", R. 08,1872; Por. 09,1874; Borb. 3,09,1878; at bitter springs "Albertfalva", Simk. 1,09,1875; at bitter springs "Kelenföld", Szemkó 4,07,1896; Simk. 15,08,1900; Th. 3,08,1907; 1,09,1913; Pénzes, 6,08,1932; at bitter springs "Lágymányos", Moesz, 23,09,1913; at salinity bath, Le. 10,10,1920; at salinity bath "Erzsébet-sósfürdő", De. 10,10,1920; V. 15, 08, 1931; Zád. 29, 08, 1949. - Budaörs 8579 (Com. Pest), De. 5,09, 1920; Tr. 1909,1920; Le. 30,06,1924; Andr. 20,09,1936 - Budra (Com. Torontál), Th. 26,08,1901 - Bugac 9387 (Com. Pest), Le. 08,1928 - between Bugyi and Sári 8780-81 (Com. Pest), Moesz, 26,07,1926; 2,08,1926; Le. 29,

07,1928 - Cece 9277 (Com. Fehér), Moesz and Ják. 3,06,1927 - Cegléd 8884 (Com. Pest), Simk. 4,08,1972 - Dinnyés 8877 (Com. Fehér) at "Szerecsenypuszta", Ják. 10,09,1939, at l. "Velencei-tó", Kümm. 28,05,1917; Ják. 4, 10,1921 - between Dinnyés and Agárd 8877 (Com. Fehér), Bs. 11,09,1938 - between Dinnyés and Gárdony 8877, 8777 (Com. Fehér), Bs. 11,09,1938 - between Dinnyés and Pákozd 8877, 8777 (Com. Fehér), at l. "Velencei-tó", Bs. 8,09,1942; at "Börgönd", Ják. 28,09,1949 - Dömsöd 8980 (Com. Pest), near "Apaj", Bs. 11,06,1925 - Dunapataj 9380 (Com. Bács), at l. "Szelidi-tó", Pénzes, 7,07,1955; Ják. 25,09,1958 - Elep 8493-94 (Com. Hajdu-Bihar), Magyar, 1928; Né. 1975 - Eszterháza 8367 (Com. Sopron), Le. 06,1902 - Felsőtárkány 8088 (Com. Borsod-Abauj-Zemplén), at mountains "Bükk", (Com. Borsod) ?, 06,1946 - at l. "Fertő-tó" 8366 (Com. Moson or Sopron), Jurányi, 06,1864 - Fülöpszállás 9181 (Com. Pest), Magyar, 16,06,1918; at "Kelemenszék", Bs. 18,06,1925 - Gárdony 8777 (Com. Fehér), Tausch. 15,09,1810; Pénzes, 28,05,1832; at l. "Velencei-tó", Pócs, 3,10,1950 - Hajdubagos 9596, 9696 (Com. Bihar), Soó, 14,06,1933 - Hortobágy 8492 (Com. Hajdu-Bihar), Tuzs. 1915; Tam. 1927; DE: Soó; HT: Pa. 1974; at "Máta", Magyar, 1928 - Hosszupályi 8596, 8696 (Com. Bihar), between "Konsári-sóstó and Sándoros", Bs. 21,08,1926 - Ilmic (Com. Moson), at l. "Zicksee", Bs. 4,09,1931 - Károlyfalva 7695 (Com. Zemplén), Ber. 19,05,1902 - Kebeleszentiván (Com. Maros-Torda) at l. "Sós-tó", Tausch. 24,08,1868 - Kenese 8974 (Com. Veszprém), at l. "Balaton", Simk. 4,10,1903 - Kiskőrös 9381 (Com. Pest), Le. 06, 1929 - Kiskunfélegyháza 9385 (Com. Pest), Bs. 6,05,1926; at l. "Szentpéteritó, near Fekete-halom", Bs. 7,06,1926 - Kiskunhalas 9582-83 (Com. Pest), Bs. 1,08,1919; at l. "Harka-tó", Bs. 12,08,1928 - Kistáplánypuszta (Töltéstava) 8372 (Com. Győr), Po. 16,08,1907; Po. 17,08,1916; Po. 20,09,1928 - Kisvelence 8777 (Com. Fehér), at l. "Velencei-tó", Bs. 4,04, 1921; Kocs 8375 (Com. Komárom), Bs. 19,09,1943 - Kolozsvár (Com. Kolozs), at mountain "Csonthegy", R. and St. and Per. 13,08,1891 - Kunszentmiklós 8980 (Com. Pest), Ko. 5,08,1908; Fil. and Moesz and Kümm. 8,10,1908; De. 3,07,1914; Bs. 14,09,1916; Bs. 6,07,1917; Fil. and Ják. 4,06,1918; De. 1,08,1922; De. 10,09,1925; Le. 06,1927; Ják. and Zo. 22,10,1935; Né. 97,1977; between Kunszentmiklós and Homokszentlőrinc, Tr. 16,06,1918; Bs. 20,05,1920; between Kunszentmiklós and Peszéradacs, Bs. 29,06,1920 - Lajosmizse 8983 (Com. Pest), Bs. 24,06,1920 - between Lepsény and Kajár 9075 (Com. Veszprém), ? 6,09,1900; B? 13,09,1900 - Makó 9788-89 (Com. Csanád), Th. 9, 06,1902; Th. 19,06,1903 - Mikepércs 8595 (Com. Hajdu), Tam. 1,07,1923 - Mosonszentandrás (Com. Moson); at l. "Fertő-tó", Bs. 29,06,1924 - Nádudvar 8592 (Com. Hajdu-Bihar), Hazsl.; Soó-Máthé 1938; at "Angyalháza", Magyar, 1928 - Nagyiván 8591 (Com. Szolnok), Magyar 1928; HT: Sz. - Nagyláng 8977, 9077 (Com. Fehér), at l. "Halastavak and Sóstó", Moesz and Ják. 26, 05,1923; at l. "Felsőhalász-tó", Fil. and Kümm. 3,10,1923 - Nagyrábé 8793-94 (Com. Bihar), at "Ujszegedpuszta", Simk. 11,08,1877 - Nyulas (Com. Moson), Bs. 9,05,1925 - Nezsider (Com. Moson), at l. "Fertő-tó", Tsch. 24,06, 1886; Fil. 18,06,1903; Th. 13,06,1913 - between Nezsider and Pátfalu (Com. Moson), Fil. 19,06,1903 - Orosháza 9489-90 (Com. Békés), Budai, 22,08, 1912 - Ottlaka (Com. Arad), Simk. 18,07,1890 - Páka 9284-85, 9384-85 (Com. Pest, near Kiskunfélegyháza, Le. 07,1926 - Pákozd 8777 (Com. Fehér) at l. "Velencei-tó", Bs. 30,06,1941 - Pálmonostora 9385 (Com. Pest), Le. 07, 1926 - Pátfalu (Com. Moson), Andr. 22,04,1906; at l. "Fertő-tó", Andr. 22,

09,1936 - Püspökladány 8692-93 (Com. Hajdu-Bihar), Soó-Máthé 1938 - Ruszt (Com. Sopron) at l. "Fertő-tó", De. 12,09,1884; Po. 22,07,1908; 8,09,1923 - Sárbogárd 9077,9177 (Com. Fehér), at "Bébicmajor", Bs. 16,09,1918 - Sárkeresztur 8977,9077 (Com. Fehér), Ják. 27,05,1923; Baksay, 30,09,1949 at l. "Sóstó" Pill. and Vágner, 6,06,1927; Bs. 30,05,1932; Bs. 7,05,1952 at l. "Sárkány-tó", Bs. 30,05,1932; Moldvai, 5,08,1953 - Sárszentágota 9077 (Com. Fehér), at l. "Kis-tó" Bs. 30,05,1932; at l. "Sós-tó" Bs. 25,09,1936 - Soroksár 8580 (Com. Pest), Per. 6,08,1891; Fil. et Per. at "Gubacsi puszta", F. at Sch. 17,06,1892; at "Gubacsi csárda", Schult, 17,06,1892; "Erzsébet falva", Fil. 20,06,1893; at "Gubacsi vadászház", Ko. 3,09,1909 - Szabadka (Com. Bács-Bodrog), at l. "Palicsi-tó" Prodán 16,09,1907; 15,09,1909; Bs. 8,07,1918 - Szabadszállás 9181 (Com. Pest), Fil. et Kümm. 21,10, 1909; Le. 06,1913; Andrs. 16,06,1918; De; 25,06,1918; at near Aranyegyház, Ják. 2, 07,1926 - between Szabadszállás and Fülöpszállás, Né. 4 and 11,08,1977 - Szalkszentmárton 9080 (Com. Pest), Near Homokszentlőrincz, De. 16, 06, 1918 - Szeged 9686-87, 9786-87 (Com. Csongrád), Ber. 15,06,1903; Magyar 2,06,1923; at rail-way station "Rókus" Ber. 15,06,1903 - Tapolcafő 8771 (Com. Veszprém), Bs. 1,05,1927 - Tótkomlós 9590, 9690 (Com. Békés), Kár. 18,05,1957 - Tököl 8679 (Com. Pest), Bs. 27,08,1917 - Töltéstava 8372 (Com. Győr), at "Táplánypuszta", Po. 17,08,1916 - Ujszentmargita 8292 (Hajdu-Bihar), Magyar 1928 - Velence 8777 (Com. Fehér), Tausch. 10, 08,1810; Bs. 13,10,1929; Bánó 07,1947 - Versecz (Com. Temes), Ber. 17, 08,1903 - Zombor (Com. Bács-Bodrog), Pr. 6,09,1909.

Spergularia rubra (L.) Presl

Akna-Szlatina (Com. Máramaros) Andr. 07,1933 - Akucs (Com. Torontál) Th. 5,08,1888 - Aranyosmarót (Com. Bars) at river "Zsitva" Moesz 11, 07,1908 and 17,05,1910 - in island Arbe (Dalmatia), Le. 24,07,1908; "direction of Bagnol" Kümm. 24,05,1913; Ká. 10,06,1934; V. 10,06,1934 - Ardánháza (Com. Bereg) m. "Háthegység" Th. 22,06,1909 - ? (Com. Baranya) Simk. 22,07,1873 - Barslédec (Com. Bars) Bs. 13,09,1926 - Bazin (Com. Pozsony) Szé. 08,1875 - Bégaszentgyörgy (Com. Torontál) Tr. 7,09, 1917 - Békéscsaba (Com. Békés) 8392 Ják. 14,07,1926 - Békásmegyer (Com. Pest) 8480 Papp 27,06,1948 - between Berzence and Tarany (Com. Somogy) 9768, 9769 at l. "Csatártó" Bs. 28,07,1922 - in m. Bihar (Com. Bihar) Simk. 10-17,07,1879 - Borsabánya (Com. Máramaros) at river Cisla Bs. 16,07,1942 - Brassó (Com. Brassó) "Pojana" Th. 24,06,1901 - Árpás and Brassó at direction "Rétyi Nyir" Simk. 7,08 and 8,09,1883; Moesz 8,09,1905; "in bottom of dried lakes" Moesz 19,05,1906 and 20,07,1907; V. 28,06,1936 - Budakalász (Com. Pest) 8380 m. "Ezüst-hegy" Bs. 3,06,1945 - Budaörs (Com. Pest) 8579 De. 7,08,1915; Tr. 19,09,1920 - Soroksár (Com. Pest) at riverside Duna, Bánó 30,09,1953; Csa. and Bánó 3,10,1953; Ják. and Csa. 3,06, 1956 - Büdszentmihály at Tiszalök (Com. Szabolcs) 7994 "Fehér - szik" Bs. 1,10,1926 - Cegléd (Com. Pest) 8884 "Varnyaspuszta" Le. 28,09,1926 - Carlopago (Com. Lika-Krbava, Croatia) Kümm. and Moesz 11,06,1907 - in Csepel island (Com. Pest) Tausch. - Ciceu (Com. Csik) at bath "Csicsói Büdös" Nyárády 9,06,1928 - in m. Choplet (Com. Zólyom) "Palenica", Le. 13,07, 1928 - Csucsom (Com. Gömör) Tr. 5,09,1918 - Csurgó (Com. Somogy), 9768

Bs. 7,08,1922 - Darány (Com. Somogy) 0071 "Nagyberek" Bs. 13,07,1922 and 29,05,1923 - Désakna (Com. Szolnok-Doboka) at river "Sóspatak" Bs. 5,09, 1943 - Deszk (Com. Torontál), De. 15,05,1925 - Dinnyés (Com. Fehér) 8877 at l. "Velencei-tó" Fil. 5,06,1922 and 6,06,1930 - Dinnyés and Pákozd (Com. Fejér) 8877, 9068 at l. Velencei-tó "Mészároslegelő" Bs. 8.09,1942 - Diósgyőr (Com. Borsod) 7889,7890 Mágócsy-Dietz, 4,07,1879; between vasgyár and Óhuta 7889, 7890 Budai, 19,05,1909 - Diósjenő (Com. Nógrád) 8080 Le. 17,10,1909 - Dobsina (Com. Gömör and Kis-Hont) "Farbáska" Le. 11,07,1922; "Langenberg" Le. 19,06,1927 - Dömös (Com. Esztergom) 8379 Mágócsy-Dietz, 6,05,1901 - Drégelypalánk (Com. Hont) 7980 on right riverbank of Ipoly Jáv. 29,06,1944 - Emőd (Com. Borsod 8090 Budai 29,05,1907 - Eperjes 9289, Hzsl. - Obornak to-day Eszteregnye (Com. Zala) 9567 at riverside "Mántai patak" Kár. 19,05,1965 - Érd (Com. Fejér) 8679, 8579 "Puszta" Bs. 20,05, 1917; De. 20,05,1917; Tr. 20,05,1917 - Fogaras (Com. Fogaras) at river Olt. ? 08,1915 - Gönyü (Com. Győr) 8272, 8273 at riverside Duna Po. 30,05, 1918 - Görgeteg (Com. Somogy) 9870 in "Alsó erdő" Bs. 7,05,1923 - Gulács (Com. Bereg) 7900 "Lapostanya" Bs. 6,09,1926 - Győr-Révfalu (Com. Győr) 8271-72, 8371-72 Po. 8,07,1916 - Győr-Ujváros (Com. Győr) 8371 in dried marshy land Po. 28,08,1916 - Hámortó (Com. Vas) ? Ká. 5,05,1933 - Herkulesfürdő (Com. Krassó-Szörény) at river "Cserna" Bs. 10,08,1918 - Hodász (Com. Szatmár) 8199, 8099 Bs. 30,08,1926 - Homokszentgyörgy (Com. Somogy) 9871 "Homokszentgyörgyi malom" Bs. 7,08,1927 - Hortobágy (Com. Hajdu-Bihar) 8492 HT: Sz; "Máta" SZL.K.F.1975; "Pentezug" HAD: S. 1975 - Huszt (Com. Máramaros) Wágner 10,1866 - Kálmáncsa (Com. Somogy) 9971 Bs. 12,07,1922 - Karcag (Com. Jász-Nagykun Szolnok) 8691, 8791 Bs. 23, 05,1926; Bs. in Soó-Máthé (1938) - Karloberg (Croatia) V. 29,05,1938 - Karlovac (Com. Zagreb) Rossi 28,08,1887 - Kassa (Com. Abauj-Torna) in m. "Medvehegy" Mágócsy-Dietz 31,07,1886; Th. 25,07,1908 - Kerettye = Bázakerettye (Com. Zala) 9466 Kár. 27,05,1945 - Kisbarátfalu (Com. Győr) 8371 Po. 20,06,1927 - Kiskőrös (Com. Pest) 9381 at the railway "Colocense" Bs. 16,07,1920 Kispest (Com. Pest) 8581 Ber. 2,08,1903 - Kisujszállás (Com. Jász-Nagykun-Szolnok) 8790, 8890 Simk. 1873 - Kistáplány (Com. Győr) 8371 Po. 1,10,1927 - Kolozsvár, Cluj (Com. Kolozs) at Feleac, ? 22,05,1923 - Kovrágy (Com. Hunyad) Csató 10,07,1870 - Köpecz (Com. Háromszék) ?, 4, 06,1887 - Kőszeg (Com. Vas) 8565, 8665 m. "Irottkő" Andr. 22,06,1948; bed of "Gyöngyös" Wanbuken 3,08,1909 - Kristyár = Biharkristyár (Com. Bihar) in m. "Tomvatyik" Simk. 21,07,1885 - Kunmadaras (Com. Szolnok) 8591 "Kunkápolnás" Zsák in Soó-Máthé (1938) - Kunszentmiklós and Peszéradacs (Com. Pest)8980 at "Ziegler tanya" Bs. 19,07,1920 - Léka (Com. Vas) 8564 alongside a river V. 28,05,1933 - Lippa (Com. Temes) at bath "Lippa" Simk. 1,09, 1871 - Litke = Ipolylitke (Com. Nógrád) 7783,7883 Borb. 25,05, 1873 - Makó (Com. Csongrád) 9788, 9789 at riverside Maros Th. 14,06,1902 - Lele = Maroslele (Com. Csongrád) 9786 at riverside Maros Th. 20,10,1906 - Mátraszentimre (Com. Heves) 8085 "Ágasvár" in m. Mátra Simk. 22,06, 1875 - Mehadia (Com. Krassó-Szörény) Hazsl. 08, ? - Menyháza (Com. Arad) "Tyinosza" Simk. 13,07,1885 - between Miskolctapolca and Kisgyőr (Com. Borsod) 7990 "Verebespuszta" Budai 30,07,1888 - Munkács (Com. Bereg) Hazsl. ? - Murarátka (Com. Zala) Kár. 2,05,1948 - Muzsaly (Com. Bereg) Zsigmond 10,08,1876; Hazsl. ? - in m. Madalbert (Com. Arad) Simk. 26,07,1887 - Nádudvar (Com. Hajdu-Bihar) 8592, 8593 Hazsl. ?; Karkovány 21,07,1892; Soó-

Máthé (1938) - Nagydém (Com. Veszprém) Po. 23,06,1918 - Nagyida (Com. Abauj-Torna) in valley "Idavölgy" Th. 15,06,1909 - Nagyiván (Com. Szolnok) 8592 "Zámpuszta" K.F.SzL. 1974; D. SzL.K.F. 1975; "Cinege Danyi tanya" 8591 SzL.F.K. in Art. Fest. ps. 1975; "Nagyiváni puszta" K.SzL.F. 8,09, 1976 - Nagykanizsa (Com. Zala) 9567, 9568 Bs. 3,09,1922; Kár. 19,06,1950 - Nagylengyel (Com. Zala) 9266 Kár. 23,06,1953 - Nagyvárad (Com. Bihar) Simk. 12,07,1877 - Napkor (Com. Szabolcs) 8097 Bs. 1,10,1927 - Nyiregyháza and Haláp (Com. Hajdu-Bihar) 8096 Simk. 8.09,1871 - Nyirbéltelek (Com. Szabolcs) 8298, 8398 Bs. 12,07,1927 - Óhat (Com. Hajdu-Bihar) 8391,8491 Soó and in Soó-Máthé (1938) Oka (Fertőmajor - Oka) (Com. Sopron) 8165 atl. "Fertőtó" Gom. 20,06,1902 - Ormándlak (Com. Zala) 9266 Kár. 11,05,1957 - Orsova (Com. Krassó-Szörény) Simk. 29,07 - 25,08,1879 - Ostffyasszonyfa (Com. Vas) 8668 Tr. 20,09,1916 - Ottlaka (Com. Arad) Simk. 23,08,1888 - Őriszentpéter (Com. Vas) 9164 "Őrség" Pócs and Gelencsér 16,07,1953 - Pákozd (Com. Fejér) 9068 "Sár-hegy" Bs. 21,05,1944; "Tompos-hegy" 8777 Bs. 4,06,1944 - Pálháza (Com. Borsod-Abauj-Zemplén) 7595 in valley "Kemence" Pócs 12,07,1950 - Parád (Com. Heves) 8086 in m. Mátra Szlovák 25, 05,1869 - in m. Paulis (Com. Arad) Simk. 4,07,1885 - Pécs (Com. Baranya) 9975 in m. Mecsek "Szentkut" Kümm. and Jáv. 7,06,1922 - Pécska (Com. Arad) Simk. 14,08,1885 - Pedesz (Com. Kolozs) in Gyalui alps in valley "Lonkavölgy" Ujv. 11,08,1943 - Perint (Com. Vas) 8765 Bs. 30,09,1922 - Péterhida (Com. Somogy) 9970 Bs. 23,06,1922 and 18,09,1933 - Pilisborosjenő (Com. Pest) 8379 "Ezüsthegy" Bs. 9,07,1940 and Kár. - Podolin (Com. Szepes) Perlaky 07,1894 - Pomáz (Com. Pest) 8380 in m. "oszolj" De. 06,1926 - Pozsony, Neudorf (Com. Pozsony) Bäumler 08,1901; at railway side to Wien Bs. 9,06,1919 - Pusztasomorja (Com. Győr) 8268 at river Duna 11,09,1868 - Prencow in m. Sytno "Pocuvadloi" Kmet. 08,1890 and 24,09,1890 - Ráckeve (Com. Pest) 8879 Bs. 9,09,1917 - in m. Retyezát in valley Szuszeny (Transsylv.) Lojka 12,08,1872 - Rozsnyó (Com. Gömör) in m. "Pozsalo" Szé. 08, 1878 - Salgótarján (Com. Nógrád) 7984, 7884 at Pécskő - Jónástelep Bs. 18, 06,1936 - Sándorfalva (Com. Csongrád) 9686 "Bezur-szék" Bs. 28,06,1825 - Sárkeresztur (Com. Fejér) 8977, 9077 at l. "Sárkánytó" Bs. 25, 09, 1935 - Sárszentágota (Com. Fejér) 9077 Jáv. and Csa. 19,09,1953 - Sárvár (Com. Vas) 8767 at railway side Bs. 29,09,1922 - Sátoraljaujhely (Com. Zemplén) 7595, 7696 "Kopaszka" Chyzer 7,07,1874 - Selmec (Com. Hont) "Szent Karácsony hegy"? 06,1880 - Selmecbánya (Com. Hont) at l. "Bacsófalvi-tó" under m. Szitnya Jáv. 29,07,1913 - Somogyszob (Com. Somogy) 9769 "Külvölgyi forrás" Bs. 8,08,1922 - Somoskőujfalu (Com. Nógrád) 7884 Simk. 20,06,1873 - Sopron (Com. Sopron) 8265,8365 "Harkauer Kogl" Gom. 22,07,1903 - S. tótfalu = Sorkitótfalu (Com. Vas) 8866 Márton 15,07,1890) - Sormás (Com. Zala) 9567 in valley "Mántai patak" Kár. 19,05,1965 - Sóvár (Com. Sáros) V. 06, 1914 - Szabadszállás 9181 (Com. Pest), De. 25,06,1918 - Szabolcs and Timár (Com. Szabolcs) 7894-95 at riverside Tisza Bs. 24,10,1943 - Szamosfalva (Com. Kolozs) Cholnoky 17,09,1919 - Szarkó (Com. Bihar) "Caleanŭlŭi-Stork" Pax 16,08,1901 - Szarvaslak (Com. Vas) Bs. 17,08,1943 - Székelyudvarhely (Com. Udvarhely) Gönczy ? - Szenta (Com. Somogy) 9769 "Pusztagát" Bs. 30, 08,1922 - Szentendre (Com. Pest) 8380 "Dömörkapu" Perlaky 21,07,1891 - at Szentendre, Izbég (Com. Pest) 8380 at riverside "Bükköspart" Bs. 17,06,1945 - between Szentes and Hódmezővásárhely (Com. Csongrád) 9387, 9587-88, 9687 Pénzes 28,09,1959 - Szentgyörgyhegy (Com. Veszprém) 8369 in vineyard 10,

05, 1879 - Szentkut to-day Tét (Com. Győr) 8471 Bs. 16,07,1918 - Szobránc (Com. Ung) Dietz 15,08,1871 - Szokolya (Com. Nógrád) 8180, 8179 "Jánospuszta" Bs. 6,10,1910 - Szováta (Com. Maros-Torda) at "Székhavas" Th. 21, 08,1908 - Szőce (Com. Vas) in Őrség 9065, 9165 "Nyirdomb" Pócs and Gelencsér 5,07,1954 - Szulok (Com. Somogy) 9971 Bs. 12,07, 1922 - Taródháza (Com. Vas) 8966 Márton - Tarpatak (Com. Szepes) in m. Tátra Simk. 12,07, 1890 - Tatatóváros 8375-76 (Com. Komárom), at "Fényesforrás", Ko. 17,08, 1911 - Tátrafüred (Com. Szepes) Szé. 08,1884 - between Tátraháza and Késmárki itató (Com. Szepes) Rosemberszky 18,07,1918 - Terbegec (Com. Hont) "Cervena Kurcuka" Hazsl. 07,1857 - Terény (Com. Hont) 8082 Porutno 07, 1876 - Tét (Com. Győr) 8471 "Betlehemes puszta" Po. 16,07,1912; "Csongota puszta" Bs. 16,07,1918 - Tolcsva "Mándoki" and Szerencs "Köveshegy" (Com. Zemplén) 7794, 7893 Simk. 23-25,07,1871 - Torja (Com. Háromszék) in cave "Büdösbarlang" Bányai 28,07,1909 - Törcsvár (Com. Fogaras) under alpine Bucsecs Th. 23,06,1894 - Tusnádfürdő (Com. Csik) at l. Szt. Anna-tó Tr. 27, 07,1915; Kümm. and Jáv. 28,07,1925 - Ujbarok (Com. Fehér) 8577 Le. 12, 06,1927 - Uj-Vincz (Transsylv.) Csató 28,04,1872 - Vasboldogasszony (Com. Zala) 9067 Kár. 14,05,1951 - Verespatak (Com. Alsó-Fehér) "Csétány" Csató 11,08,1878 - Vitnyédsztpál to-day Bagodvitnyéd (Com. Zala) 9166 Kár. 29,05, 1950 - Zalasárszeg (Com. Zala) 9568 Kár. 30,05,1954 - Zirc (Com. Veszprém) 8773 "Imremajor" Po. 16,06,1932 - Zombor (Com. Bács-Bodrog) ? 6, 09,1909.

Spergularia salina J. et C. Presl

Aknaszlatina (Com. Máramaros), Vág, 10,1845 - in island Arbae (Dalmatia) Borb 06,1884 - Balázsfalva-Blaj (Com. Alsó-Fehér) Borza, 21,04, 1912; Borza, 18,06,1912 - Balmazujváros 8394 (Com. Hajdu-Bihar), HAD: S. 1975 - Békéscsaba 9392 (Com. Békés), Jáv. 14,07,1926, Zsil. 06,1916; ? 14, 07,1926 - Brassó (Com. Brassó), Csató, 27,06,1860 - Budapest 8480 (Com. Pest), at "Óbuda", Szép. 12,06,1874 - Csepel 8580, 8679-80, 8779, 8879, 8979, (Com. Pest), Tausch, 8,07,1869 - Csicsóholdvilág (Com. Alsó-Fehér), near "Abtsdorf", Barth, 9,09,1901 - Csorba (Com. Liptó), Per. 7,08,1907 - Déva (Com. Hunyad), Simk. 8,10,1882; 10,06,1882 - Egyek 8391 (Com. Hajdu-Bihar), Magyar, in: Soó-Máthé 1938 - Fülöpszállás 1918 (Com. Pest), Magyar, 16,06,1918 - Gara 9980 (Com. Bács-Bodrog), Le. 9,09,1926 - Gégény 7897 (Com. Szabolcs), at l. "Kár-tó", Bs. 11,09,1929 - Győr-Ujváros 8271-72, 8371-72 (Com. Győr), Polgár, 2,08,1912 - Felgyő 9386 (Com. Csongrád), Rpcs. 6,08,1926 - Hajduszoboszló 8593-94 (Com. Hajdu-Bihar), Györffy, 1932; Soó-Máthé, 1938 - Homoródszentmárton (Com. Udvarhely), Bs. 28, 06,1943 - Hortobágy 8492 (Com. Hajdu-Bihar), Soó, 22,09,1947; at river "Hortobágy", Rpcs. 14,06,1914; 1916a; HT: Pa. 1974; at "Hármas", HAD: S. 1960 - Hosszupályi 8596, 8696 (Com. Bihar), at "Konyárisóstó-fürdő and Sándoros", Bs. 21,08,1926 - Jászberény 8585 (Com. Szolnok), Pócs, 12,06, 1951 - Kiskunfélegyháza 9284-85, 9384-85 (Com. Pest), at "Páka", Le. 18, 08,1926 - Kiskunhalas 9582,9583 (Com. Pest), at "Járószék", Le. 6,09,1926 - Kolozs (Com. Kolozs), Ká. 15,08,1942 - Kunszentmiklós 8980 (Com. Pest), Kocsis, 5,08,1908; +Fil. Moesz, Kümm. 8,10,1908 - between Kunszentmiklós and Peszéradacs 8980 (Com. Pest), at "Ziegler tanya", Bs. 29,06,1920 -

Lajosmizse 8993 (Com. Pest), between l. "Sós-tó and Fehér-tó", Bs. 19,06, 1924 - Marosujvár (Com. Alsó-Fehér), ? 8, 06,1974 - Nagyenyed (Com. Alsó-Fehér), Csató, 7,07,1898 - Nagyiván 8591 (Com. Szolnok), HT: Sz., at "Cinege Danyitanya", K. F. SzL. 1974; at "Nagyiváni puszta" K. SzL. F. 1976; at "Zám puszta" 8592 D. SzL. F.K. 1974-75 - Nyiregyháza 8096 (Com. Szabolcs), Latzel, 29,06,1893 - Ottlaka (Com. Arad), Simk. 23,08,1888 - Parajd (Com. Udvarhely), Bs. 7,06,1941 - Rónaszék (Com. Máramaros), Pap, 16,08, 1895 - Soborsin (Com. Arad), Simk. 11,08,1888 - Sárbogárd 9077,9177 (Com. Fehér), Bs. 16,09,1918 - Sárkeresztur 8977,9077 (Com. Fehér), at l. "Sárkánytó", Bs. 25,09,1935 - Soroksár 8580 (Com. Pest), at "Molnársziget", ? 7,11,1915 - Szabadszállás 9181 (Com. Pest), Tr. 16,06,1918; Bs. 13,10, 1918 - Szabéd (Com. Maros-Torda), Le. 23,06,1913 - between Szamosszentmiklós and Szamosfalva (Com. Kolozs), ? 18,07,1943 - Szeged 9686 (Com. Csongrád), at l. "Fehér-tó", Bs. 10,07, 1918; at "Nagyszéksós and Horgos" 9786, Bs. 28,09,1941 - Szomolya 8188, 8189 (Com. Borsod), Vrabélyi, 15, 05,1873 - Szovátafürdő (Com. Maros-Torda), at l. "Medve-tó", Bs 7,06, 1941 - Tata 8375 (Com. Komárom) at "Fényes folyás", Bs. 5,07,1925 - Torda (Com. Torda-Aranyos), Kocsis, 10,07,1902; Borza, 9,08,1913; Pap, 4, 08,1915; Ká. 11,08,1934 - Töltéstava 8372 (Com. Győr), at "Táplánypuszta", Polgár, 08,1916 - Tétény 8580 (Com. Pest), Tr. 07,1919 - Vestény (Com. Szeben), Simk. 10,08,1883 - Vizakna - Salzburg (Com. Alsó-Fehér), Barth, 31,08,1888.

The number of specimens, belong to the same species were unequal among the three Hungarian Spergularia species in our herbaria and the available information data of labels were different too. In Table 1. the three species are recorded and devided in classes of habitat according to data of labels.

Spergularia rubra occur in 13 different habitats and were collected in more cases also. It gives the maximum habitat diversity values but the evennes is also high. It has especially high frequency values in the rivulet and river side, in the rocky and grotty soil, ditch along road or railway side, in the margin of cultivated fields, forests and weedy places. These frequency values showed the pioneer and weed characters of this species.

The second in this order is Spergularia media referring to the H' and J values but it is more frequent in absolute values also in their "natural" habitats, that is salinity pastures and the side of salinity lake. The last in order is the Spergularia salina, frequent in the same habitats as Spergularia media, because it is more probably a hybrid species between S. media and S. rubra (Szujkó-Lacza J. - Kováts, D. - Rajczy, M. 1978). It bears more characters from S. media, especially in its vegetative parts of architecture. This supposition that S. salina is a hybrid species is corroborated by the fact, that the mentioned species was grown for example at Kunszentmiklós, if there were S. rubra with together S. media (Map 1, 2 and 3). S. salina was collected in the same place in 1977 but S. salina was not present, because S. rubra - one of the parents of S. salina had disappeared (see the list of enumeration).

The life-form according to RAUNKIER (l.c.) implies how the plants survived the unfavourable season(s). But indirectly the life-form includes more or less the life-span of plants. The collectors collected the specimens rendomly, over a long period of time and therefore we can suppose, these

Table 1. Distribution of three Spergularia species referring to habitat

| Habitat: salinity pasture / Species | Wet salinity pasture | Salinity, bitter-spring | Margin of salinity marshes | Salt mine | Side of lake, salinity lake | Dried bottom lake | Rivulet, river side | Sea side | Wet loamy soil | Wet sandy soil | Rocky, grotty soil | Wet meadow | Ditch along road or railway-side | Margin of fields, forests, weedy places | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S. media | 25 | 4 | | | 25 | | | | 4 | | 1 | | 7 | | 66 |
| S. rubra | 33 | 2 | | | 4 | 9 | 5 | 19 | 8 | 17 | 13 | 30 | 6 | 11 | 20 | 177 |
| S. salina | 35 | | 4 | 1 | | 11 | | 3 | 1 | | | 2 | 2 | | 59 |

Abbreviations: N = number of specimens; S = types of habitat

S. media H' = 1.3765
J = 0.7683
N = 66
S = 6

S. rubra H' = 2.3324
J = 0.9094
N = 177
S = 13

S. salina H' = 1.3244
J = 0.6369
N = 59
S = 8

herbarium specimens reflected the truth, with respect to life-form as well. Sometimes more than one sample is found on one sheet ant they may belong to different categories of life-form in Table-2, therefore one sheet may reflect the age of the population. Sometime we found such herbarium sheets also, on which there were only some fragments of the plants instead of the whole plants and these samples were not taking into consideration in connection with life-form records. Refer to the H' and J values of life-form, the S. rubra in more cases is H = hemikryptophyta and rarely Ch= chamaephyta. The next in order is S. salina both in H' and J, but more frequently only Th = therophyta.

Table 2 Distribution of Spergularia species according to life-form

| Life-form / species | Th | H | Ch |
|---|---|---|---|
| S. media | 7 | 54 | 106 |
| S. rubra | 69 | 102 | 41 |
| S. salina | 24 | 18 | 9 |

Key to abbreviation: N= number of specimens; S= types of life-form;
Th= Therophyta; H= Hemicryptophyta;
Ch= Chamephyta

| | | | |
|---|---|---|---|
| S. media | H' =0.7864 | J= 0.7159 | N=167 S=3 |
| S. rubra | H' =1.0350 | J= 0.9421 | N=212 S=3 |
| S. salina | H' =1.0283 | J= 0.9360 | N= 51 S=3 |

More than half of the data belong to the Ch categorie in S. media, and it has fewer life-form diversity values and in contrast with this, relatively high evennes ones. According to Table-3, S. media and S. salina are grown in the lowland practically, except some exemples of S. salina. These are shown in H' and J values with respect to altitudes. S. rubra remain here also in the first place according to number of categories and both H' and J values. Like the habitat, the distribution according to altitude of this species also reflect the weed and pioneer nature of it.

CONCLUSION - According to the analysed characters, the distribution of the Spergularia species, into the habitat, life-form and altitude's categories, the highest values of H' and J in every case are to be found in the S. rubra and the less of S. media, except for the habitats (Table 1, 2, 3). The S. salina from these points of view is between these two species.

Regarding the life-form categories, S. rubra more frequently Th, contrary to S. media which is dominant the Ch life-form. The S. rubra mostly is hemicryptophytan (Table 2).

All the three species grown more frequently in salinity habitats (Map 1, 2 and 3) but the S. rubra has shown the more adaptability to the different habitats and altitudes among them (Map 2).

Besides this it should be mentioned that for example in HNP the Spergularia species are frequent and grow in extended patches in those places where there are the pastures of horses and in wheel tracks where in more cases, the A-layer, but not very rarely in B-horizon of the soil there is erosion. Moreover necessary to note, the top-root of the Spergularis species always are mykorrhized. Probably, these species can exist in the extremely hot, dry and salinity soils by the help of mycelium of fungus.

Table 3 Distribution of Spergularia species according to altitude

| altitude in m / species | 0-99 | 100-199 | 200-299 | 300-399 | 400-499 | 500-599 | 600-699 | 700-799 | 800-899 | 900-999 | 1000- |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S. media | 11 | 143 | 6 | 1 | - | - | - | 1 | - | - | - |
| S. rubra | 15 | 59 | 26 | 8 | 3 | 1 | 1 | 1 | 4 | 10 | 4 |
| S. salina | 3 | 35 | 2 | 1 | 3 | 3 | - | - | - | - | - |

Key to abbreviation: N= number of specimens; S= number of altitude categories

| | | | | |
|---|---|---|---|---|
| S. media | H' =0.4776 | J=0.2968 | N=162 | S=5 |
| S. rubra | H' =1.7012 | J=0.7095 | N=132 | S=11 |
| S. salina | H' =0.9626 | J=0.5372 | N= 47 | S=6 |

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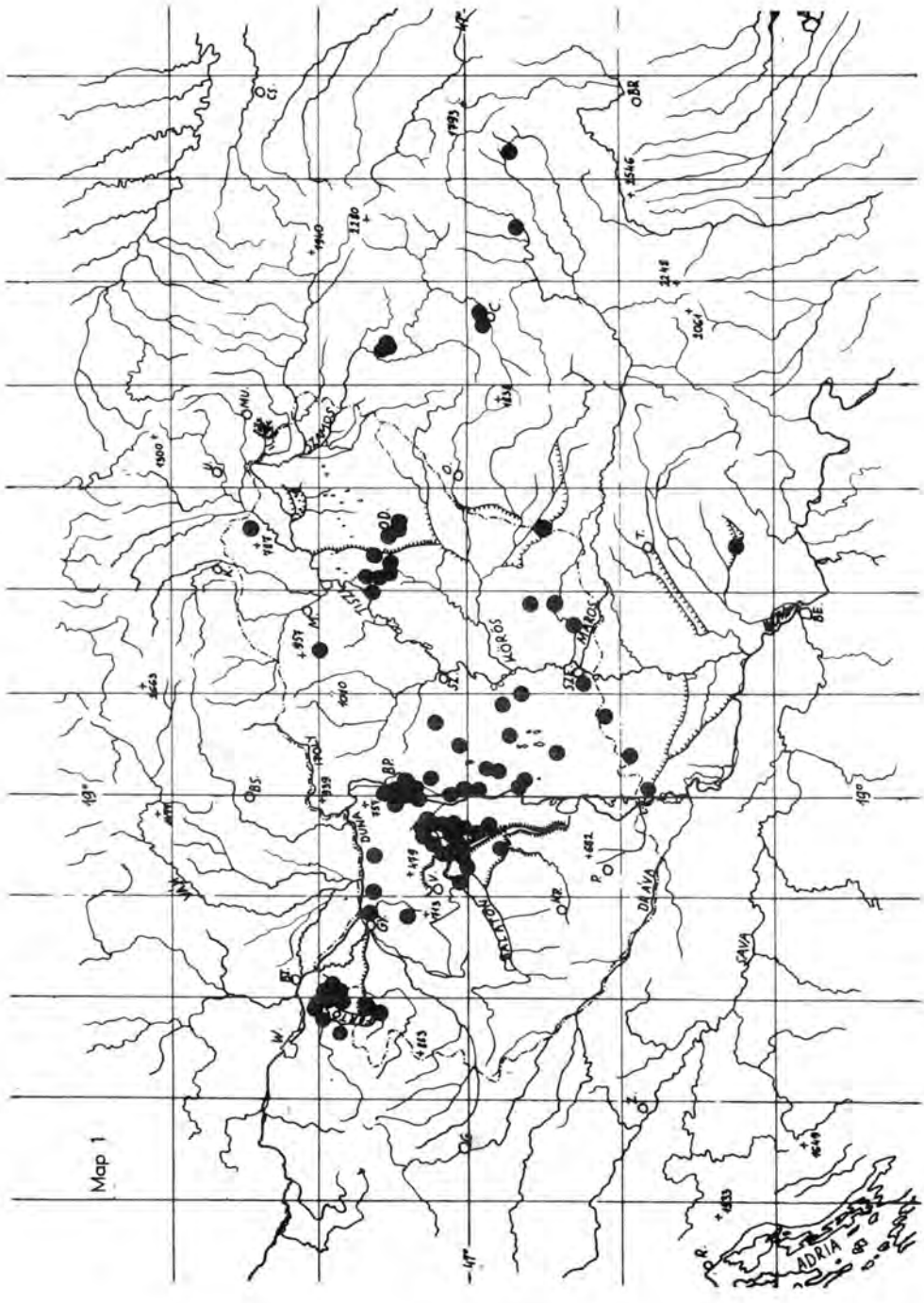
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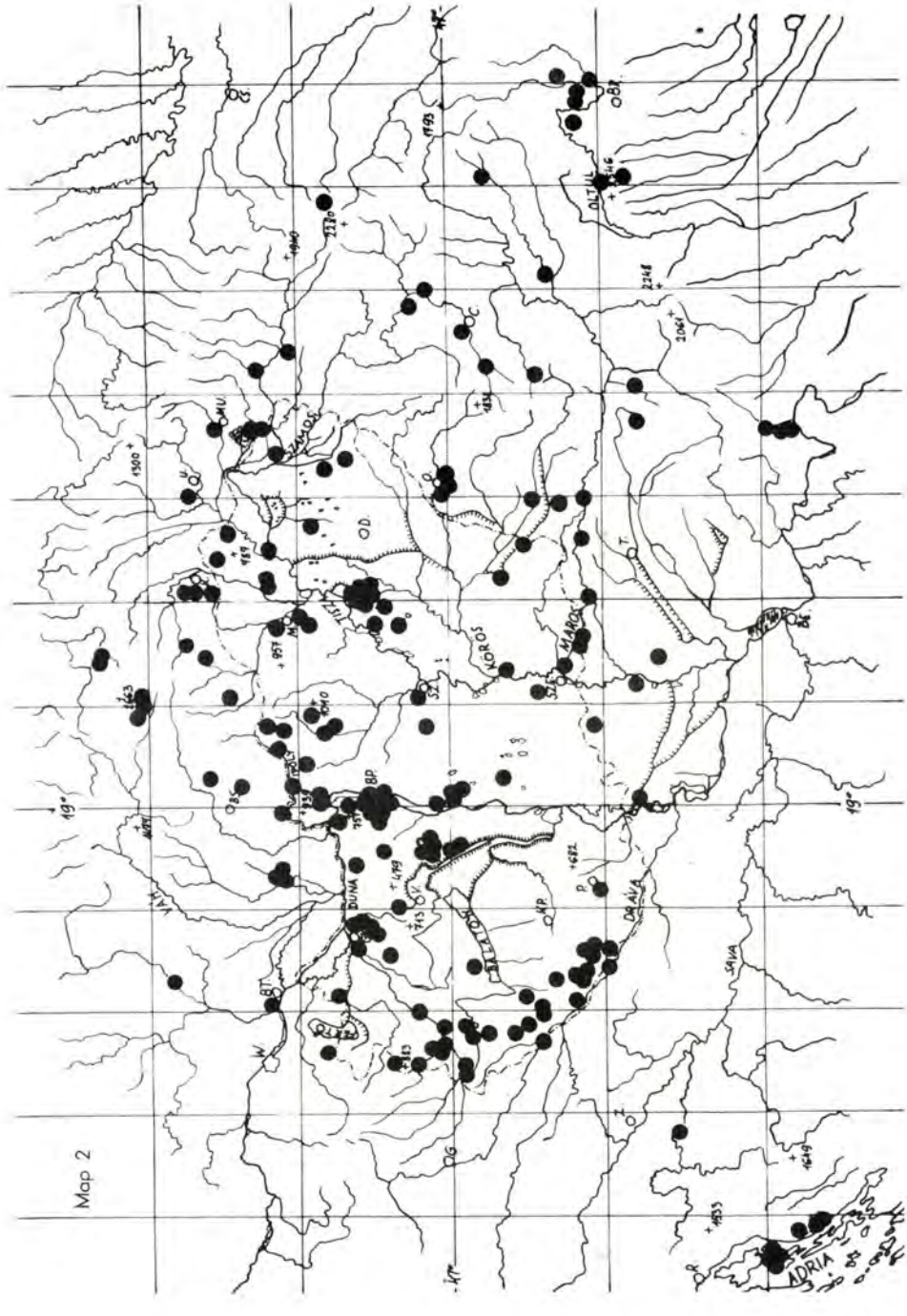
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Abbreviations of towns (Maps 1-3)

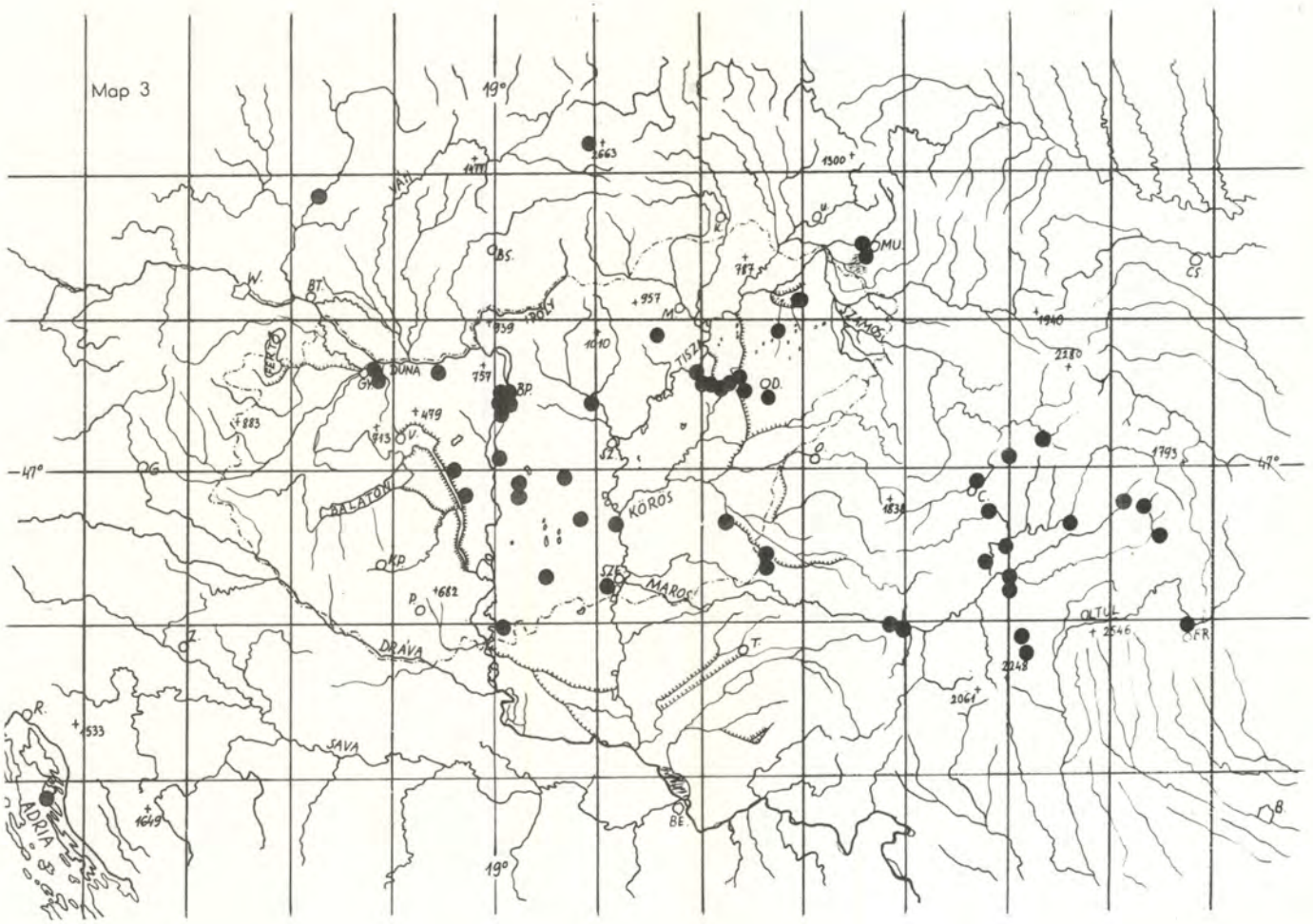
B = Bucuresti (Rumania)
BE = Beograd (Yugoslavia)
BP = Budapest (Hungary)
BR = Brasov (Rumania)
BS = Banska Stiavnica (Czechoslovakia)
BT = Bratislava (Czechoslovakia)
C = Cluj (Rumania)
CS = Csernovci (Soviet Union)
D = Debrecen (Hungary)
G = Graz (Austria)
GY = Győr (Hungary)
K = Kosice (Czechoslovakia)
KP = Kaposvár (Hungary)
M = Miskolc (Hungary)
MU = Mukacsevo (Soviet Union)
O = Oradea (Rumania)
P = Pécs (Hungary)
R = Rijeka (Yugoslavia)
SZ = Szolnok (Hungary)
SZE = Szeged (Hungary)
T = Timisoara (Rumania)
U = Uzsgorod (Soviet Union)
V = Veszprém (Hungary)
W = Wien (Austria)
Z = Zagreb (Yugoslavia)


ADRIA
DRAVA
DUNAJ
MOROS
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W
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46°
47°
18°
19°
20°

Map 1




Map 2


Map 3
19°
47°
DUNA
TISZA
KÖRÖS
MAROS
DRÁVA
SAVA
BALATON
ADRIA
OMU
BP.
GY.
SZ.
KP.
V.
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T.
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OC.
OD.
1682
1533
1649
2663
2546
2048
2061
1838
1795
1940
2380
1300+