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## Revision of the *Lactuca* species (*Asteraceae*) occurring in the Maltese Islands

### Abstract

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An investigation on the species of *Lactuca* occurring in the Maltese Islands was carried out on 105 populations in natural habitats and 15 herbarium specimens. The main aim was to revise the four *Lactuca* species reported in historical literature of which the occurrence of *L. virosa* was doubtful, whereas *L. saligna* has not been reported for the last 30 years or more. Results confirmed the presence of three species: the agricultural cultivated crop *Lactuca sativa*; the frequently occurring *L. serriola* (both f. *serriola* and f. *integrifolia*) and the rediscovery of *L. saligna* from Gozo. *L. virosa* was not confirmed in this study and is considered as a past misidentification that persisted till present date derived from the misconception that the leaves of *L. virosa* are entire, whereas those of *L. serriola* are lobed. Achenes morphology and leaf characters were used for the determination of the species, and consequently, magnified images of the achenes and their morpho-metric assessment are given. The variation and infraspecific taxa of *L. serriola* are also discussed based on field findings. A brief account on the history of *Lactuca* species in Malta, a distributional map and an identification key are also given.

*Key words:* *Compositae*, Crop Wild Relatives, flora.

### Introduction

*Lactuca* L. is a fairly large genus in the family *Asteraceae* which comprises some 100 species distributed throughout most regions of the world. Member species occur naturally in Europe, Tropical and Temperate Asia, Africa and North America (Lebeda & al. 2004) with some species introduced in Australia and many countries in South America (POWO 2019). The most representative or well-known species of the genus is the vegetable *Lactuca sativa* L. – the garden lettuce, with a production of 26.87 million tons in 2017 (FAO 2017). Seventeen species occur in Europe according to Lebeda & al. (2004) and from the neighbouring countries to Malta, ten are recorded in Italy (Euro+Med 2019), six in Sicily (Giardina & al. 2007; Euro+Med 2019) and four in Tunisia (Le Floch & al. 2010).

From preliminary studies and ad-hoc examinations of *Lactuca* species from numerous surveys we conducted in Malta since the year 2002, *L. sativa* (as a crop), *L. ser-*

*riola* have been confirmed, but *L. virosa* could not be substantiated. This contradicted with the historical and current literature stating that *L. virosa* is a frequent wild lettuce in Malta, with some old reports indicating that it is more common than *L. serriola* (Lanfranco 1995, 2001; Bonett & Attard 2005), or even that only *L. virosa* occurs in the Maltese Islands (Lanfranco 1969). Confused by the two opposing scenarios, a study on the wild species of *Lactuca* occurring in the Maltese Islands was conducted between 2018 and 2019. Its aim was to confirm or not the current presence, distribution and ecology of *L. virosa* and perhaps other *Lactuca* species which occur in Sicily or Tunisia and highlight differences in their ecological and habitat preference. In addition, the study was also aimed to find populations of *L. saligna* which appears to have become extirpated. Reference to herbarium specimens collected from Malta was also taken into account as this gives important evidence of what was the concept of plants reported as *L. virosa* in the late nineteenth and early twentieth century.

In addition, this study stemmed up from the well-documented confusion in historical literature where *L. virosa* was widely confused with *L. serriola*, where apparently, there was a misconception that plants with unlobed leaves were treated as *L. virosa* whereas plants with runcinate-lobed leaves were identified as *L. serriola* (Prince & Carter 1977; Oswald 2000). For example Prince & Carter (1977) stated that up to the early 20<sup>th</sup> century, unlobed-leaved plants of *Lactuca* were assigned as *L. virosa* by British botanists and old British Floras specifically referring as an example to Bentham (1865): “*The name of L. scariola is often limited to the varieties with more erect leaves, with deeper and narrower lobes ; and those with broader leaves, toothed only, and not so glaucous, have been considered as a distinct species, under the name of L. virosa*”. The same treatment was indeed expressed by Maltese botanists namely Borg (1927) where he mentioned that *L. scariola* var. *silvestris* (L.) Moris (= *L. serriola*) has runcinate and pinnatifid leaves while in his account for *L. virosa* he wrote: “[Leaves] *usually undivided, or rarely slightly lobed and with reddish spots* [spots].”. Prince & Carter (1977) were aware about this confusion and to stop this saga, they reorganised the taxonomic concepts between *L. virosa* and *L. serriola*, stating that both species can have pinnatifid or entire leaves and assigned the unlobed-leaf form of *L. serriola* into a new combination - *L. serriola* f. *integrifolia* (S. F. Gray) S. D. Prince & R. N. Carter. This misconception had probably influenced Maltese botanists in their floristic work till the present date, although it does not exclude the possibility that both species existed and may still occur in Malta. This investigation should hence bring new knowledge to settle this uncertain situation.

## Material and methods

Based on the morphological accounts and keys by Ferakova (1976), Prince & Carter (1977), Rich & Jermy (1998), Tison & al. (2015) and Pignatti (2018), the agricultural crop *L. sativa* is well distinguished from the other species occurring in the Maltese archipelago by its broad cauline leaves, whereas *L. saligna* has characteristic narrow leaves with pointed auricles. Prince & Carter (1977) studied well the distinction between the closely related *L. virosa* and *L. serriola* (and also *L. saligna*), where

besides giving several morphological differences in foliar and floral characters they emphasised that the best distinguishing characters are present in the achenes. A dichotomous identification key was adopted from the floristic accounts cited above and used to determine the Maltese material. As expected, the key depended heavily on the characters of the achenes and inferred that fruit-collection is instrumental in the planning of the methodology.

The methodology incorporated the examination of leaves *in situ* and more importantly the collection and examination of achenes of *Lactuca* plants from different habitats throughout the Maltese Islands. About 30 achenes from at least three fruiting heads were collected from a single plant (hereafter referred to as a *specimen*) between the end of June and the end of August of years 2018 and 2019. Observations on the habitat, population, ecology and digital photographs were also taken *in situ*.

A total of 105 specimens were examined, 23 from Gozo and 82 from mainland Malta and achenes were collected from each specimen. Two short visits in Comino (30<sup>th</sup> August and 14<sup>th</sup> September 2019) did not result in any findings of *Lactuca* spp. The fruits were stored in a labelled paper sachet and were examined under a stereo microscope during September 2019. The collected specimens are tabulated in the Electronic Supplementary File 1 (ESF 1, table 2).

Moreover, herbarium specimens of *Lactuca* from the private collection of Edwin Lanfranco and Michael Briffa as well as voucher specimens deposited at the Argotti Botanical Gardens [ARG] were also examined of which information about these specimens are given in the Electronic Supplementary File 1 (ESF 1, table 3).

We had also received voucher specimens of *Lactuca serriola* and *Lactuca virosa* collected from Montpellier, France by Prof. Erol Vela on June 2019. These, and achenes of *L. sativa* collected from open fields in Xagħra Gozo (10-July-2019) and of *L. saligna* from Xewkija, Gozo (13-Sep-2019) were used as reference material to compare the fruits of specimens collected from the wild with fruits of known or reference *Lactuca* species.

The achenes were examined under a stereomicroscope using a magnification of 16× and digital images of five fruits for each specimen were taken. The colour, mottling and texture including the presence of bristles were noted. Images were also taken against an eyepiece graticule scale by which the length and width of the achenes were measured using the software Piximeter V5.9 by Alain Henriot. The width was measured along the widest part of the fruit. The length included the beak, here denoted as the coloured part above the apex of the achene just below the white shaft of the pappus. The location of each specimen was plotted on a digital map using Google Earth Pro (Fig. 1).

## Results

### *Distinction and an identification key to Lactuca spp. recorded in Malta*

The most important distinctive characters were found to be present in the achenes and leaves (lamina and auricles) and these were the main morphological components to construct an identification key (see below). The morphological findings of the achenes of the four *Lactuca* species published or collected from the Maltese Islands are summarised in Table 1.



Fig. 1. Map showing location of collected specimens.

Table 1. Comparison of morphological characters of achenes from reference *Lactuca* species: *L. serriola* (Montpellier), *L. virosa* (Montpellier), *L. saligna* (Xewkija, Gozo) and cultivated *L. sativa* (Xewkija Gozo).

Achene character	<i>L. serriola</i>	<i>L. virosa</i>	<i>L. saligna</i>	<i>L. sativa</i>
<b>Colour</b>	Light to medium olive brown	Dark maroon-brown, reddish when still immature	Medium to dull bronze-brown	Silvery-grey with golden tones towards the apex
<b>Outline shape</b>	Oblanceolate	Elliptical	Oblanceolate	Obovate
<b>Broadest part</b>	Upper part	Middle part	Upper part	Upper part
<b>Apex (beak not included)</b>	Blunt, rarely acute	Blunt	Acute	Rounded-obtuse
<b>No. of ribs</b>	6-7	8-9	7-8	7-10
<b>Beak</b>	Long	Moderately long	Short	Very short, mucronate
<b>Mottling</b>	Sometimes present	Not mottled	Not mottled	Not mottled
<b>Bristles</b>	Long and distinct on the face and sides of the achene's apex	Absent or sparse and very short only on the faces	Subnil, sparse and very short at the apex when present	Short, indistinct on the face and sides of the achene's apex
<b>Length (mm)</b>	2.9-3.2	4.3-4.6	3.4-3.8	3.3-3.7
<b>Width (mm)</b>	0.8-1.0	1.4-1.6	0.8-1.0	1.1-1.3

**Key to the *Lactuca* taxa reported in the Maltese Islands**

- 1 Vegetable crop; leaves bright green, >10 cm wide, all without spinulose margin. . *L. sativa*
- Wild plants; leaves dull green, < 8cm wide, sometimes with spinulose margin. .... 2
- 2 Adult plants never reaching 100 cm of height; leaves <12 mm wide (usually 4–8 mm) without rigid spinules at the margin or midrib; cauline leaves linear-oblong with a sagittate base made of long narrow lobes. .... *L. saligna*
- Adult plants usually more than 100 cm high (up to 200 cm); leaves > 15 mm wide lined with rigid spinules on the margin and the main veins; cauline leaves broad oblong-obovate with a cordate base made of broad lobes. .... 3
- 3 Leaves pointing in a different direction; leaf lobes wide and distinctly clasping the stem; achenes dark, maroon, ca. 4.5 mm long, glabrous at the sides, sometimes with short, indistinct bristles on the face. .... *L. virosa*
- Leaves twisted and pointing at one vertical plane; leaf lobes acute and small; achenes light (rarely medium-dark) olive brown or peanut colour, ca. 3.0 mm long, distinctly bristly on both the face and the sides at the apical part of the achene. .... *L. serriola* (4)
- 4 Leaves distinctly lobed, runcinate-pinnatifid ..... *L. serriola* f. *serriola*
- Leaves entire and unlobed or shallowly lobed ..... *L. serriola* f. *integrifolia*

**Literature records of *Lactuca* species from the Maltese Islands.**

**1. *Lactuca saligna* L.** This species is first reported from Cottonera by Gavino Gulia (1858-59) and then (1869) at Corradino. Sommier & Caruana Gatto (1915) report it from fields and herbaceous places as a “not common” plant in Malta at Gnien il-Kbir and Buskett, and list the earlier records of Gulia. Borg (1927) meanwhile records this species as frequent here and there in Malta (often common around Attard), and besides *L. saligna* s.s., he lists also the *L. saligna* f. *walrothii* Spreng., and *L. saligna* var. *virgata* Trusch. It is then reported by Vella & Penza (1938) who consider it as a native plant. Lanfranco (1969) states that it is not frequent and present mostly beside walls. Haslam & al. (1977) report the older records and give a new record by Gauci from Villa Rundle, Victoria in Gozo. Casha (2013) just mentions that it is found in our islands without providing any personal records. The last sighting was from Victoria in the eighties (pers. comm., Michael Briffa & Edwin Lanfranco May-2019).

**2. *Lactuca sativa* L.** First listed by Zerafa (1827) as a cultivated plant followed by Gulia (1855-1856). Borg (1927) listed this species as *L. scariola* var. *sativa* (L.) Moris, and that many forms are cultivated in Malta as a vegetable. Several authors also consider it as a cultivated plant: Haslam & al. (1977), Lanfranco (1993), Camilleri (2004), Casha (2013) and Weber & Kendzior (2006). According to Camilleri (2004), at least *L. sativa* ‘Capitata’ and *L. sativa* ‘Romana’ are frequently harvested for the local market. Weber & Kendzior (2006) are the first to record it as a rare naturalised plant at Ta’ Gajdore, Ramla Valley, Xagħra, Gozo.

**3. *Lactuca serriola* L.** First recorded by Borg (1927) as *L. scariola* var. *silvestris* Lam. as a rather rare plant found at Girgenti and possibly elsewhere and which is easily mistaken for *L. virosa* L. Penza (1969) mentions it as its synonym of *L. scariola* L., and recounts that he found it at Ghajn il-Kbira. Haslam (1977) only mentions Borg’s record without giving any new locations. Lanfranco (1995) reported it under the Maltese name of *ħass tal-Pizzi* and stated that it is frequent and increasing in numbers. Sultana (2006) lists it as fre-

quent in disturbed localities throughout the Maltese Islands. Weber & Kendzior (2006) also states that it is a frequent-common and gives it the Maltese name *Ħassa Salvagġa tal-Pizzi*. Casha (2013) records it as common in disturbed habitats including roadsides, paths, fields and gardens and is the first to show a photograph of the achenes. It is also reported by Lanfranco & Bonett (2015) as a frequent species.

**4. *Lactuca virosa* L.** Recorded first by Zerafa (1827) who states that this species grows ‘in agerribus’ (on fortifications) and flowers in June. Grech Delicata (1853) mentions that it occurs in the same habitat but is in flowers from May. He is the first author to coin the name ‘*Ħass Selvagġ*’ to a wild *Lactuca* species. This species was then recorded from Cottonera (Gulia 1855-56, 1869) and from Corradino (Gulia G. 1889-90) both as indigenous and indicating that it is common in our islands. Sommier & Caruana Gatto (1915) state that it occurs here and there in some localities in Malta in fields and uncultivated places, and only cites previously recorded sites. In the catalogues of plants found in the Argotti Botanical Gardens, Borg & Penza (1924) and later, Vella & Penza (1938) gives this species as a native plant. Borg (1927) states that *L. virosa* was rather frequent in fields and gardens in Malta, and was rather rare in Gozo. Lanfranco (1960, 1969) consider it as a frequent plant and later gives its medicinal properties (Lanfranco 1975, 1993). It is reported by Penza (1969), Haslam & al. (1977), Lanfranco (1995) and Bonett & Attard (2005) as a frequent species in agricultural and suburban sites and ascribes the Maltese name of *Ħass Xewwieki*. Weber & Kendzior (2006), Casha (2013) and Lanfranco & Bonett (2015) just states that *L. virosa* also occurs in our islands but they do not show photographs in their work.

#### ***Distribution, habitat and chorology***

Specimens have been found in two types of habitats in Malta. About 75% of the specimens were collected from agricultural areas, namely fallow or neglected fields, field margins or less often inside harvested fields (grains are usually harvested in May-June in Malta), sides of rubble walls and footpaths or lanes near fields (refer to ESF 1, Table 2). The minor portion of specimens were located in semi-urban to urban areas such as roadsides, footpaths, curbs, public gardens and parks, paved ground, traffic islands, wasteland (soil heaps) and rarely from old walls. Nevertheless, many of the urban-located specimens were up to 300 m away from agricultural land. No plants of *Lactuca* were found in Comino during two surveys carried out in August and September of 2019. Similarly, *Lactuca* was not reported from Selmunett (Mifsud & al. 2016) or satellite islets in the Maltese archipelago (Sciberras & Sciberras 2010). A map showing the sites where the 105 specimens were collected is shown in Fig. 1.

Specimens were uncommon or often absent in agricultural or derelict areas near the coast such as at I-Ahrax tal-Mellieha, Marfa, Ħal-Far, Kalkara (Malta) as well at Xlendi, Ta’ Cenc, Sanap and Marsalforn in Gozo, albeit vast agricultural areas are present in these localities. On contrast, specimens were locally frequent inland. As a result, it can be inferred that wild *Lactuca* species do not prefer coastal areas. In addition, many of the *Lactuca* specimens were found in clayey soil. While the incidence of clayey soil in fields is higher compared to fields with reddish (terrarossa) soil, there seems to be an ecological correlation that *Lactuca* species prefer clayey soils, possibly because this has more residual moisture during the arid and warm months of June and July when the plants are fully mature.

With regards the chorology of the specimens examined *in situ*, plants undergo a daily cycle where flowers blossom for only about three hours, opening at dawn, (ca. 6 a.m.) and close back at about 9 a.m. Then the fruiting heads open to expose their achenes at about 10 a.m. and remain open indefinitely. The flowering period is from end of June till the beginning of September with few plants persisting till the mid-September depending on the onset of rainy autumn climate.

### **Reference material**

The morphological findings of the achenes of *L. virosa*, *L. sativa*, *L. saligna* and *L. serriola* are reported in table 1 and photographed side by side in Fig. 2. The achene of *L. virosa* is distinct by having a dark maroon colour with an elliptic-fusiform flattened lenticular shape lined by a distinct thick-ribbed margin. It is the largest fruit at an average length of 4.5 mm. *L. serriola* is unique by having a brush of conspicuous hyaline bristles at the apex and a light greyish olive-brown colour. The intensity of the colour varies between different specimens but it is never dark. Achenes of *L. sativa* are quite similar to *L. serriola* but apart from the apical bristles being very reduced, they have a broader obovate shape and a pale silvery-grey colour with a faint amber-golden hue at the apex. Finally, achenes of *L. saligna* have a medium toned dull bronze-brown colour without, or if present, inconspicuous bristles at the apex.



Fig. 2. Comparison of achenes of (left to right): *Lactuca virosa* (Montpellier, France), *L. sativa* (Xewkija, Gozo, Malta), *L. saligna* (Xewkija, Gozo, Malta) and *L. serriola* (Montpellier, France).

***Achenes morphology and variation of specimens collected from the Maltese Islands***

The characters of the fruits and the outline shape of the leaves of each examined specimen is reported in the ESF 1 (Table 3). The fruits of all specimens had a homologous morphology with some minor and taxonomically insignificant variation in the outline shape, size, amount of mottling and the length of the beak. Images of one achene from each of the 105 specimens are illustrated in Fig. 5a (L01 to L50) and Fig. 5b (L51 to L105) in the ESF 2. A general description of the important characters observed from the examination of the fruits is given below.

**Colour:** typically light olive brown throughout the whole achene, varying from either being medium dark (but never very dark) to occasionally greyish and discoloured on the other extreme. Some fruits (L03, L06, L10, L22, L42, L44, L62 and L87) had a yellowish hue here referred to as peanut colour.

**Mottling:** There was a diverse pattern of mottling in terms of number and distinctness (contrast) of small blobs on the fruit coat. Only seven specimens (L07, L09, L16, L31, L43, L94 and L103) had fruit with a fairly distinct mottling, the remaining having indistinct mottling with few or/and faded blobs, or nothing at all. The only relationship which could be linked was that none of the peanut-coloured fruits were mottled.

**Shape:** oblanceolate, broadest slightly below the beak, approximately  $\frac{3}{4}$  the length of the achene, then tapering down into a blunt base. Sides linear or rarely vaguely curved. On average, achenes were about three times as long as wide, but some were more elongated with a length/width ratio of up to  $\times 4$ .

**Ribs:** Six to seven longitudinal and parallel ribs, one at each margin of the fruit. Some specimens had a slightly flattened or minutely winged margin at the upper part of the achene.

**Beak:** Distinct and about 0.2 to 0.5 mm long. Elongated achenes had longer beaks.

**Texture:** Presence of simple but distinct hyaline bristles, located both on the face and the sides at the upper fifth of the fruit. The bristles measured 0.2–0.3 mm on average, then abruptly reduced in size and disappearing towards the lower part of the achene.

**Size:** Rather constant size of  $3.0 \pm 0.4 \times 1 \pm 0.1$  mm ( $2.65\text{--}3.41 \times 0.88\text{--}1.05$  mm). Fourteen specimens had achenes longer than 3.5 mm, the longest being 4 mm long usually with long beaks. Three specimens had achenes shorter from 2.6 mm (2.4 mm being the shortest) which were found to be wider than average and had relatively shorter beaks.

The colour, size, shape and more importantly the presence of bristles at the apical part of the achene of all the 105 specimens corresponded to species *Lactuca serriola*. *L. virosa* was not confirmed from the entire collection.

***Results from herbarium specimens collected from the Maltese Islands***

The voucher specimens loaned from Edwin Lanfranco consisted of two specimens labelled as *L. virosa*, three as *L. serriola* and four as *L. saligna* (ESF, Table 3). Specimens labelled *L. serriola* and *L. saligna* were confirmed but specimen L501, labelled as *L. virosa* (collected by Michael Briffa), was badly preserved and lacked fruits, making its determination impossible. However, L502 (*L. virosa*) was better preserved with its few leaves having an oblong shape with an entire and unlobed margin similar to L501 and seven achenes within the debris. The achenes were identical to that of *L. serriola* and hence L502 has been ascribed to this species.



Five specimens are deposited in [ARG] of which two (L511 & L512 : Table 3) were not collected from the Maltese Islands (pers. comm. Christian Borg at [ARG], Oct 2019) and labelled as *L. perennis* L. (a species not recorded from Malta) and *L. augustana* All., now a synonym of *L. serriola*, but this specimen was clearly *L. saligna* instead.

The voucher specimens L514 (*L. saligna*) and L515 (*L. scariola*) were confirmed to match the labelled species. On the other hand, the specimen L513 collected by Caruana Gatto and labelled as *L. virosa* and consisting of only of ten unlobed cauline leaves (no achenes available) was determined using Prince & Carter (1977: table 2) who provide distinguishing characters on the cauline leaves. In regards, the white midrib (not maroon); the “herring-bone” pattern formed by the midrib and lateral veins; the glaucous colour of the lamina and the non-undulated outline observed in specimen L513 correspond to *L. serriola*. Moreover, the auricles of the leaves of *L. virosa* are wide and distinctly clasping the stem whereas in *L. serriola* the lobes are narrow and acute and clasping the stem less distinctly (Keil & Stebbins, 2012) as was the case for specimen L513.

## Discussion

The examination of the 105 specimens of wild species of *Lactuca* and of the herbarium specimens did not confirm the presence of *L. virosa* on the Maltese Islands. From the three herbarium specimens cited as *L. virosa*, L501 and L513 (refer to Table 3) with entire leaves were instead found to correspond to *L. serriola* f. *integrifolia*, while L500 was undetermined due its bad state of preservation. This corroborates the misconception initiated from the historical literature (Zerafa 1831; Grech Delicata 1853; Gulia 1858-59, etc.) and flowing indisputably to the contemporary floristic works where *L. virosa* was determined as the wild lettuce with unlobed leaves, and *L. serriola* with runciform-lobed leaves, as was, for example, the case in Great Britain in the mid-nineties (Prince & Carter 1977). It seems that the achenes were ignored for the determination of *Lactuca* species by previous authors and students of the Maltese Flora, because from the literature review we carried out, none emphasised the distinct taxonomic value that the achenes have. It was perhaps because of this lack of knowledge that, as stated by Borg (1927), it was easy to confuse these two closely-related *Lactuca* species.

Poor herbarium evidence makes it difficult to assess and ascertain historical records, however, two considerations were taken into account. Since historical literature indicated that *L. virosa* was not rare in Malta – for example: “*Malta, qua e là, Hamrun, Zabbar, Ghirghenti, Marsa, ecc.*” (Sommier & Caruana Gatto 1915) – there is no plausible justification to explain why this species succumbed while the closely related *L. scariola* survived if both share the same habitat (Sommier & Caruana Gatto 1915; Borg 1927). Moreover, Caruana Gatto’s specimens L513 (Table 3) cited as *L. virosa* but being determined as *L. serriola* f. *integrifolia* further supports the general misconception about these two taxa since the early 20<sup>th</sup> century.

With regards to *L. saligna*, the species was more common in the past, both from the old records and the herbarium specimens collected between 1960-1990 (refer to Table 3). The last sightings dated about 30 years ago from Victoria, Gozo (pers. comm. Edwin Lanfranco, 2019 & Michael Briffa, 2019) and since it has not been confirmed or reported in either publications of reports by the citizen science, *L. saligna* was considered extirpated or presumably extinct. The rediscovery by one us [SM] close to the Xewkija Industrial

Estate, Gozo (Fig. 3), is a welcome finding for the Flora of the Maltese Islands. Two plants were observed on the 8<sup>th</sup> of November 2017, in their vegetative state and confirmed as *L. saligna* the year after (7<sup>th</sup> October 2018), where five adult plants were found very close to each other. A survey on the 18<sup>th</sup> September 2019 resulted in nine flowering plants showing a small but significant increase in its population.

This study also resulted in an assessment of the variation of *L. serriola* in the Maltese Islands. Both *L. serriola* f. *serriola* (89% of the population) and *L. serriola* f. *integrifolia* (= *L. virosa* auctt. melit. non L.) (see Fig. 4) were encountered, the latter represented by specimens L07, L23, L26, L30, L33, L39, L41, L58, L63, L65, L80 and L82 (refer to ESF 1). Few plants here referred as *intermediate* forms were characterised by having variably lobed leaves mostly being shallowly lobed or/and possessing entire and lobed leaves on the same plant (L14, L26, L33, L35, L38, L40, L52 and L62). In the past, these forms were given some recognition (Ferakova 1976; Prince & Carter 1977; Haslam & al. 1977; Pignatti 1982) but currently, *L. serriola* is considered as a monogenetic variable species where these old forms based on the shape and lobation of the leaves have no more any taxonomic value.

Out of interest, Sommier & Caruana Gatto (1915) and Borg (1927) give the impression that *L. serriola* and *L. virosa* were scarce or infrequent in Malta, where they only give and a handful of localities in their flora. In contrast, the current distribution of *L. serriola* is widespread throughout the Maltese Islands (Fig. 1) and this divergence raises doubts if this species was introduced in Malta around the end of the 19<sup>th</sup> century and flourished during the last 100 years.



Fig. 3. *Lactuca saligna*, Xewkija (close to Ulysses Grove), Gozo (7-Oct-2018).



Fig. 4. *Lactuca serriola* with entire leaves where it was previously referred to as f. *integrifolia* and sometimes misidentified as *L. virosa*. (specimen L41, Qala, Gozo).

## Conclusions

This investigation concludes that *Lactuca virosa* does not occur in the Maltese Islands. Most probably, it was a past misidentification based on the misconception that plants having entire or shallowly-lobed leaves were determined as *L. virosa*, whereas only plants with run-cinate-lobed leaves were ascribed as *L. scariola*. In the past these plants were instead referable to as *L. serriola* f. *integrifolia* and f. *serriola* respectively *sensu* Ferakova (1976). The fact that all herbarium specimens labelled as *L. virosa* had entire leaves supports this supposition. It stands out that examination of the achenes was not carried out for the determination of *Lactuca* species in Malta. Moreover, *L. saligna*, a species of urban habitats that has not been observed for more than 30 years has been substantiated from Xewkija, Gozo in 2017. Hence the wild *Lactuca* species occurring in the Maltese Islands are *L. serriola* (common), *L. saligna* (very rare) and the cultivated crop *L. sativa* which seldom escapes as a casual and short-lived alien close to fields where it was originally in cultivation.

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**Additional tables**

Table 2. Location and habitat of the *Lactuca* specimens collected throughout the Maltese Islands and their seed morphological characters where all 105 specimens correspond to *L. serriola* (SM: Stephen Mifsud; OM: Owen Mifsud).

Code	Leg.	Collection Date	Island	Locality	Location	Habitat	ACHENES					LEAF	
							Length (mm)	Width (mm)	L:W Ratio	Colour	Mottling	Bristles at apex	Outline shape
L01	SM	04/07/2018	Malta	Rabat	Torri tan-Nadur	Field margin of a harvested field	2.5	0.9	2.8	Light greyish olive brown	Few, indistinct	Yes	Deeply lobed
L02	OM	04/07/2018	Malta	Attard	Attard Gardens	Along the road margins with fields on opposite side	3.0	0.8	3.6	Light olive brown	None	Yes	Deeply lobed
L03	OM	05/07/2018	Malta	Mosta	Saint Joseph prayer room	Cultivated area for embellishment	3.7	1.2	3.2	Peanut	None	Yes	Deeply lobed
L04	SM	08/07/2018	Malta	Naxxar	Triq ir-Ramla, close to Maghtab	Harvested field with clayey soil	2.9	1.0	3.0	Medium olive brown	Several, indistinct	Yes	Deeply lobed
L05	SM	08/07/2018	Malta	Mgarr	In the vicinity of Triq is-Santi	Pathway close to a rubble wall of a harvested field.	2.8	1.0	2.9	Medium olive brown	Few, indistinct	Yes	Deeply lobed
L06	SM	08/07/2018	Malta	Saint Paul's Bay	Close to Scott's supermarket, in Burmarrad area	Harvested field with several dry <i>Glebionis coronaria</i>	3.3	1.0	3.3	Peanut	None	Yes	Deeply lobed
L07	SM	08/07/2018	Malta	Mosta	Close to il-Ġnien tal-Gharusa tal-Mosta	Harvested field with various dry agricultural weeds	3.0	1.0	3.2	Medium olive brown	Several, distinct	Yes	Entire
L08	SM	08/07/2018	Malta	Mgarr	In the vicinity of Triq is-Santi	Side of pathway in an agricultural area	2.7	1.0	2.8	Light olive brown	Several, indistinct	Yes	Deeply lobed
L09	SM	11/07/2018	Malta	Rabat	Triq Ghajn Qajjet, close to an area known as il-Markiz	Roadside against a rubble wall of an arable field	3.0	0.9	3.4	Light greyish olive brown	Several, distinct	Yes	Deeply lobed
L10	SM	12/07/2018	Gozo	Xaghra	Triq Marsalforn (close to granite showroom)	Street curb (arable land about 100m away)	3.0	1.0	2.9	Peanut	None	Yes	Deeply lobed
L11	SM	14/07/2018	Malta	Mgarr	Triq Ghajn Tuffieha	Margin of a harvested field with clayey soil	2.5	0.9	2.9	Light olive brown	Few, indistinct	Yes	Deeply lobed
L12	SM	28/06/2019	Gozo	iz-Zebbuġ	Close to triq tal-Kanun	Field cultivated with grain	3.0	1.0	2.9	Medium olive brown	Few, indistinct	Yes	Deeply lobed
L13	SM	29/06/2019	Gozo	Nadur	Close to triq tad-duru	Abandoned field plot, untilled and weedy	3.5	1.1	3.2	Medium-dark olive brown	None	Yes	Deeply lobed
L14	SM	29/06/2019	Malta	Qormi	Wied is-Sewda, in the vicinity of Simar farmhouse	Valley bed	2.7	0.9	2.9	Medium olive brown	Few, indistinct	Yes	Intermediate form
L15	SM	29/06/2019	Malta	Żebbuġ	Wied Qirda	Cultivated field with reddish soil	3.2	1.0	3.3	Medium greyish olive brown	Several, indistinct	Yes	Deeply lobed
L16	SM	29/06/2019	Malta	Żebbuġ	Triq tal-Ħlas	Harvested field	3.2	1.0	3.3	Light olive brown	Several, distinct	Yes	Shallowly lobed
L17	SM	29/06/2019	Gozo	Victoria	Main roundabout near LIDL (Triq l-Imġarr)	Cultivated field	3.0	0.9	3.2	Light olive brown	Few, indistinct	Yes	Shallowly lobed
L18	SM	30/06/2019	Malta	Rabat	Group of old houses close to Triq tal-Virtu and triq tal-Merhliet.	Growing from a wall in a disturbed area	2.8	0.9	3.1	Medium greyish olive brown	Few, indistinct	Yes	Deeply lobed
L19	SM	30/06/2019	Malta	Attard	Ta' Qali National Park (open picnic area)	Grassy ground with compact clayey soil	2.8	0.8	3.4	Medium olive brown	Few, indistinct	Yes	Deeply lobed
L20	OM	30/06/2019	Malta	Mgarr	Imsejjet valley	Field margin located over a valley	2.9	0.9	3.2	Light olive brown	Several, indistinct	Yes	Deeply lobed
L21	SM	01/07/2019	Malta	Qormi	Trejqa tal-Ghajn tal-Ħajja	Roadside (arable land about 100m away)	3.4	1.1	3.2	Medium olive brown	Few, indistinct	Yes	Deeply lobed
L22	SM	01/07/2019	Malta	Qormi	Side street from Imriehel bypass	Harvested field with clayey soil	3.6	1.1	3.1	Peanut	None	Yes	Deeply lobed
L23	SM	01/07/2019	Malta	Rabat	Triq tal-Infetti, below Mdina	Road side and wall of a harvested field	2.9	0.9	3.2	Medium greyish olive brown	Several, indistinct	Yes	Entire
L24	SM	01/07/2019	Malta	Attard	Notabile road, close to Citroen showroom	Rubble wall and entrance to bare harvested field	3.1	0.8	4.0	Medium olive brown	Few, indistinct	Yes	Deeply lobed
L25	SM	01/07/2019	Malta	Mellieha	Triq tal-Wilġa	Margin of a field with rotated soil	2.7	0.9	3.1	Medium olive brown	Few, indistinct	Yes	Shallowly lobed
L26	SM	01/07/2019	Malta	Dingli	Triq inżul ix-xemx	Margin of a cultivated field	3.0	0.9	3.3	Medium greyish olive brown	Several, indistinct	Yes	Intermediate form
L27	SM	01/07/2019	Malta	Attard	Ta' Qali water reservoir (Triq il-Pitkali)	From gaps in a cemented wall or reservoir	4.1	1.2	3.5	Light olive brown	None	Yes	Deeply lobed
L28	OM	02/07/2019	Malta	Siġġiewi	Siġġiewi Cemetery	Along roadside of parking area - field behind.	2.9	0.9	3.1	Medium olive brown	None	Yes	Deeply lobed
L29	OM	02/07/2019	Malta	Dingli	Along Road from Misraħ Suffara	Disturbed patch along road - field behind.	2.9	1.0	3.0	Medium olive brown	None	Yes	Deeply lobed
L30	OM	02/07/2019	Malta	Swieqi	Ibraġġ road - Parking space opposite Triq Barmil	Cultivated area along parking spaces - fields nearby	2.9	0.9	3.2	Light olive brown	None	Yes	Entire
L31	SM	03/07/2019	Gozo	Munxar	Fields near Munxar main playing fields	Harvested field	2.9	1.0	3.0	Medium olive brown	Few, distinct	Yes	Deeply lobed
L32	SM	03/07/2019	Gozo	Xewkija	Triq tal-Gruwa, close to R.A.sons factory	Disturbed area at margin of harvested field.	3.9	1.1	3.7	Light olive brown	None	Yes	Deeply lobed
L33	SM	03/07/2019	Gozo	Xewkija	Area near roundabout at triq l-Imġarr close to SB Auto	Harvested field	2.9	1.0	3.1	Medium greyish olive brown	Several, indistinct	Yes	Mixed (Entire and Lobed)
L34	SM	03/07/2019	Gozo	Xaghra	Fields in the vicinity of triq l-ghejun and Dream horse farm	Harvested field	2.8	1.0	2.8	Medium-dark olive brown	None	Yes	Deeply lobed
L35	SM	03/07/2019	Gozo	Ghasri	Triq il-Knisja (close to Gharb centre)	Side of excavated field for development	2.6	1.0	2.6	Medium olive brown	Several, indistinct	Yes	Shallowly lobed
L36	SM	03/07/2019	Gozo	Xewkija	Close to Cecilia chapel at triq ta' Lambert	Field fallow or possibly abandoned	2.9	1.0	2.9	Medium greyish olive brown	Several, indistinct	Yes	Deeply lobed
L37	SM	04/07/2019	Gozo	Żebbuġ	Tunnel below triq ir-Rabat	Wasteground/dirt at side of road.	2.9	1.0	2.9	Medium olive brown	None	Yes	Deeply lobed
L38	OM	04/07/2019	Malta	Burmarrad	Ghajn Mula (near St. Margerita church)	Patch along road - fields behind.	3.0	0.9	3.1	Medium olive brown	None	Yes	Mixed (Entire and Lobed)
L39	SM	04/07/2019	Gozo	Victoria	Wied Żejta (near Eucalyptus tree)	Road embellishment area	3.2	1.1	3.3	Light olive brown	None	Yes	Entire
L40	SM	05/07/2019	Gozo	Xewkija	Fields opposite horse race course (at Triq ir-Rabat)	Margin of a harvested field	3.0	1.0	3.0	Medium olive brown	None	Yes	Deeply lobed
L41	SM	05/07/2019	Gozo	Qala	Fields below (south of) triq il-Kuncizzjoni	Fallow fields with many Brassicaceae weeds	2.9	0.9	3.1	Light olive brown	Several, indistinct	Yes	Entire
L42	SM	07/07/2019	Malta	Naxxar	Triq il-Widna at San Pawl tat-Tarġa	Pathway close to a rubble wall of arable fields.	3.3	1.0	3.4	Peanut	None	Yes	Deeply lobed
L43	SM	07/07/2019	Malta	Żabbar	Triq il-Kaħwiela	Harvested field with some wild plants	2.7	0.8	3.3	Medium greyish olive brown	Several, distinct	Yes	Deeply lobed
L44	SM	07/07/2019	Malta	Żabbar	Triq Bieb is-Sultan	Wasteground area in abandoned fields	2.7	0.9	2.9	Peanut	None	Yes	Deeply lobed
L45	SM	07/07/2019	Malta	Marsaxlokk	Xrobb l-Ghaġin	Fallow fields	3.6	1.0	3.7	Light olive brown	None	Yes	Deeply lobed
L46	SM	08/07/2019	Malta	San Ġiljan	Triq Mikiel Angelo Borg (near Wied Ghomor)	Embellishment area aside main road	2.8	1.0	2.9	Light olive brown	Several, indistinct	Yes	Deeply lobed
L47	SM	09/07/2019	Malta	Żebbuġ	Mdina road, close to Gnien il-Paċi	Margin of harvested field	3.1	1.0	3.3	Light olive brown	None	Yes	Deeply lobed
L48	SM	09/07/2019	Malta	Rabat	Round about at Triq l-Imdina	Margin of harvested field	2.8	0.9	3.0	Light olive brown	Few, indistinct	Yes	Deeply lobed
L49	SM	09/07/2019	Malta	Saint Paul's Bay	Triq il-Bidnija (upper part of road close to Bidnija church)	Disturbed area at margin of harvested field.	3.8	1.1	3.6	Medium olive brown	Several, indistinct	Yes	Deeply lobed

L50	SM	09/07/2019	Malta	Mġarr	Triq Sir Temi Zammit	Margin of field cultivated with strawberries	2.9	0.8	3.5	Medium olive brown	Several, indistinct	Yes	Shallowly lobed
L51	SM	09/07/2019	Malta	Mġarr	Triq Sir Temi Zammit	Disturbed ground near harvested field	3.0	0.9	3.2	Medium olive brown	Several, indistinct	Yes	Deeply lobed
L52	SM	09/07/2019	Malta	Mellieħa	Il-bir, opposite Ghadira Bay	Harvested field	3.2	1.1	3.3	Light olive brown	Few, indistinct	Yes	Shallowly lobed (intermediate)
L53	SM	09/07/2019	Malta	Mġarr	Junction between Triq tal-Wilġa and Triq Ghajn Tuffieħa	Fallow field with dry Sinapis and Brassica spp.	3.3	1.1	3.1	Medium olive brown	None	Yes	Deeply lobed
L54	SM	09/07/2019	Malta	Mellieħa	Selmun road	Side of road	2.7	0.9	3.0	Medium greyish olive brown	None	Yes	Deeply lobed
L55	SM	09/07/2019	Malta	Mellieħa	Triq Ghajn Tuta	Field with old <i>Vicia faba</i> plants and some weeds	3.5	1.1	3.2	Light olive brown	Several, indistinct	Yes	Deeply lobed
L56	SM	09/07/2019	Malta	Mellieħa	Vicinity of Ramla Bay Resort	Fallow field	3.4	1.0	3.4	Medium olive brown	Several, indistinct	Yes	Deeply lobed
L57	SM	09/07/2019	Malta	Mellieħa	Small parking lot down to Mġiebah Bay	Behind rubble wall of cultivated fields	2.7	0.9	3.1	Medium greyish olive brown	Several, indistinct	Yes	Deeply lobed
L58	SM	09/07/2019	Malta	Mellieħa	Vicinity of Ghajna Hadid Tower	Fallow field	2.8	0.9	3.2	Medium olive brown	Few, indistinct	Yes	Entire (some shallowly lobed)
L59	SM	11/07/2019	Gozo	Għasri	Triq il-Fanal	Harvested fields	2.9	1.0	3.0	Medium-dark olive brown	None	Yes	Deeply lobed
L60	SM	11/07/2019	Gozo	Xagħra	Triq il-Marġa	Fallow field near small spring	2.9	0.9	3.1	Light olive brown	Several, indistinct	Yes	Shallowly lobed (intermediate)
L61	SM	11/07/2019	Gozo	Xagħra	Triq tas-Sruġ	Fallow field with dry <i>Vicia faba</i> and few weeds	2.8	0.9	3.0	Medium olive brown	None	Yes	Deeply lobed
L62	SM	11/07/2019	Gozo	Fontana	Triq tal-Għajn, very close to farmhouse near I-Għajn il-Kbira	Margin of fallow field close to rubble wall.	3.3	1.0	3.2	Peanut	None	Yes	Shallowly lobed (intermediate)
L63	SM	11/07/2019	Gozo	Għarb	Triq tat-Trux, close to Fireworks factory	Dry bed of small valley in an agricultural area	2.4	0.9	2.7	Medium olive brown	Several, indistinct	Yes	Entire
L64	SM	11/07/2019	Gozo	Nadur	Triq Dahlet Qorrot.	Fallow or unworked field with few citrus trees	2.6	1.0	2.8	Medium olive brown	Few, indistinct	Yes	Deeply lobed
L65	SM	11/07/2019	Gozo	Nadur	Wied ta' Ġulju in the vicinity of Wied ta' Grejġel	Growing from a crevice in a wall bordering cultivated fields below the street	2.6	1.0	2.7	Medium olive brown	Several, indistinct	Yes	Entire
L66	SM	11/07/2019	Gozo	Nadur	Triq il-Qala	Fallow field with few trees	2.7	0.9	3.1	Light olive brown	None	Yes	Deeply lobed
L67	SM	11/07/2019	Gozo	Nadur	Triq ir-Rabat	Fallow field with several weeds	2.7	0.9	2.9	Light olive brown	Few, indistinct	Yes	Deeply lobed
L68	OM	12/07/2019	Malta	Mtaħleb	Road leading to Mtaħleb church	Margin of cultivated field.	2.7	0.9	3.1	Light olive brown	Few, indistinct	Yes	Deeply lobed
L69	OM	12/07/2019	Malta	Żebbuġ	Triq it-12 ta' Mejjū	Along roadside - fields nearby	2.8	0.9	3.2	Light olive brown	Few, indistinct	Yes	Deeply lobed
L70	SM	13/07/2019	Malta	Żebbuġ	Triq is-Siġġiewi	Margins of fallow fields, disturbed or neglected	3.0	0.9	3.2	Light olive brown	Few, indistinct	Yes	Deeply lobed
L71	SM	13/07/2019	Malta	Siġġiewi	Triq il-Warda, Siġġiewi, close to tal-Gabba Farmhouse.	Harvested field with weeds at margins.	2.8	0.9	3.0	Light olive brown	None	Yes	Deeply lobed
L72	SM	13/07/2019	Malta	Qrendi	Triq il-Wied, Qrendi (near Haġar Qim Temples)	Fields at the junction. Located at field margins beside a rubble wall	3.5	0.9	3.6	Medium olive brown	None	Yes	Deeply lobed
L73	SM	13/07/2019	Malta	Hal-Kirkop	Triq il-Belt Valletta	Fallow field with several dry weeds	2.7	0.9	3.0	Medium olive brown	None	Yes	Deeply lobed
L74	OM	13/07/2019	Malta	Mrieħel (Qormi)	Triq l-Artiġjanal	Along margin of unused field - now a dump	2.7	0.9	3.1	Medium olive brown	None	Yes	Deeply lobed
L75	OM	14/07/2019	Malta	Qormi	Wied is-Sewda	In valley bed	2.9	0.8	3.6	Medium olive brown	Few, indistinct	Yes	Deeply lobed
L76	OM	15/07/2019	Malta	Mosta	Wied Speranza	Roadside near Wied Speranza bridge	2.7	0.9	3.0	Light olive brown	None	Yes	Deeply lobed
L77	OM	18/07/2019	Malta	Rabat	Wied Gerzuma area	Road leading from Kuncizzjoni chapel to valley - road pathway - fields nearby	3.8	1.0	3.7	Medium olive brown	None	Yes	Deeply lobed
L78	OM	18/07/2019	Malta	Rabat	Between Fiddien and ir-Ruwa	Along road - margin of cultivated field	2.6	1.0	3.0	Medium olive brown	Few, indistinct	Yes	Deeply lobed
L79	OM	18/07/2019	Malta	Attard	Gardina tal-Gibjun	Public cultivated square - very large population	3.0	0.9	3.3	Light olive brown	None	Yes	Deeply lobed
L80	OM	18/07/2019	Malta	Siġġiewi	Buskett road - just before Verdala Palace	Along roadside - fields behind	2.7	0.9	3.2	Medium-light olive brown	Few, indistinct	Yes	Entire
L81	OM	18/07/2019	Malta	Siġġiewi	Girgenti - near Inquisitor's Palace	Along roadside - fields below area	2.7	0.9	2.9	Light olive brown	None	Yes	Deeply lobed
L82	OM	18/07/2019	Malta	Siġġiewi	Road leading to Dar tal-Providenza	Along roadside - margins of fields - large population	2.8	0.9	3.1	Medium olive brown	Few, indistinct	Yes	Entire
L83	OM	18/07/2019	Malta	Siġġiewi	Near San Niklaw chapel	Pathway leading into field	2.6	0.9	3.0	Medium olive brown	None	Yes	Deeply lobed
L84	OM	18/07/2019	Malta	Luqa	Road leading to Industrial estate	Pathway leading into field	3.7	1.0	3.7	Medium-dark olive brown	None	Yes	Deeply lobed
L85	OM	19/07/2019	Malta	Mosta	Tal-Wej. Triq il-Kartaginizi.	Along the road. Fields behind.	4.1	1.0	3.9	Medium-dark olive brown	None	Yes	Deeply lobed
L86	OM	19/07/2019	Malta	Naxxar	Triq il-Musbieħ garden	In public garden.	2.7	0.9	2.9	Medium olive brown	Few, indistinct	Yes	Deeply lobed
L87	OM	19/07/2019	Malta	Gżira	Sliema road just up from public school.	Disturbed area in front of path into fields	3.3	1.1	3.1	Peanut	None	Yes	Deeply lobed
L88	OM	22/07/2019	Malta	Mġarr	Tas-Santi chapel	Along road in front of chapel. Fields opposite.	2.5	0.9	2.7	Medium olive brown	Several, indistinct	Yes	Deeply lobed
L89	OM	22/07/2019	Malta	Iklin	Triq Abos	In front garden. Largest plant seen over 2m high	3.4	1.1	3.2	Medium olive brown	None	Yes	Deeply lobed
L90	OM	22/07/2019	Malta	Santa Luċija	Dawret it-Torri street	In cultivated area along road - fields nearby	4.0	1.1	3.5	Medium olive brown	None	Yes	Deeply lobed
L91	OM	22/07/2019	Malta	Luqa	Qormi road - opposite entrance to old Airport	Cultivated area along road	2.9	0.9	3.2	Medium olive brown	None	Yes	Deeply lobed
L92	OM	30/07/2019	Malta	Qormi	Tal-Handaq	Along road leading to Junior lyceum. Fields behind.	3.0	1.0	3.1	Medium-dark olive brown	None	Yes	Deeply lobed
L93	OM	06/08/2019	Malta	Żebbuġ	San Blas area	Along road leading to Girgenti area. Fields behind	2.8	0.9	3.0	Medium olive brown	Several, indistinct	Yes	Deeply lobed
L94	OM	06/08/2019	Malta	Żurrieq	Road leading to Hal-Millieri chapel	Margin of cultivated field.	3.0	1.0	3.0	Medium olive brown	Several, distinct	Yes	Deeply lobed
L95	OM	06/08/2019	Malta	Żurrieq	Road leading to Il-Gibjun garden	Pathway leading into field	3.1	1.0	3.1	Medium olive brown	None	Yes	Deeply lobed
L96	OM	11/08/2019	Malta	Mġarr	Road leading to Ġnejna Bay	Pathway leading into field	2.6	0.9	2.8	Medium-dark olive brown	Several, indistinct	Yes	Entire
L97	OM	11/08/2019	Malta	Mġarr	Vjal il-Haddiem parallel to main road	Along gate leading into field	2.8	0.9	3.2	Medium-dark olive brown	Several, indistinct	Yes	Deeply lobed
L98	OM	24/08/2019	Malta	Floriana	Vjal Sir Paul Boffa	Cultivated land along road	2.9	1.0	2.9	Medium olive brown	Several, indistinct	Yes	Shallowly lobed
L99	SM	27/08/2019	Malta	Marsaxlokk	Triq tat-Trunciera	Harvested field close to the sea	3.5	1.1	3.1	Medium-dark olive brown	None	Yes	Deeply lobed
L100	SM	27/08/2019	Malta	Marsaxlokk	Triq iż-Zejtun	Through a wall of a field facing out towards the road	3.8	1.1	3.3	Light olive brown	None	Yes	Deeply lobed
L101	SM	27/08/2019	Malta	Hal-Għaxaq	Triq it-Terha and Triq Ghajn Barrani	Harvested fields in semi-urban area	3.6	1.1	3.5	Medium-light olive brown	None	Yes	Deeply lobed
L102	SM	29/08/2019	Malta	Marsa	Close to Adolorata cemetery	Disturbed area close to abandoned reservoir	3.8	1.1	3.4	Light olive brown	None	Yes	Deeply lobed
L103	SM	29/08/2019	Malta	Żurrieq	Triq il-Pluvieri, near Saverit Farm.	Roadside in an agricultural area.	3.2	1.1	3.1	Light olive brown	Several, distinct	Yes	Deeply lobed
L104	SM	29/08/2019	Malta	Hal-Safi	Triq ta' Gawħar, junction from Triq Hal-Far, vicinity of ta' Gawħar Tower	Margin of harvested field	3.5	0.9	3.4	Medium-light olive brown	Several, indistinct	Yes	Deeply lobed
L105	SM	29/08/2019	Malta	Żurrieq	Wied Babu area	Footpath aside rubble wall of harvested field	3.4	0.9	3.6	Medium-dark olive brown	None	Yes	Deeply lobed

Table 3. The studied herbarium specimens of *Lactuca* collected from the Maltese Islands and deposited at Argotti Gardens (ARG) or housed in the private collection of Edwin Lanfranco (EL) or Michael Briffa (MB). [d.d. : data deficient]

Code	Island	Locality	Coll. Date	Leg.	Sub	Herb	Herb. Code	Notes	Determination of specimen
L501	Malta	St. Andrews	--/--/1979	M. Briffa	<i>L. virosa</i>	EL	<b>6426</b>	Mostly destroyed, seeds not available	Undetermined
L502	Malta	Sliema (Gżira Rd.)	23/08/1965	E. Lanfranco	<i>L. virosa</i>	EL	<b>2691</b>	Leaves preserved, few seeds retrieved	<i>L. serriola</i>
L503	Malta	St. Andrews	--/07/1979	M. Briffa	<i>L. serriola</i>	EL	<b>6357</b>	Seeds not available	<i>L. serriola</i>
L504	Malta	Paola (MCAST)	03/07/1970	E. Lanfranco	<i>L. serriola</i>	EL	<b>1535</b>	Portion of inflor. suitably preserved with numerous seeds included	<i>L. serriola</i>
L505	Malta	Paola (MCAST)	03/07/1970	E. Lanfranco	<i>L. serriola</i>	EL	<b>1533-34</b>	Stem and Cauline leaves	<i>L. serriola</i>
L506	Malta	Sliema	09/09/1966	E. Lanfranco	<i>L. saligna</i>	EL	<b>2692</b>	Mostly destroyed by insects, seeds not available	<i>L. saligna</i>
L507	Malta	Naxxar	02/07/1969	E. Lanfranco	<i>L. saligna</i>	EL	<b>2688</b>	Partly destroyed, few seeds retrieved from debris.	<i>L. saligna</i>
L508	Malta	Ta' Giorni (SMCE)	12/09/1968	E. Lanfranco	<i>L. saligna</i> f. <i>walrothii</i>	EL	<b>2689</b>	Mostly well preserved, few seed retrieved from fruiting heads	<i>L. saligna</i>
L509	Gozo	Rabat	31/08/1983	M. Briffa	<i>L. saligna</i>	EL	<b>7173</b>	3 specimens, 2 x well preserved, some seeds retrieved from debris and fruit	<i>L. saligna</i>
L510	Malta	Mellieħa	14/06/1989	M. Briffa	<i>L. saligna</i>	MB	<b>2152</b>	Good preservation	<i>L. saligna</i>
L511	d.d	d.d.	d.d.	d.d.	<i>L. augustana</i>	ARG	<b>d.d.</b>	Fair preservation, seeds not included	<i>L. saligna</i>
L512	d.d.	d.d.	d.d.	d.d.	<i>L. perennis</i>	ARG	<b>d.d.</b>	Fair preservation, seeds not included	<i>L. perennis</i>
L513	Malta	d.d.	25/08/1933	A. Caruana Gatto	<i>L. virosa</i>	ARG	<b>394</b>	Good preservation flowers and seeds not included	<i>L. serriola</i>
L514	Malta	d.d.	25/08/1933	A. Caruana Gatto	<i>L. saligna</i>	ARG	<b>395</b>	Good preservation, flowers and seeds not included	<i>L. saligna</i>
L515	Malta	Għajn il-Kbira	19/09/2026	C. Penza	<i>L. scariola</i>	ARG	<b>n/a</b>	Good preservation	<i>L. serriola</i>

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## **Appendices (supplement data)**





Fig. 5a. Digital photographs of achenes of specimens L01 to L60 collected from the Maltese Islands.



Fig. 5b. Digital photographs of achenes of specimens L61 to L105 collected from the Maltese Islands.