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Oenothera coronifera RENNER (*Onagraceae*) – a new species in the vascular plant flora of Poland

KRZYSZTOF ROSTAŃSKI[1], KAROL LATOWSKI[2]

[1]Department of Plant Systematics, University of Silesia, Jagiellońska 28, 40-032 Katowice (Poland), e-mail: rostansk@us.edu.pl
[2]Department of Plant Taxonomy, Adam Mickiewicz University, Niepodległości 14, 61-713 Poznań (Poland), e-mail: latowski@amu.edu.pl

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Abstract: For the first time *Oenothera coronifera* was described by Renner from the territory of Germany. In Poland it has been unknown until now. In 2000 on the railway terrain in Głogów (W Poland) abundant in this species locality was stated. On the basis of the literature data and the further studies the authors give a description of some morphological and anatomical diagnostic features which enable its identification and show differentiation, allowing to distinguish it from the most similar species..

Keywords: *Oenothera coronifera*, distribution, first locality from Poland, morphological and anatomical diagnostic features, habitat.

Introduction

The genus *Oenothera* L. has some interesting features which are the object of intensive studies in taxonomy, phytogeography, ecology, cytogenetic, as well as in phytochemistry and pharmacology (ROSTAŃSKI 1985, 1995a, 1998, 1999, ROSTAŃSKI, TOKARSKA-GUZIK 1998, JEHLIK, SPITZOVA 1995, ROSSMANN 1970, MOL et all. 2001). The primary native lands and centres of systematic differentiation of Evening-primroses are both American continents which indicates separation in this genus of 15 units in the range of sections (MUNZ 1965, ROSTAŃSKI 2004a).

Special taxonomic problems make *Oenothera* species from the typical section (*Oenothera*), which occur in Europe. During the meiosis process the disturbance

in chromosomes translocation is being often observed which results in individuals with new combinations of morphological features (STACE 1993). That mechanism and consolidated hybrid forms have become the subject of interesting discussion on the species. Here we can distinguish two separate conceptions (schools). One of them described as "American-West German school" in the frame of typical subsection (from section *Oenothera*) distinguishes only 12 species treating them on a large scale (DIETRICH et al. 1997). On the other hand so called "European school", which after the first Author is based on penetrating genetic, morphological and of many years field studies treats species in a small way. According to that concept from typical subsection are known about 70 species in Europe, 29 species in Poland (ROSTAŃSKI 1985, 2004a, MIREK et all. 2002). In adjacent countries the number of the *Oenothera* species (with permanent hybrids) is the following: Czech Republic - 23 species, Slovakia –17, Lithuania – 8, Belarus – 15 and Ukraine – 13 species (ROSTAŃSKI 1995b, 2004b).

This work comprises wide characterization of *Oe. coronifera* which is a new species in the flora of Poland. Description of characteristic features can be helpful in further search of this species in other regions of Central Europe.

Oenothera coronifera Renner (English name – Lacelike Evening-primrose, German name - Kronen-Nachtkerze, Polish name - wiesiołek koronkowy) was discovered in 1936 by Otto Renner in Kloster Zinna near Jüterbog (Brandenburgia), south of Berlin and named as "*Oe. nova* von Zinna", next mentioned in the Author's publications in1937 (p. 195, 220), 1938 (p. 99), 1942 (p. 456), and 1950 (p.132). The latin diagnosis can be found in the work from 1956 (p. 239-240). Further information on the occurrence of that species in Berlin gave SCHOLZ (1956), whereas the localities from Saxonia were given after GUTT & ROSTAŃSKI (1971). According to HARDTKE & IHL (2000) *Oe. coronifera* is often found in ruderal communities (Sisymbrietalia, Onopordetalia) in dry and sandy habitats.

Material and methods

The herbarium materials of *Oe. coronifera* stored in the two herbaria in Poland - at the Department of Plant Taxonomy, Adam Mickiewicz University (POZ) and University of Silesia (KTU). Were used for the description of morphological features in a comparative aspect. These are following herbarium sheets:

1. Głogów - sandy intertrack space nearby old engine-house. 1.09.2000, K.Latowski (POZ);
2. Głogów - sandy intertrack space nearby old engine-house. 4.07.2001, K.Latowski, K.Rostański (POZ, KTU);
3. Cultivation 13/63 in Botanical Garden in Wrocław. Cultivation with O.Renner's seeds, 15.07.1964, 23.09.1964, K.Rostański (KTU);
4. Berlin-Lichterfelde, an derBahn bei der Ostdorfer Str., 19.07.1961, H.Scholz, dupl. No 2398a (KTU);

5. Brandenburg, Gruena, am Bahndamm zwischen Luckenwalde und Jüterbog (loco classico!), 26.06.1967, K.Rostański, G.Hudziok (KTU);
6. Sachsen, Coswig bei Wittenberg/Elbe, 29.06.1967, P.Gutte (KTU);
7. Sachsen, Wiederitzsch, nordlich von Leipzig, am Bahndamm, 20.08.1967, P.Gutte (KTU);
8. Berlin-Tiergarten, bei Klingerhofer Str., 13.09.1980, K.Rostański (KTU);
9. Berlin, am Potsdamer Bahnhof, 13.09.1980, K.Rostański (KTU).

The features connected with the colour of seeds were described on the ground of a scale of colours, after BONDARTZEV (1954) together with their latin names. The terms put into practice by ROSTAŃSKI (1982, 2004) were used in the description of morphological details. The analysis of some chosen anatomical features was carried out on a fresh material kept in jars with 60% ethyl alcohol. Studies on the anatomical structure of leaf were made with the use of semi-durable preparations, and with the help of Carl Zeis's microscope and MNR-2 drawing apparatus. The picture from the scaning microscope (SEM) were taken in Laboratory of Electron Microscope at the Adam Mickiewicz University in Poznań. Phytocenoses with the share of *Oe. coronifera* were shown in the two phytosociological releve's using the Braun-Blanquet method.

Results

The specimens for the taxononomical identification were collected for the first time in Głogów on 1st September, 2000. In that time the plants had fully mature fruits (capsules) with long, characteristicly parted at the top teeth, and that is why the species has an epithet "coronifera". At the top of the stems of some specimens, there were present the last flowers which at the end of vegetation season had no diagnostic value (ROSTAŃSKI 1998). The next collection was made in a time of full plant blooming (4.07.2001) and then temporarily was confirmed that the species belong to *Oe. coronifera.*

Oe. coronifera in a intragenera system sugested by ROSTAŃSKI (1985, 2004) represents the following units:

Subgenus - *OENOTHERA*
Sectio - *OENOTHERA*
Subsectio – *OENOTHERA*
II Series – *OENOTHERA* (*Oe. coronifera* RENNER)

It should be emphasized that a typical series has the biggest taxonomic differentiation, it encloses 19 species and 15 consolidated hybrids (ROSTAŃSKI 1985), among which these are common in the whole of Central Europe (*Oe. biennis* L., *Oe. rubricaulis* KLEB.).

The locality of *Oe. coronifera* discovered in Głogów is rich and consists of two populations separated one from the other about several hundred metres, and every has tens of blooming and bearing fruit individuals. In every population there was taken a phytosociological releve. They both are shown below:

Relevé n° 1. Date - 4.07.2001. Głogów - sandy intertrack space near old engine-house. Area of releve - 30m^2 Cover of herb layer– 40 %. Number of species – 22. *Oenothera coronifera* 1.1, *Solidago canadensis* 2.3, *Achillea millefolium* 2.2, *Medicago lupulina* 1.1, *Verbascum lychnitis* 1.1, *Artemisia vulgaris* +, *Conyza canadensis* +, *Linaria vulgaris* +, *Oenothera biennis* var. *brevihypanthialis* +, *Poa angustifolia* +, *Poa compressa* +.2, *Rumex thyrsiflorus* +, *Taraxacum officinale* +, *Artemisia absinthium* r, *A. vulgaris* r, *Carduus acanthoides* r, *Cichorium intybus* r, *Cirsium arvense* r, *Echium vulgare* r, *Matricaria maritima* subsp. *inodora* r, *Senecio viscosus* r, *Tragopogon dubius* r.

Relevé n° 2. Date - 4.07.2001. Głogów - grassy place at the inactive loading platform. Area of releve - 20m^2 Cover of herb layer – 65 %. Number of species – 23. *Oenothera coronifera* 1.1, *Medicago* x *varia* 3.3, *Solidago canadensis* 2.2, *Artemisia camopestris* 1.2, *Arrhenatherum elatius* 1.1, *Berteroa incana* 1.1, *Trifolium arvense* 1.2, *Dactylis glomerata* +.2, *Trifolium campestre* +.2, *Achillea millefolium* +, *Artemisia vulgaris* +, *Cichorium intybus* +, *Lathyrus sylvestris* +, *Poa compressa* +, *Potentilla argentea* +, *Anchusa officinalis* r, *Carex hirta* r, *Echium vulgare* r, *Medicago lupulina* r, *Melandrium album* r, *Poa pratensis* r, *Rumex thyrsiflorus* r, *Vicia villosa* r.

We have stated, that characteristic for the leaf anatomical structure of *Oe. coronifera* is the occurrence of stomata both in lower (Fig.2) and higher epidermis (Fig. 1). For that reason these are amphistomatical leaves and this feature probably refers to the whole genus. The stomata on both surfaces have approximate sizes, in under surface – their lenght is 24.8µm to 31.0µm (mean 29.3µm); in higher surface – lenght 24.8µm to 31.0µm (mean 28.9µm).

The stomata are mostly surrounded by 3-4 epidermis cells. These cells are not differentiated and therefore the stomata can be called anomocytic (STACE 1993).

The habit of seeds of *Oe. coronifera* (Fig. 3), and their measurements and colour are similar those in other species from the typical subsectio. Seed coat (testa) in a top view is indicated by pentagonal to hexagonal cells with delicate reticulate sculpture (Fig. 4,5).

Conclusions

A new species of *Oenothera coronifera* Renner in the Polish flora, noted in September of 2000, for the first time was described in the vicinity of Berlin. That species was found on the railway station in Głogów (W Poland) similarly as many other evening-primroses occurring in typical ruderal habitats. The locality in Głogów is quite abundant in species and consists of two separated about several hundred meters, populations every posses tens of flowering and fruiting individuals. Actually the list species of genus *Oenothera* in Poland consist of 30 species.

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Tab. 1. Diagnostic morphological features for the identification of *Oenothera coronifera*.

Feature	*Oenothera coronifera*[1]	*Oenothera glazioviana*[2]
Colour of stem	intensively red at base	green or partly reddish at base
Colour of young rhachis	gradually reddening (gradually turning red)	gradually reddening (gradually turning red)
Punctulately of stem and rhachis	red bulbous-based hairs; these present on red blotches	red bulbous-based hairs; these present on red blotches
Hairs of stem	hairs acuminate pappilose or not papillose at base	hairs acuminate pappilose or not papillose at base
Shape of leaves	widely lanceolate, flat	elliptic or elliptic-lanceolate, often strongly wavy
Colour of midrib	red	white or rose
Colour of flower buds	red striped	red striped
Sepal tips in buds	closed up at base	closed up at base
Shape, colour and length of petals	obovate, yellow, to 35mm long and wide	obovate, yellow, to 50mm long, wider than long
Position of stigmas and anthers	stigma lobes spreading about in half of petal lenght	stigma lobes spreading at tip of petals
Lenght of fruits;	25-30mm;	20-35mm;
Hairs of fruits	mainly covered with acuminate hairs	covered with acuminate and glandular hairs
Teeth of fruits	long	short
Seeds	1.0 - 2.3mm long, 0.3 - 1.2mm wide, 0.3-1.5mm high; deep dark ferruginous to deep dark purple (atrobrunneus to atropurpureus)	1.1 - 2.2mm long, 0.3 - 1.7mm wide, 0.3-1.8mm high; deep dark ferruginous to deep dark purple (atrobrunneus to atropurpureus)

[1] According to RENNER (1956) including the material from Głogów and other materials from herbaria (KTU, POZ): [2]According to ROSTAŃSKI (1991) subnom. *Oe. erythrosepala* Borb.; ROSTAŃSKI et all. (1989).

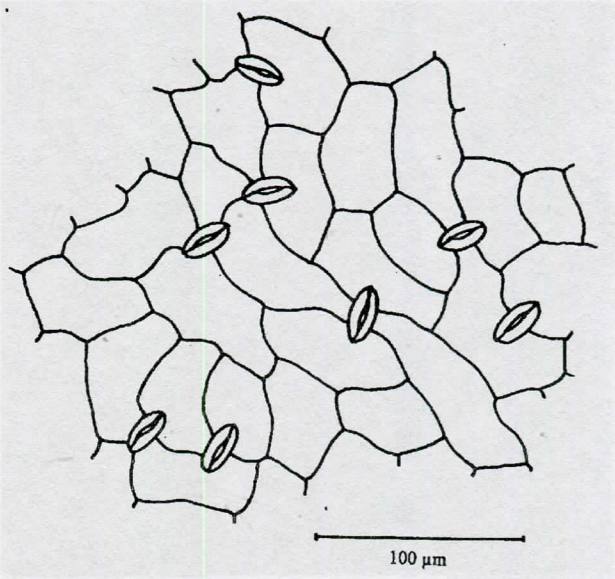

Fig. 1. *Oenothera coronifera* - part of the higher leaf epidermis in surface view.

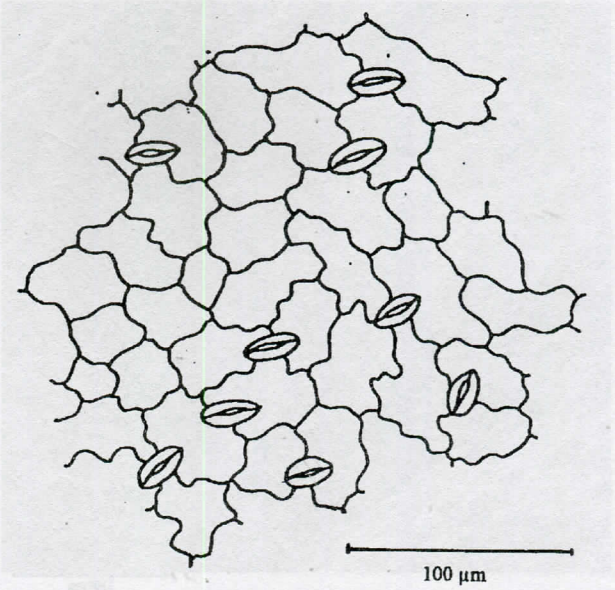

Fig. 2. *Oenothera coronifera* - part of the lower leaf epidermis in surface view.

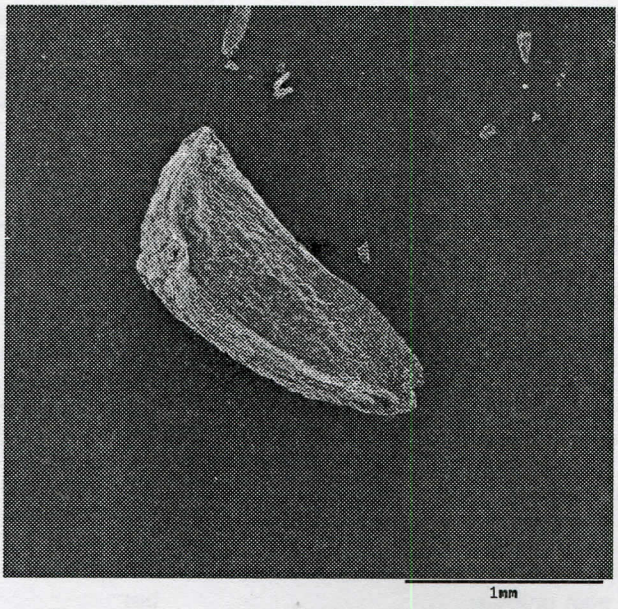

Fig. 3. *Oenothera coronifera* - habit of seed in SEM microphotography.

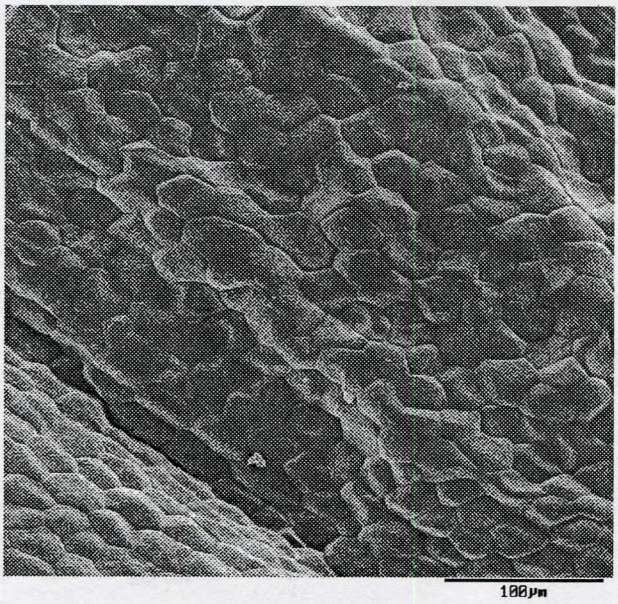

Fig. 4. *Oenothera coronifera* - part of testa epidermis from lateral surface (surface view in SEM microphotography).

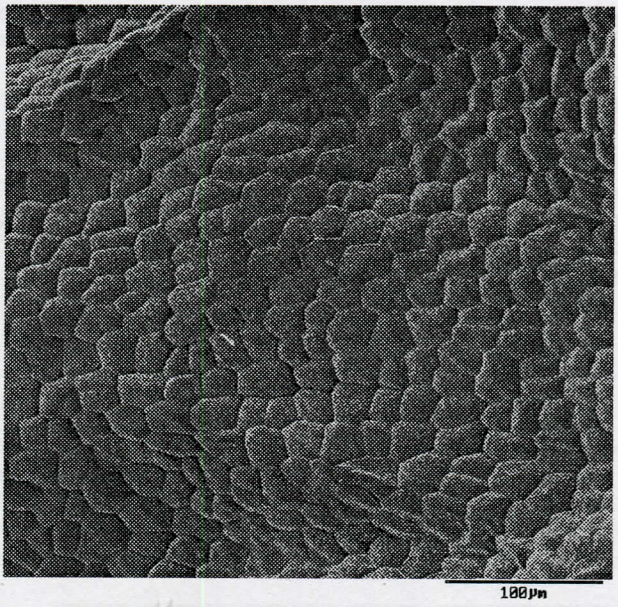

Fig. 5. *Oenothera coronifera* - part of testa epidermis from dorsal surface (surface view in SEM microphotography).