

The occurring of *Oenothera* species in Scandinavia

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Abstract: This paper presents results of a taxonomic revision of the specimens of *Oenothera* L. stored in the major herbaria of Denmark, Norway, Sweden and Finland. The examination of about 3000 specimens revealed that in Scandinavia a total of 45 *Oenothera* species were collected, and 22 of them were cultivated in gardens (especially in botanical gardens) but the remaining 23 were growing wild. The list of *Oenothera* species found in Scandinavia is compared with similar lists from the Baltic countries (Estonia, Latvia and Lithuania) and with the list of all *Oenothera* species identified by me all over Europe (99 species).

Key words: *Oenothera*, species, distribution, frequency, collections, herbarium specimens, Scandinavia, Europe, Baltic countries

1. Introduction

Before the second half of the 20th century the knowledge about the taxonomic differentiation and geographic distribution of representatives of the genus *Oenothera* L. in Scandinavia (as well as in other regions of Europe) was concerned with the 2 Linnaean species: *Oe. biennis* L. and *Oe. muricata* L. (Hultén 1950). Since the 1950s in the new floras published in Scandinavia (Kurtto & Lahti 1987; Lid & Lid 1994; Elven 1994; Hämet-Ahti *et al.* 1998; Mossberg & Stenberg 2003) some other *Oenothera* species have been given, too, on the basis of the revisionary studies conducted by me in 1962-1968. In connection with the preparing of a new edition of *Flora Nordica* (Jonsell 2000, 2001, 2004), its Editors asked me to revise the *Oenothera* collections stored in the herbaria of the several countries of Scandinavia. The present paper gives the results of these investigations.

2. Material and methods

The material of the investigations derived from the following Herbaria: AAU, C in Denmark; BG, KMN, KUO, O and TRH in Norway; GB, LD, NORRKOEPING, OHN, S, SBT, UME, UPS and VI in Sweden; H, OULU, TUR, TURA and VOA in Finland (acronyms after Index Herbariorum I, Holmgren *et al.* 1990).

The identification of the *Oenothera* specimens was based on an analysis of taxonomic characters, such as: size of flowers and their parts (length of hypanthia, sepal

tips, anthers and stigma lobes; length and width of petals in mm); pilosity of the rhachis, ovaries, buds and capsules; colour (either green or red) of the young inflorescence axis, red punctulation of green parts of the stem, rhachis, ovaries (or its lack), and red striping of the buds (sepals). The stereoscopic microscope was used for examination of the material.

3. Results

The herbarium specimens of *Oenothera* were collected in Scandinavia starting from the mid-19th century. The oldest specimens are as follows:

Oe. biennis: 1826 in Sweden (LD), 1841 in Denmark (C, AAU), 1854 in Finland (H), 1867 in Norway (O, BG).

Oe. rubricaulis (= *Oe. muricata* L. s. str., not auct. europ. et americ.): 1840 in Denmark (C), 1841 in Sweden (LD), 1864 in Finland (KUO).

Oe. ammophila: 1821 in Denmark (C).

Oe. glazioviana: 1883 in Sweden (GB), 1897 in Denmark (AAU), 1899 in Finland (KUO).

Oe. perangusta: 1840, 1841 in Sweden (Stockholm, S), 1869 in Finland (H).

Oe. depressa: 1884 in Finland (TURA), 1919 in Sweden (Stockholm, S), although

Oe. scandinavica (= *Oe. biennis* × *depressa*) was collected in Stockholm just in 1884! (S) (Rostański 2006 in print)

The total number of the *Oenothera* species found in Scandinavia is 45 (Table 1). Among them, 22 were

Table 1. Distribution of *Oenothera* species in Scandinavia

No.	Species	Cultivated/ wild	Number of specimens in Herbaria				Total	
			Denmark	Norway	Sweden	Finland		
1	<i>Oe. acaulis</i> Cav.	C	1	0	2	1	4	
2	<i>Oe. affinis</i> Cambess	C	0	0	1	0	1	
3	<i>Oe. ammophila</i> Focke	W	91	13	3	3	110	
4	<i>Oe. biennis</i> L.	W	252	169	864	82	1367	
5	<i>Oe. brachycarpa</i> A. Gray	C	0	0	1	0	1	
6	<i>Oe. canovirens</i> Steele	W	12	12	15	46	85	
7	<i>Oe. cambrica</i> Rostański	W	0	1	0	0	1	
8	<i>Oe. casimiri</i> Rostański	W	18	10	28	4	60	
9	<i>Oe. cruciata</i> Nutt.	C	0	0	3	0	3	
10	<i>Oe. deflexa</i> Gates	W	0	0	2	0	2	
11	<i>Oe. depressa</i> Greene	W	3	32	54	71	160	
12	<i>Oe. fallax</i> Renner	C/W	26	3	26	6	61	
13	<i>Oe. flava</i> (A.Nelson) Garrett	C	0	0	1	0	1	
14	<i>Oe. fruticosa</i> L.	C	0	0	3	0	3	
15	<i>Oe. gauroides</i> Hornem.	C	0	0	1	0	1	
16	<i>Oe. glazioviana</i> Micheli	C/W	155	18	92	5	270	
17	<i>Oe. hoelscheri</i> Renner ex Rostański	W	0	2	2	0	4	
18	<i>Oe. indecora</i> Cambess.	W	0	0	17	0	17	
19	<i>Oe. laciniata</i> Hill	W	0	7	29	1	37	
20	<i>Oe. linifolia</i> Nutt.	C	0	0	1	0	1	
21	<i>Oe. longiflora</i> L.	C	1	0	1	0	2	
22	<i>Oe. macrocarpa</i> Nutt.	C	1	0	2	1	4	
23	<i>Oe. mollissima</i> L.	C	3	0	1	0	4	
24	<i>Oe. odorata</i> Jacq.	C	2	0	3	0	5	
25	<i>Oe. oakesiana</i> (A.Gray) Robbins.	W	0	1	0	0	1	
26	<i>Oe. parviflora</i> L.	C	0	0	3	1	4	
27	<i>Oe. perangusta</i> Gates	W	0	3	41	16	60	
28	<i>Oe. perennis</i> L.	C	3	2	4	3	12	
29	<i>Oe. pinnatifida</i> Nutt.	C	0	0	1	0	1	
30	<i>Oe. rosea</i> L'Her. ex Aiton	C	1	0	3	1	5	
31	<i>Oe. rubricalyx</i> Gates	C	0	0	1	0	1	
32	<i>Oe. rubricaulis</i> Kleb.	W	52	26	356	35	469	
33	<i>Oe. rubricauloides</i> Rostański	W	3	2	17	3	25	
34	<i>Oe. scandinavica</i> Rostański	W	0	15	29	12	56	
35	<i>Oe. speciosa</i> Nutt.	W	0	0	7	2	9	
36	<i>Oe. spectabilis</i> Hort.	C	0	0	1	0	1	
37	<i>Oe. stricta</i> Ledeb.	W	8	2	6	1	17	
38	<i>Oe. suaveolens</i> Desf. ex Pers.	C	1	0	1	0	2	
39	<i>Oe. tetragona</i> Roth	C	5	2	10	14	31	
40	<i>Oe. tetraptera</i> Cav.	C	1	0	6	0	7	
41	<i>Oe. trichocalyx</i> Nutt.ex Torr.& Gray	C	0	0	1	0	1	
42	<i>Oe. victorini</i> Gates	W	0	0	1	0	1	
43	<i>Oe. villosa</i> Thunb.	W	0	1	0	0	1	
44	<i>Oe. wienii</i> Renner ex Rostański	W	0	1	8	0	9	
45	<i>Oe. wratislaviensis</i> Rostański	W	0	0	0	2	2	
Total specimens			639	322	1648	310	2919	
Total species			C=24 W=23	21	19	40	22	45

Table 2. Comparison of distribution of *Oenothera* species in Scandinavia and the Baltic countries

No.	Species	Denmark	Norway	Sweden	Finland	Estonia*	Latvia	Lithuania
1	<i>Oe. ammophila</i>	●●●	●	●	●	●	○	●●
2	<i>Oe. biennis</i>	●●●●	●●●	●●●●	●●●	●●●	●●●●	●●●●
3	<i>Oe. rubricaulis</i>	●●●	●●●	●●●	●●●	●●●	●●●	●●●
4	<i>Oe. depressa</i>	●●	●●	●●●	●●●	○	●●	●●
5	<i>Oe. casimiri</i>	●●	●●	●●●	●	●	●●●	●●●
6	<i>Oe. canovirens</i>	●●	●●	●●	●●●	○	○	○
7	<i>Oe. laciniata</i>	○	●●	●●	●	○	○	●
8	<i>Oe. glazioviana</i>	●●●●	●●	●●●	●	○	○	○
9	<i>Oe. perangusta</i>	○	●	●●●	●●	●●	●	○
10	<i>Oe. suaveolens</i>	●	○	●	○	○	●●	○
11	<i>Oe. hoelscheri</i>	○	●	●	○	○	●	●
12	<i>Oe. wienii</i>	○	●	●	○	○	○	●

Explanations: ○ lacking ● very rare ●● rare ●●● often ●●●● common

* (Rostański & Ramst 2001)

Table 3. The *Oenothera* species in Scandinavia compared with the whole list of *Oenothera* species recorded so far in Europe

No.	Origin	Species	Distribution in Europe
1	A, E, S	<i>Oe. acaulis</i> Cav.	Cultivated in Europe
2	E	<i>Oe. acerviphila</i> Rostański	Poland
3	E	<i>Oe. acutifolia</i> Rostański	Poland and neighbouring countries
4	E	<i>Oe. adriatica</i> Soldano	Italy
5	A, E, S	<i>Oe. affinis</i> Cambess.	Portugal
6	E, S	<i>Oe. albipercurva</i> Renner ex Hudziok	Germany, Poland, Czech Republic, Denmark
7	E, S	<i>Oe. ammophila</i> Focke	Germany, Denmark, Poland and neighbouring countries
8	A, E	<i>Oe. angustissima</i> Gates	Germany, Belgium,
9	E, S	<i>Oe. biennis</i> L.	All over Europe
10	A, S	<i>Oe. brachycarpa</i> A.Gray	Sweden, cultivated
11	E	<i>Oe. braunii</i> Doell.	Germany
12	E	<i>Oe. brevispicata</i> Hudziok	Germany
13	E	<i>Oe. britannica</i> Rostański	U.K.
14	E	<i>Oe. bulgarica</i> Delipavlov	Bulgaria
15	A, E, S	<i>Oe. cambrica</i> Rostański	U.K.
16	E	<i>Oe. canovirens</i> Steele	Germany
17	A, E, S	<i>Oe. canovirens</i> Renner	Europe (rare)
18	E	<i>Oe. carinthiaca</i> Rostański	Austria
19	E, S	<i>Oe. casimiri</i> Rostański	NE Europe
20	E	<i>Oe. clavifera</i> Hudziok	Germany
21	E	<i>Oe. coloratissima</i> Hudziok	Germany
22	E	<i>Oe. compacta</i> Hudziok	Germany
23	E	<i>Oe. conferta</i> Renner	France
24	E	<i>Oe. coronifera</i> Renner	Germany, Poland
25	A, E, S	<i>Oe. cruciata</i> Nutt. ex G.Don	France, Poland
26	A, E, S	<i>Oe. deflexa</i> Gates	Germany, Belgium, Sweden
27	A, E, S	<i>Oe. depressa</i> Greene	Europe
28	E	<i>Oe. drawertii</i> Renner ex Rostański	Germany, Hungary
29	E	<i>Oe. editicaulis</i> Hudziok	Germany
30	E	<i>Oe. ersteinensis</i> Linder & Jean	France
31	E	<i>Oe. fallacoides</i> Soldano et Rostański	Italy
32	E, S	<i>Oe. fallax</i> Renner ex Rostański	Europe
33	E	<i>Oe. flaemingina</i> Hudziok	Germany, Poland
34	A, S	<i>Oe. flava</i> (A.Nelson) Garrett	Sweden, cult.
35	A, S	<i>Oe. gauroides</i> Hornem.	Sweden, cult.
36	A, E, S	<i>Oe. fruticosa</i> L.	Europe, cult.
37	A, E, S	<i>Oe. glazioviana</i> Micheli	Europe
38	E	<i>Oe. heiniana</i> Teyber	Austria

39	E, S	<i>Oe. hoelscheri</i> Renner ex Rostański	Poland and neighbouring countries, Sweden
40	E	<i>Oe. inconspicua</i> Hudziok	Germany
41	A, E, S	<i>Oe. indecora</i> Cambess.	W Europe
42	E	<i>Oe. indivisa</i> Hudziok	Germany
43	E	<i>Oe. issleri</i> Renner ex Rostański	France, Germany, Poland, Czech Republic
44	E	<i>Oe. italica</i> Rostański & Soldano	Italy
45	E	<i>Oe. jueterbogensis</i> Hudziok	Germany, Poland
46	A, E, S	<i>Oe. laciniata</i> Hill	Europe
47	A, S	<i>Oe. linifolia</i> Nutt.	Sweden, cult.
48	A, E, C	<i>Oe. longiflora</i> L.	SW Europe
49	A, E, S	<i>Oe. macrocarpa</i> Nutt.	Europe, cult.
50	E	<i>Oe. macrosperma</i> Hudziok	Germany
51	E	<i>Oe. marinellae</i> Soldano	Italy
52	E	<i>Oe. mediomarchica</i> Hudziok	Germany
53	A, E, S	<i>Oe. mollissima</i> L.	Europe, cult.
54	E	<i>Oe. moravica</i> Jehlik & Rostański	Czech Republic
55	E	<i>Oe. nuda</i> Renner ex Rostański	France, Germany, Portugal
56	A, E, S	<i>Oe. oakesiana</i> (A.Gray) Robbins	Europe
57	E	<i>Oe. obscurifolia</i> Hudziok	Germany
58	E	<i>Oe. octolineata</i> Hudziok	Germany
59	A, E, S	<i>Oe. odorata</i> Jacq.	Denmark, cult.
60	E	<i>Oe. oehlkersi</i> Kappus	Germany, Italy, Portugal
61	E	<i>Oe. paradoxa</i> Hudziok	Germany, Poland
62	A, E, S	<i>Oe. parviflora</i> L.	Europe
63	E	<i>Oe. pedemontana</i> Soldano	Italy
64	E	<i>Oe. pellegrini</i> Soldano	Italy
65	A, E, S	<i>Oe. perangusta</i> Gates	N Europe
66	A, E, S	<i>Oe. perennis</i> L.	W Europe
67	A, S	<i>Oe. pinnatifida</i> Nutt.	Sweden, cult.
68	E	<i>Oe. ploompuii</i> Rostański	Estonia
69	E	<i>Oe. polgari</i> Rostański	Hungary
70	E	<i>Oe. pseudocernua</i> Hudziok	Germany
71	E	<i>Oe. pseudochicaginisensis</i> Rostański	Poland
72	E	<i>Oe. punctulata</i> Rostański & Gutte	Poland, Germany, Czech Republic
73	E	<i>Oe. purpurans</i> Borb.	Hungary
74	A, E	<i>Oe. pycnocarpa</i> Atk. & Bartl.	France, Germany, Poland, Ukraine, Czech Republic, Italy
75	E	<i>Oe. pyramidiflora</i> Hudziok	Germany
76	E	<i>Oe. rigirubata</i> Gutte & Rostański	Germany
77	A, E, S	<i>Oe. rosea</i> L.'Her. exAit.	W Europe
78	E	<i>Oe. rostanskii</i> Jehlik	Czech Republic, Poland
79	A, E	<i>Oe. royfraseri</i> Gates	Germany, Poland
80	E, S	<i>Oe. rubricalyx</i> Gates	France, Sweden cult.
81	E, S	<i>Oe. rubricaulis</i> Kleb.	NE Europe
82	E, S	<i>Oe. rubricauloides</i> Rostański	N Europe
83	E, S	<i>Oe. scandinavica</i> Rostański	N Europe
84	E	<i>Oe. sesitensis</i> Soldano	Italy
85	E	<i>Oe. slovacica</i> Jehlik & Rostański	Slovakia
86	A, E, S	<i>Oe. speciosa</i> Nutt.	W Europe
87	A, E	<i>Oe. spectabilis</i> Hort.	Sweden, cult.
88	A, E, S	<i>Oe. stricta</i> Ledeb.	Europe
89	E	<i>Oe. stucchii</i> Soldano	Italy
90	E, C	<i>Oe. suaveolens</i> Desf. ex Pers.	Europe, Sweden cult.
91	A, E	<i>Oe. subterminalis</i> Gates	France, Germany, Poland, Czech Republic
92	E	<i>Oe. tacikii</i> Rostanski	Poland
93	A, E, S	<i>Oe. tetragona</i> Roth	Europe, cult.
94	A, E, S	<i>Oe. tetraptera</i> Cav.	W Europe, cult.
95	A, S	<i>Oe. trichocalyx</i> Nutt. ex Torr.&Gray	Sweden, cult.
96	A, E, S	<i>Oe. victorini</i> Gates	Poland, Czech Republic, Sweden
97	A, E, S	<i>Oe. villosa</i> Thunb.	W Europe (?)
98	E, S	<i>Oe. wienii</i> Renner ex Rostański	C Europe, Sweden
99	E, S	<i>Oe. wratislaviensis</i> Rostański	Poland, Finland, Belgium

Explanations: A – origin from America, E – found in Europe, S – found in Scandinavia, cult – cultivated

cultivated in gardens, while 23 were collected in the wild. The most frequent *Oenothera* species, represented by more than 60 herbarium sheets each, are: *Oe. biennis* (1347), *Oe. rubricaulis* (459), *Oe. glazioviana* (270), *Oe. depressa* (160), *Oe. ammophila* (110, especially numerous in Denmark!), *Oe. canovirens* (85), and *Oe. fallax* (61). The rarest, represented by 1-2 sheets only, are: *Oe. cambrica*, *Oe. deflexa*, *Oe. oakesiana*, *Oe. victorini*, *Oe. villosa*, and *Oe. wratislaviensis*. The frequency of the 12 species occurring in Scandinavia and in the Baltic countries (Estonia, Latvia, Lithuania – Rostański *et al.* 2004) is compared and illustrated in Table 2. The distribution of *Oenothera* species recorded in Scandinavia and all over Europe (compiled here by me for the first time) is shown in Table 3.

4. Conclusions

In light of the revisionary studies of the genus *Oenothera* in Scandinavia and in Europe, it is possible to state that from the 99 *Oenothera* species known so far in Europe, 45 occur in Scandinavia. The species common to Scandinavia and the Baltic countries include the common *O. biennis* and *O. rubricaulis*, but also *O. casimiri*, *O. ammophila* (no records from Latvia!), *O. depressa* (none from Estonia!), *O. perangusta* (none from Denmark!). These results reflect the current floristic situation of *Oenothera* in Scandinavia (and in Europe, too).

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