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AN ASSESSMENT OF THE DISTRIBUTION OF *IRIS PSEUDOPUMILA* TINEO [FAM. IRIDACEAE] IN THE MALTESE ISLANDS AND COMPARISON OF ITS TWO FLOWER FORMS.

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ABSTRACT

The distribution of *Iris pseudopumila* Tineo in the Maltese islands is given, including information on four new populations. A comparison study between three populations of the yellow-flower form, and between the violet and yellow forms are provided, the latter showing marked morphological differences between the two colour forms in the Maltese islands.

Keywords: *Iris pseudopumila*, Distribution, Malta

INTRODUCTION

Iris pseudopumila Tineo, Cat. Pl. Horti Panorm. 283 (1827); (= *I. panormitana* Tod.; *I. lutescens* Guss. non Lam.) also known as the Southern Dwarf Iris, has been reported to be found in Italy, Sicily (including the Maltese archipelago) and West region of former Yugoslavia (Tutin *et al.*, 1980). Pignatti (1982) specifies this species is only found in the Italian regions of Apulia and Sicily (precisely in Messinese, Palermo, Nebrodi and Etna), while Conti *et al.* (2005) add the regions of Basilicata and Molise, further stating that the plants used to be reported from the region of Campania are no longer recorded.

The records from West 'Yugoslavia' (probably Dalmatia) could not be verified thoroughly, although Bogdanovi *et al.* (2004) exclude *I. pseudopumila* from the checklist of the Croatian flora. Unless its status in the newly independent state of Montenegro is clarified, as stated by Pignatti (1982), the distribution of *I. pseudopumila* should be considered to be as endemic only to the Central Mediterranean region, more specifically ranging from Molise (Northmost), Apulia (Eastmost), Palermo in Sicily (Westmost) to the Maltese Islands (Southmost).

The main morphology flower (seldom two to three). The external tepals (down tepals) have a characteristic beard in the form of a central, longitudinal, linear band. The perianth tube is longer by 3-5 times the ovary. The flowers are usually lower from the erect, ensiform leaves, and 2 main colour forms exist - deep purple and yellow. Fruit is a dehiscent, fusiform capsule. This species prefers arid pastures and garigue habitats Pignatti, 1982). A third colour form – off white/cream, is also reported from Italy (Fiori, 1923-1929) but is very rare and so far not known from the Maltese islands (Stevens, D.T., pers. comm. Sep-2008).

Distribution of *Iris pseudopumila* on the Maltese Islands

Despite its conspicuous flowers, the earliest reference to a presence of *I. pseudopumila* from Malta was in 1976 by Mario Gauci (Wayfarer, 1976). He reported that the first population of *I. pseudopumila* with violet flowers was discovered in 1970 in Selmun; the yellow flower-form, discovered by Ms. Patricia Wright in 1972, from Ras il-Pellegrin; and a large population found in 1976 consisting of both flower forms growing together at il-Qortin tal-

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Magun, l/o Nadur, Gozo (Wayfarer, 1976). Michael Briffa (pers.com., May 2008) also observed the violet flower forms at il-Fawwara tal-Wardija, l/o Mkarr in 1979 and later at Ghajn Fladid, l/o Selmun in 1993. Darrin T. Stevens (pers. comm., Oct-2008) reported to the author 3 other populations, while Steven Bonello (pers. comm., Feb-2007) found another population in Mosta. Four other populations were found by the author during the last 2 years as indicated in the distribution list below.

Malta:

- [Violet form, Selmun, l/o Mellieha (1970, leg. unknown but reported by Wayfarer (1976))] !
- [Yellow form, Ras il-Pellegrin (Fomm ir-Rih), l/o Mkarr (1972, leg. Patricia Wright)] !
- [Violet form, Fawwara tal-Wardija, l/o San Pawl il-Bahar (1979, leg. Michael Briffa)] !
- [Violet form, Ghajn Fladid, Selmun, l/o Mellieha (1993, leg. Michael Briffa)] !
- [Unknown colour form, Tal-Kortin, l/o San Pawl il-Bahar (2006) ⁴]
- [Violet form, Mosta fort, l/o Mosta (Feb-2007, leg. Steven Bonello)]
- [Yellow form, Ghajn Luta, Marfa l/o Mellieha (22-Apr-2007, leg. Stephen Mifsud) ²] *
- [Violet form, near Dingli Cliffs, Dingli (1-Nov-2007, leg. Stephen Mifsud)] *
- [Violet form, Binkemma l/o Mkarr (12-Mar-2008, leg. Stephen Mifsud)] *
- [Unknown colour form, Wied Musa, Marfa l/o Mellieha (4-Apr-2008, leg. Stephen Mifsud) ²] *

Gozo:

- [Intermixed violet and yellow forms, Il-Qortin tal-Magun, l/o Nadur (1976. leg. Mario Gauci) ¹]
- ! [Intermixed violet and yellow forms, Il-Qortin il-Kbira, l/o Nadur (1976. leg. Mario Gauci) ¹] !
- [Unknown colour form, Ta' CenO Area, l/o Sannat (1990s. leg. Shirley A. Micallef) ^{3,4}]

¹ Although Il-Qortin tal-Magun and Il-Qortin il-Kbira are two adjacent sites, they are regarded as one location on the distribution map, in view of their proximity (figure 1).

² Wied Musa and Ghajn Luta in Marfa are very close to each other and will be regarded as one location on the distribution map (figure 1).

³ Another population has been recently reported from Il-Qortin il-Kbir, close to Ta' CenO, l/o Sannat, and this might be the same record of Shirley A. Micallef; further fieldwork is required to determine if there are two distinct populations in this area (Stevens D.T., pers. comm. Oct 2008).

⁴ Data provided by Stevens D.T. (pers. comm., Oct 2008)

* New records found by the author

New populations of *Iris pseudopumila* recorded in the present study

One of the new populations was found on the 1st of November 2007 at Flad-Dingli - some 400m away from Dingli cliffs. It consisted of a patch of densely growing plants covering an area about 4m x 3m. The habitat was typified by xeric grassland and ermes species, and was rather rich in soil. This population was partially sheltered by *Opuntia ficus-indica* (L.) Miller and *Ceratonia siliqua* L. while other dominant flora that was present during the date of discovery includes the low-growing *Oxalis pes-caprae* L., *Bituminaria bituminosa* (L.) Stirton, *Silene colorata* Poirlet, *Leontodon tuberosus* L., and few specimens of *Ferula communis* L., and *Asphodelus aestivus* Brotero.

When this new population was observed in November, the plants were not yet in flower – however, the population was surmised to belong to the violet flower form in view of the leaf size and overall large size of the plants. The violet flower form was in fact confirmed on the 9th of February 2008 (Figure 2 - top). During this day, another smaller, violet-flowering population was found some 50m away (Figure 2 - bottom). It occupied an area of about 2m x 1m. The population of Dingli is, so far, the southernmost location of this species in the Maltese Islands.

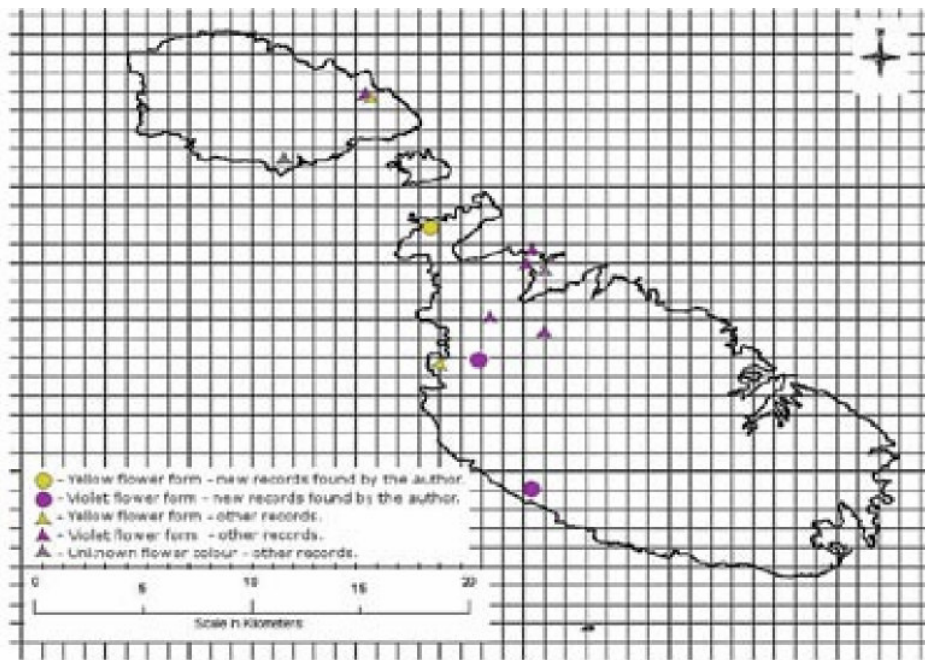


Figure 1. Distribution of *Iris pseudopumila* on the Maltese Islands (UTM, zone 33S, 1 km x 1 km grid).

Another population of *I. pseudopumila* was found in 3 different stations in the Marfa/irkewwa area. The largest population was reported from Ghajn Luta (Mifsud, 2007), but the plants were not in flower at the time. The author observed the plants in flower on 1st January 2008, and as he predicted from the small size of the leaves that the species belonged to the yellow-flower form. Two smaller populations were found on the 4th of April 2008: one was located about 200m WNW of this site (also part of Ghajn Luta) and it consisted of some 60 small plants over a small area of 2-3m across. The plants were small and had the same leaf-sizes as the other population of Ghajn Luta, and so it is assumed that they were also the yellow variety. The other population was about 700m Eastwards, more-or-less at the beginning of Wied Musa. This population was very small and occupied a narrow stretch of 4-5m long.

The author noticed that, unlike other known populations of *I. pseudopumila*, the distribution habit of the plants at Ghajn Luta did not consist of one dense clump but was instead scattered at various densities, ranging from single specimens to small groups composed of three to ten individuals.. At four locations, larger and more denser patches were present (Figure 3). The habitat was an arid, unsheltered phrygana/labiate garigue with xeric grassland communities, situated on karstic rock of the Upper Coralline Limestone, with *Urginea pancration* (Steinheil) Philippe, *Atractylis gummifera* L. *Galactites tomentosa* Moench, *Anthyllis vulneraria* L., *Anthyllis hermanniae* L., *Fumana thymifolia* (L.) Webb, and *Thymus capitatus* L.



Figure 2. Two separate populations of *Iris pseudopumila* (violet flower form) from Dingli

It is also only the third population on the

Maltese Islands, together with the smaller population at Ras il-Pellegrin (which is declining) and the larger population at Nadur, in the island of Gozo, where it is interspersed with specimens of the violet flower form.

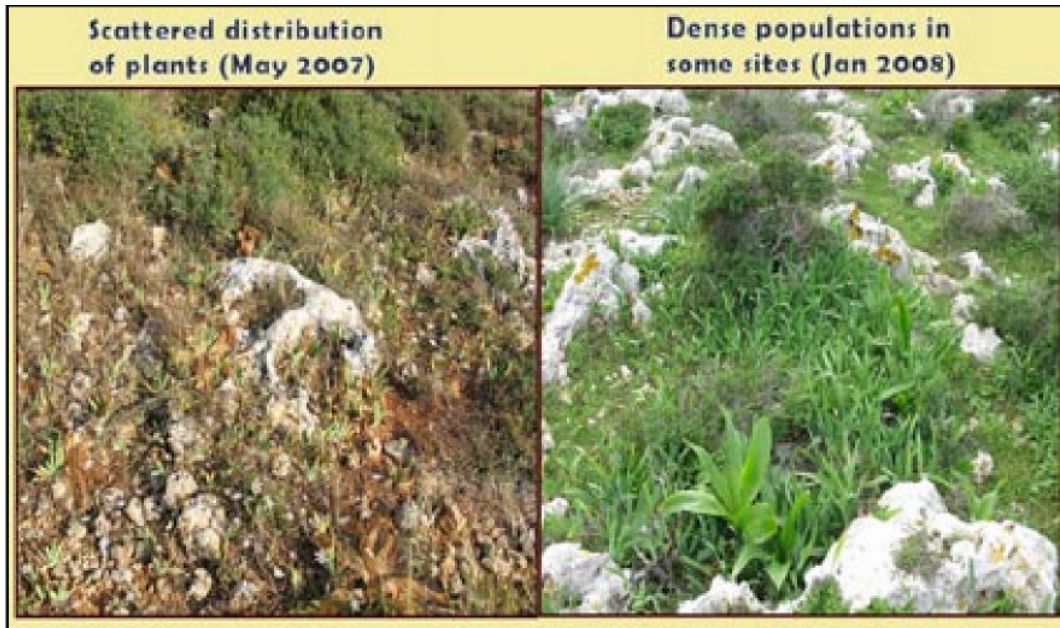


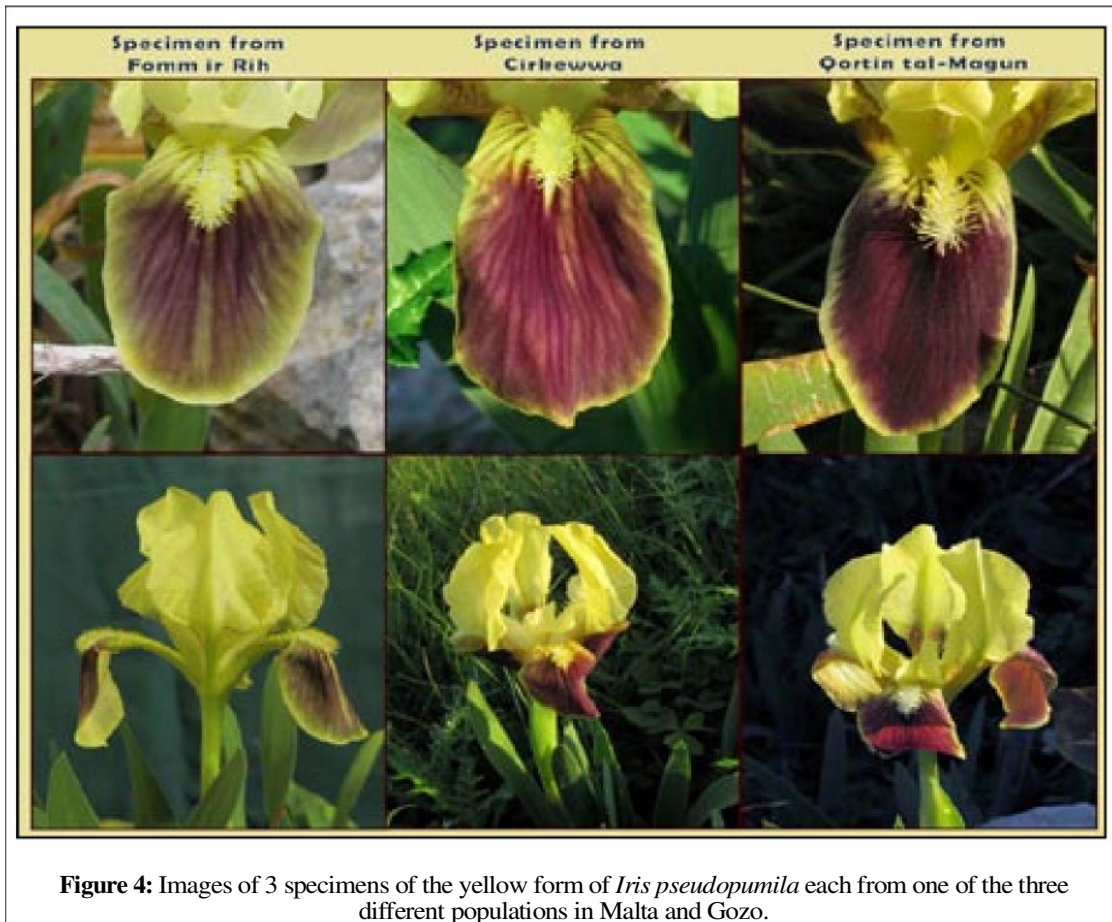
Figure 3. Populations of the yellow flower form of *Iris pseudopumila* in Marfa.

Another population of *I. pseudopumila* was found by the author in Dwejra, over the Victoria Lines on 12th March, 2008. This had violet flowers and was about 2mm across. The population was growing close to a British military construction and might have been transplanted from the nearby Fort Campbell, Selmun, which is an unused British military fortification.

Differences between the 3 yellow forms of *Iris pseudopumila*

On comparing the three populations of the yellow form, the author found some differences in the dark reddish-brown coloration of the down tepals. These differences are given in Table 1 and are illustrated in a composite image of photos in Figure 4.

Table 1. Comparison of the 3 yellow flower forms of <i>Iris pseudopumila</i> in Malta			
Characteristic of the maroon patch	Population at Fomm ir-Ri~	Population at ~irkewwa	Population at Nadur, Gozo
Intensity of colour	Relatively faint. Sub-diffused with the yellow colour of the tepal	Dark and well defined. Darker veins distinctly visible	Very dark, almost as dark as the veins, making the latter not distinctly visible.
Size	The patch reaches up to about 3 mm from the edge of the tepal leaving a distinct yellow border.	The patch reaches nearly the edge of the tepal, leaving a very narrow yellow outline (c. 1mm)	The patch reaches up to about 2mm from the edge of the tepal. Yellow border distinct



The pattern of the maroon patch was in general consistently similar in the specimens of the corresponding population, though a certain degree of variation was observed in the large population of Nadur. The difference in the maroon coloration between the populations at Ras il-Pellegrin (Fomm ir-Rih) with those of the other 2 locations is quite marked. Owing to these differences, the populations are likely to originate from 3 separate races each stationed at the corresponding locations, hence not transplanted from a previous existing population.

Differences between the yellow and violet forms of *Iris pseudopumila*

The author has observed a number of differences between the yellow (or variegated, to be more precise) flower form and the violet flower form of *I. pseudopumila* in Malta. The main differences summarized in Table 2 were consistently found on specimens growing at Selmun (violet form), Dingli (violet form), Marfa (yellow form) and Nadur (both yellow and violet forms).

Table 2. Main differences between the violet and yellow form of <i>Iris pseudopumila</i>		
Characteristic	Violet flower form	Yellow flower form
Size of the leaves.	Large; with the largest leaves reaching about 28cm long and 2.7cm wide. (See Table 3 for data)	Smaller; with the largest leaves reaching about 20cm in length and 2.1cm wide. (See Table 3 for data)
General Flower Size	Large; average length of standard is 7.2cm; average length from the tip of beard to the tip of the tepal is 4.1cm	Smaller; average length of standard is 5.5cm; average length from the tip of beard to the tip of the tepal is 2.5cm
Flower Fragrance	Average to mild, sweet-scented	Stronger scented, somehow different (more 'delicate') from the violet variety.
Flowering Time	End of Jan to mid Mar	Earlier, beg of Jan to end Feb

Due to the marked difference in the sizes of the leaves, one can distinguish with a relatively high level of confidence whether a population of *I. pseudopumila* is of the yellow or violet flower form during the non-flowering period. The criteria that the author uses is that if the larger leaves of a population are on average less than 21mm wide, then the plants correspond to the yellow form. The larger leaves of specimens of the violet form are often wider than 25mm. Measurement data of the width of the leaves of both varieties are given in Table 3 and were taken between November 2007 and January 2008. This difference in leaf size is well illustrated in Figure 5. This difference was observed in all the *Iris* populations known to the author in Malta.



Figure 5. Largest leaves of the yellow form on the left side, and largest leaves of the violet form on the right side from an intermixed population of *Iris pseudopumila* in Gozo.

Pignatti (1982) gives a range of 15-35mm for the width of the leaves of *I. pseudopumila* and up to 20cm long. He does not give separate measurements for the leaves (or flowers) of the yellow or violet form, and hence, gives the impression that there are no marked differences between the two forms in Italy. More interestingly, Tutin *et al.* (1980) states that the width of the leaves of this species is up to 15mm!

Fiori (1923-1927), gives four different forms of *I. pseudopumila*, but these were based only on the colour of the flowers, not on other differences mentioned in Table 2. The forms given are:

- I. pseudopumila* f. *violacea* Parl. [1860] – perianth dark violet
- I. pseudopumila* f. *discolor* Fiori [1907] – perianth violet with yellow margins
- I. pseudopumila* f. *lutescens* Fiori [1907] – perianth cream-white
- I. pseudopumila* f. *lutea* Fiori [1907] – perianth purely yellow.

The two forms of the same species do not seem to hybridize in the intermixed populations at il-Qortin tal-Magun / Il-Qortin il-Kbira, and although specimens with yellow tepals with a violet border exist according to Pignatti (1982), these have not been observed at Nadur where the two forms co-occur. This, coupled with the differences indicate in Table 2 may imply that some differences might be taxonomically important, although further studies are required. In this respect, it should be noted that Service (1999) has recently described a new subspecies from the island of Gozo, namely *Iris. pseudopumila* Tineo subsp. *gozoensis* N. Service, on the basis of plants found in the limits of Nadur. It is unclear if this is the same population located at Il-Qortin tal-Magun / Il-Qortin il-Kbira, where the two colour forms co-exist. Service (1999) also compared the Nadur plants with those in Italy and reported significant differences in the Gozitan population that fall beyond the variability of *I. pseudopumila* s.str.

This supposedly endemic subspecies is reported to differ from subsp. *pseudopumila* in having dark violet flowers, larger stems, leaves and flowers (c. 7.0cm diameter), a much larger ovary and shorter perianth tube. Service (1999) also states that while the Maltese plants (without giving locations) can be regarded as *I. pseudopumila* subsp. *pseudopumila*, the irises of the population at Gozo “are very much larger and of a distinctive violet colouration”. Since this matter requires further investigation, this author is aiming to compare the forms of *I. pseudopumila* of Malta with those in Italian territories, so as to shed more light about the situation of the *Iris pseudopumila* in Malta and the Central Mediterranean region.

Status of *Iris pseudopumila* for the Maltese Islands

Lanfranco (1989) reports the species as a vulnerable with a restricted distribution in the Maltese Islands and the Mediterranean. On the basis of the IUCN Red List Categories and Criteria (IUCN, 2008) the species resulted being critically endangered in the Maltese Islands, with the following status: CR B1+2ab(iii), noting that the area of occupancy is less than 3km², with the extent of occurrence being less than 100km² (calculated to be 98km²).

The main threats to the species appear to be bird trapping sites, as evidenced by the considerable damage inflicted to part of the population of the yellow flower form at Il-Qortin tal-Magun (Gozo), which was destroyed by the clearing of an area to make space for a bird trapping site as shown in Figure 6. In this respect, it should be noted that the species is strictly protected in the Maltese Islands since 2003, particularly through the provisions of the Flora, Fauna and Natural Habitats Protection Regulations, 2006 (Legal Notice 311 of 2006), published through the Environment Protection Act and Development Planning Act.

Table 3. Measurement data of the width of the largest leaves of the yellow form and violet form of *Iris pseudopumila* from different populations for a comparison study between the two forms.

Variety: Population:	Yellow flower form		Violet flower form		
	Ĉirkewwa	l/o Nadur	l/o Nadur	Dingli	Selmun
Measurments of 10 samples (mm)	22.0	22.5	25.5	24.0	29.0
	17.0	21.5	26.5	25.0	27.2
	18.0	19.5	27.0	24.5	25.5
	19.5	18.0	30.0	27.5	26.0
	22.0	18.5	27.5	24.0	28.0
	19.0	20.0	26.5	24.0	26.5
	20.0	21.5	25.0	28.5	24.5
	21.0	20.5	28.0	27.5	27.0
	20.5	19.0	30.5	28.0	29.5
	22.0	23.5	25.5	26.5	28.5

Sample size (n)	10	10	10	10	10
Largest value/mm	22.0	23.5	30.5	28.5	29.5
Lowest value/mm	20.3	18.0	25.0	24.0	24.0
Average/mm	20.10	20.45	27.20	25.95	27.17
Standard deviation	1.74	1.79	1.86	1.83	1.60

Methodology adopted: Plants in a population which had relatively large leaves were chosen for measurement. Measurements of 10 such plants randomly distributed in the population were taken. The widest part of the chosen leaf was measured by a ruler with 0.5mm resolution.



Figure 6. *Iris pseudopumila* was found growing around a clearing used as a trapping site at Qortin tal-Magun, Gozo (Jan 2008).



Figure 7. *Iris pseudopumila* from Ras il-Pellegrin, Malta



Figure 8. *Iris pseudopumila* from Ghajn Luta (Marfa), Malta



Figure 9. *Iris pseudopumila* from Dingli, Malta

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