

A New Record *Oenothera laciniata* Mill. for the Flora of Libya

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Abstract *Oenothera laciniata* is reported for the first time for the flora to Libya which is a new generic record as well. The specimens were collected from Ain Zarar region belonging to Tripoli province in the North West part of Libyan coast. This exotic species is native to the eastern part of North America, and it should be considered as a potential invader in the Mediterranean ecosystems. Morphological description is provided to facilitate further identification of this species and to warrant its future detection as well.

Keywords Onograceae, *Oenothera laciniata*, Invasive, Weed

1. Introduction

Oenothera is a large genus belongs to the family Onagraceae with about 120 – 145 species [1, 2], native to North, temperate and subtropical America, now it introduced in many other countries [3], where often colonize altered environments, vegetation open, often in abandoned crops, roadsides and dunes [3, 5, 6, 7].

Species of the genus *Oenothera* L. often grow in open disturbed habitats in temperate subtropical areas of North, Central, and South America, The greatest number of species can be found in Mexico and the northern part of Central America [8], now it naturalized in South Africa, Australia and Europe, with the center of diversity in S. W North America [9].

Some species are considered weeds, many of the species are grown in gardens or have commercial interest. The spread of invasive *Oenothera spp.* throughout Europe over the last 200 years was studied by [10, 11]. Most species of this genus flower only once when long days and short nights occur, the flowers open either near sunset or near sunrise [12].

At present *O. laciniata* is considered naturalized in much of the world, including south western Europe [13, 14] *O. laciniata* is largely naturalized and potentially harmful by its invasive nature, it seems appropriate to offer here a detailed description and equipment graphic from the collected area, All this can facilitate detection new populations in the foreseeable case that continue to expand our territory, helping to monitoring.

2. Materials and Methods

Plant specimens were collected from Ain Zara region about 20 km south east of Tripoli, in the North West part of Libyan coast N 32° 49' 33.53" and E 13° 17' 53.42" (Fig 5). Monitoring the plant and gathering of plant specimens were conducted within two consecutive years between 2014 – 2015.

Plant specimens were examined carefully, characterized with detailed description and equipment graphic from the collection locality within the two consecutive years of the study, all this can facilitate detection new populations in the foreseeable case that continue to expand our territory, helping to monitoring.

The identification of the species was authenticated by Dr. Mohammed Mahklouf, Department of Botany, Faculty of Sciences, Tripoli University, with the aiding of data from the following literature [9, 15].

The specimens were deposited at the national herbarium of the Department of Botany, Faculty of Sciences, Tripoli University, Libya.

Taxonomic description

Oenothera laciniata Hill, Veg. Syst. 12, App.: 64. 1767. Synonym: *Raimannia laciniata* (Hill) Rose ex Britton & A. Brown. *Oenothera laciniata* var. *mexicana*, *O. mexicana*, *Raimannia Mexicana* English name: Cutleaf evening primrose

Herbs erect to procumbent, annual or short-lived perennial, branched from base, usually with basal rosette leaves. Stems 10 - 80 cm long, simple or branched, covered with spreading hairs, often with glandular hairs on inflorescence. Leaves green, with inconspicuous veins, pubescent, rosette leaves petiolate, and cauline leaves sessile to shortly petiolate, blade

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Published online at <http://journal.sapub.org/ijmb>

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4–15 × 1–3 cm; cauline leaves narrowly lanceolate or narrowly elliptic, 2–10 × 0.5–3.5 cm, base narrowly cuneate, margin deeply lobed to dentate, apex acute. Inflorescence a lax open leafy spike, terminal. Flowers open near sunset, one per stem per day; 25 - 30 mm across, rotate, hypanthium forming floral tube 1.5–3.5 cm, upcurved in bud. Sepals 4, free or fused near the base, 5–15 mm, strongly reflexed, narrowly triangular to narrowly lanceolate with a free, acute terminal apices, 12.5–17.5 × 2.5–3.5 mm (including apices), green with reddish midvein, covered with long hairs, the apices narrowly conic and 1.5–3.3 mm long, solid. Petals 4, 5–22 mm, spreading, yellow to pale yellow, fading to orange, cordate, veined, apex broadly bilobed, lobes rounded. Stamens 8, in one row, 7–10 mm, anthers exserted, versatile, dithecal, linear, 4.8–5 mm long, pale yellow, longitudinally

dehiscent; Ovary inferior, strigillose, with spreading and sometimes few glandular hairs, narrowly oblong, 11–18 mm long, 4-sided with rounded angles and 4 shallow grooves, 4-loculed, each locule with numerous ovules attached to center; style exserted, cylindrical, 25–35 × 0.5–0.7 mm, pale green to greenish yellow; stigma conspicuously 4-lobed, lobes spreading, 3.5–5.3 mm long, yellowish to greenish yellow. Fruit capsule, cylindrical, sessile, loculicidal dehiscent by 4 valves, many seeded, slightly club-shaped, 3 - 4.5 mm, 4-lobed in transverse section, valves ascending-hirsute and pubescent. Seeds in two rows per locule, brown to dark brown, ellipsoid to suborbicular, 0.9–1.8 mm, slightly reticulate.

(Fig 1 a & b, 2, 3).

Fl. Apr – Sep. Fr. May – Oct.

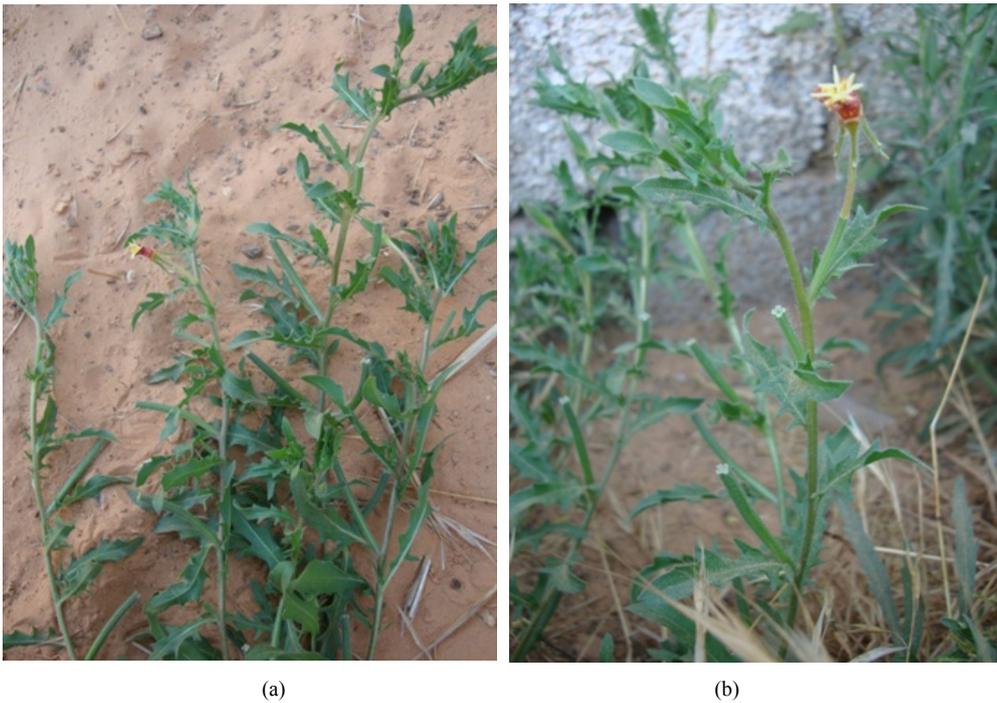


Figure 1. (a) & (b) Habit



Figure 2. Flower



Figure 3. Fruit

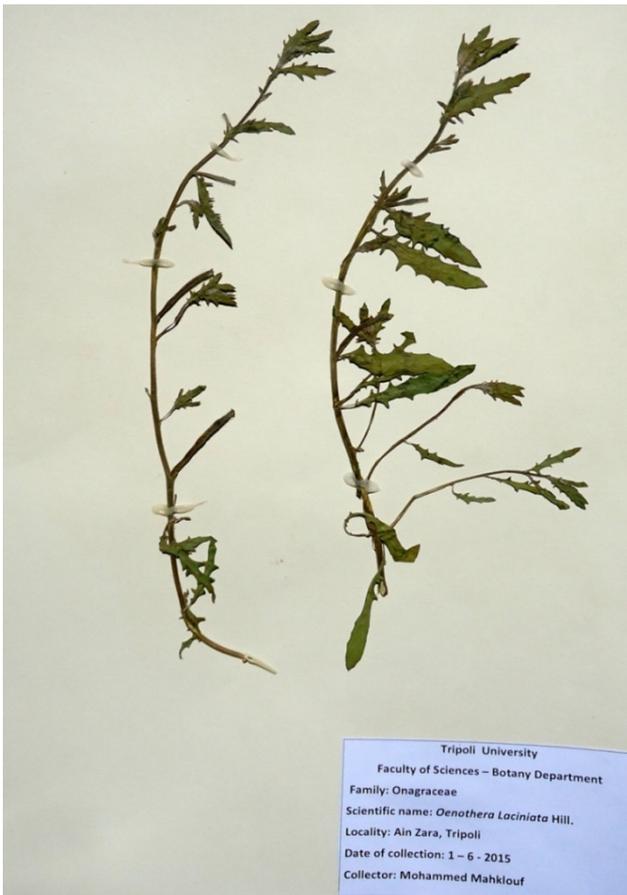


Figure 4. Herbarium specimen

3. Results and Discussion

Oenothera laciniata is reported for the first time in the Ain Zara region about 20 km south east of Tripoli, N 32° 49' 33.53" and E 13° 17' 53.42" (Fig 5). a report that also constitutes its new generic record *Oenothera* L. to the Flora of Libya. This exotic species is native to the eastern part of North America, and it should be considered as a potential invader in the Mediterranean ecosystems, it reported for the

first time in the Valencian Community (E of Spain) as an invasive species [15, 16].



Figure 5. A map of Libya showing site of collection

Morphological data are shown to facilitate further identification of this species and to warrant its future detection as well. The identification of this species was done using the data from the literature [9, 15]. In addition it easily recognized by its yellow showy epigynous flowers, long cylindrical floral tube, spreading deflexing spals, lobed-lacinate leaves and long cylindrical - tetragonal capsule.

In this paper *O. laciniata* is recorded for the first time in the Flora of Libya as an invasive weed, which is considered a new generic addition *Oenothera* L. as well depending on records of Flora of Libya [17].

According to 9 (2007) chromosome number of *O. laciniata* $2n = 14$.

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