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## MIGRATION OF THE PAINTED LADY *VANESSA CARDUI* L. (LEPIDOPTERA) IN THE ISLAND OF MALTA (CENTRAL MEDITERRANEAN)

Mark-Anthony Falzon<sup>1</sup>

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### ABSTRACT

A number of records (including six previously unpublished ones) of the Painted Lady *Vanessa cardui* L., 1758 migrating over the Maltese Islands, are compiled and compared. In particular, a migration that took place in spring 2003 is documented in detail; passage details and weather measurements are given which may shed light on the patterns of migration of this species.

### INTRODUCTION

The Painted Lady *Vanessa cardui* L. 1758 is a cosmopolitan species and one of the most widely distributed butterflies in the world. It is distributed throughout Europe, Asia, Africa, North America, and Central America. It is known to engage in exceptionally large migrations: in the eastern United States, for instance, it is not a permanent resident but quasi-periodically migrates there from the deserts of the southwestern U.S. and northern Mexico (Opler and Krizek 1984; Scott 1986, as cited on <http://www.public.iastate.edu/~mariposa/species.html>).

*V. cardui* migrations are also well documented in Europe. In Belgium, for example, a southern airflow between 15 and 17 May 2002 resulted in several reports of migrating butterflies. Again, in mid-June, a sub-tropical airflow brought with it regular reports of active migration across the country. There were daily sightings of constant passages in a NNE'ly direction (as reported on <http://trekvinders.members.easyspace.com/>).

### *VANESSA CARDUI* MIGRATION IN THE MALTESE ISLANDS

*V. cardui* is one of the commoner species of butterfly in the Maltese Islands and breeds widely on a range of foodplants notably thistles *Asteraceae*-tribe-*Carduae*, Borage *Borago officinalis*, and Mallow *Malva*, *Lavatera* sp. (Valletta 1971, Sammut 2000). Most authors who have written about the butterflies of the Maltese Islands comment that the species migrates regularly over the islands. The sole exception is Borg (1932), who describes the Painted Lady as 'very common' but does not note any migratory movements for the species. He does so for other species, however, notably for the 'white butterflies' (*Pieris brassicae* L. 1758, *Pieris rapae* L. 1758): "They also migrate over long distances, and in spring enormous batches of these pests arrive regularly over the sea from the SE when the winds are favourable. Alighting on the rocks and cliffs of the coast, they soon spread over both islands in search of suitable food plants to oviposit. Sometimes they fail to reach their destination and fall into the sea forming large froth-like patches on its surface" (ibid.: 2). One should point out that Valletta (1952) refers to one such migration of 'countless thousands' of 'whites' on 29 March 1952; at Wied Inċita he described them as trying to "take shelter among the vegetation and in crevices in the rocks. Many of them which alighted to sip moisture from the mud at the edges of ponds were blown on to the water by the strong hot wind, and thousands of dead bodies were floating on the surface" (ibid.: 279).

Noting the migratory behaviour of *V. cardui*, Valletta (1971: 42) holds that "we in Malta see large numbers of this species just for a few days and then they disappear altogether as they continue their migratory urge to other countries." Sammut (2000) also lists the species, together with the Red Admiral *Vanessa atalanta* L., 1758, as migratory in spring and autumn. Throughout its range *V. cardui* is known to be a more irregular and sporadic migrant than *V. atalanta* (Ford 1975), which also means that passages of the former species tend to be more spectacular.

To date there are published records of seven local passages from 1948 to 1989. Table 1 presents all known records to date of *V. cardui* migration in the Maltese Islands; it includes these published records as well as other previously unpublished ones kept by the present author.

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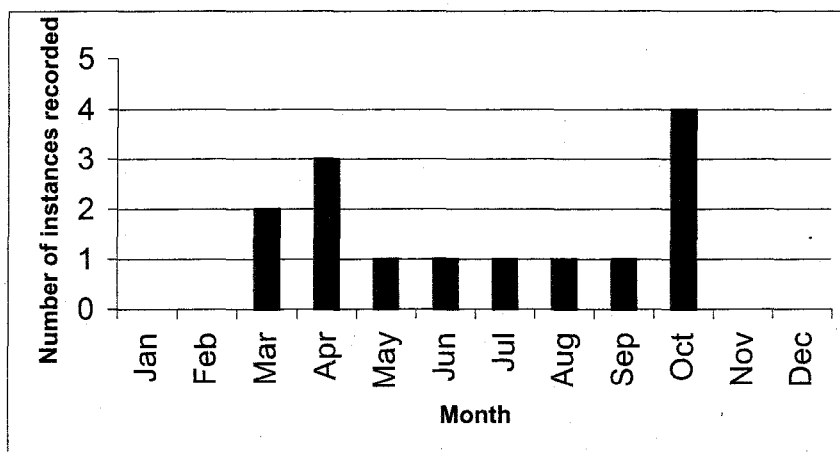
<sup>1</sup> "Posidonia", America Street, Naxxar NXR 05, Malta.

**TABLE 1** Instances of *V. cardui* migration recorded in the Maltese Islands, 1948 – 2003.

DATE	LOCALITY OBSERVED	NUMBERS COUNTED*	NOTES	SOURCE
17.08.48	Not specified	'unusually big numbers'	<i>Gegenes pumilio</i> , a new species for Malta, taken	Valletta 1948, cited in Sammut 1989
02.07.50	Marsascala	ca. 250	Observed from a yacht offshore, flying NW towards land	Dannreuther 1951, cited in Sammut 1989
27/28.03.52	Mriehel	'Thousands'	Attempting to roost in Oleander bushes	Valletta 1952
11.04.52	Wied is-Sewda	'Thousands upon thousands'	All feeding on Thistles	Valletta 1952
4/5.04.69	Various	'large numbers'		Valletta 1974
30.09.69	Various	'huge numbers'		Valletta 1974
10.87	Valletta and Sliema	'very large numbers'	'Huge clouds' observed flying in from the sea	M. Sammut (pers. comm.)
10.88	Delimara	Unspecified	Flying in from the sea	M. Sammut (pers. comm.)
24/25.04.89	Fawwara Rabat	1500, 2800 **	Flying in from the sea from the direction of Filfla at Fawwara	Sammut 1989
06.10.92	St. Elmo Pt.	60+	Noted flying about, a.m.	Present author
11/12.10.92	Għajn Żejtuna, Naxxar Xemxija	2500, 30, 450	All observed at Għajn Żejtuna in good condition	Present author
01.03.95	Qammieħ	'Hundreds'	Flying in from the sea, a.m.	Present author
31.05/01.6.03	Various	Various counts	See present work	Present work

\* These figures represent numbers actually observed; many of these migrations would have involved far greater numbers.  
 \*\* In this case, at Fawwara, 50 individuals per minute were counted crossing a 20m stretch of wall; at Rabat, 400 individuals were noted flying over in 7 minutes.

As shown in Fig.1, records to date indicate that October is the month with the highest frequency (4 records) of migration, followed by April (3 records) and March (2 records).



**Fig. 1** Frequency of recorded instances of *V. cardui* migrations, 1948 - 2003, by month.

The behaviour of the species during migration is not well documented locally and further study is required. However, many of the published as well as the previously unpublished records mention the fact that substantial numbers of butterflies are often observed resting and/or feeding on various species of flowering plants. Valletta (1952) refers to 'thousands' resting in Oleander *Nerium oleander* bushes at Mriehel during the passage of 27 March 1952. He also mentions that during that passage and that of 11 April of the same year, many butterflies took the opportunity to oviposit; he found a number of larvae on thistles at Mriehel and Wied is-Sewda, many of which were parasitised by *Apanteles* sp. - a hymenopterous Braconid which typically parasitises high percentages of larvae of various species of Lepidoptera, notably *Pieris brassicae* and *P. rapae* (Ford 1975 and pers. obs.)

## THE MAY – JUNE 2003 MIGRATION

This paper reports on a reasonably well-documented instance of *V. cardui* migration, which took place on 31 May and 1 June 2003. The following notes were collected from a number of field observers; all observations are to be considered reliable.

Usual numbers of *V. cardui* were around on the morning and early afternoon of 31 May. However, 'an abundance' of Small White *Pieris rapae* was noted at Salina, and a Golden Danaid (or Plain Tiger) *Danaus chrysippus* L., 1758 was seen at Xemxija.

On the evening of 31 May, at 2030, 'several hundred thousand' individuals *V. cardui* were seen flying from the SW towards Ta' Xbiex. Around the same time, another observer noted 'larger than usual numbers' at St. Julian's. A couple of hours later about 100 individuals were seen at a street light in Żebbuġ. At 0300 on the night of 31 May – June 1, about 250 were seen at a single street light in Pieta'; the same observer noted that many more were at street lights in the area and he estimated that at least 2500 were present along one short street.

The following morning, migration was again evident. Several hundred dead butterflies were noted floating in the sea at Ta' Xbiex, with many more squashed on the surrounding roads. The present author counted hundreds of *V. cardui* flying in a NNE'ly direction while driving from Naxxar to Marsaxlokk from 0720 to 0745; most were seen in the central area of the island and none were seen at Marsaxlokk / Delimara. Driving back from Marsaxlokk at 0845 only very few individuals were spotted but at 1030 many hundreds were noted resting and feeding on flowering *Lantana camara* shrubs at Vittoriosa – most were in good condition. A strong passage was reported at Dingli between 0700 and 0800; about 8 – 10 butterflies were counted flying past per second in a northerly direction, making the total counted about 32 000. A 'heavy migration' in an ENE direction was noted while driving from Santa Luċija to Ghadira between 0730 and 0800, with exceptionally high numbers at Mriehel and Mosta; no unusual numbers were reported at Ghadira. Another observer noted thousands (ca. 5000) while driving from Iklin to Ċirkewwa between 0700 and 0730; he reported that they were absent beyond St. Paul's Bay. A similar pattern was observed at St. Julian's, with 'hundreds per minute' flying over early on Sunday morning and more along the coast road, but less as the observer drove northwards and none at Ċirkewwa. On the same morning, higher numbers than usual were noted at Buskett and at Bahrija; at the latter place many were observed feeding on flowering Thyme *Thymus* sp. with up to 8 individuals per shrub. On the afternoon of 1 June, 50 – 80 were noted on *L. camara* shrubs at Rabat. Table 2 summarises these data.

In sum, this particular passage may have involved two passages, a heavy but localised one on the evening of 31 May and an equally substantial one which lasted till about 0800 on 1 June. It is also possible that these were in fact two ends of one passage that continued throughout the night. My estimate, which is probably very conservative, is that at least hundreds of thousands of butterflies were involved. It is interesting to note that observers (including the present author) in the extreme south and north of the island failed to note migrating butterflies; moreover, two observers on Gozo did not notice unusual numbers for the given duration (J. Sultana, J. Vassallo, pers. comm.). The migration followed the central axis of the island in a SW - NE direction

The fact that the species, as well as the closely-related Red Admiral *Vanessa atalanta* L., 1758, often fly toward hilltops and along ridgetops, trails, cliffs, and similar visually-prominent features is well established (Scott 1992, Benvenuti *et al.* 1996, as cited in <http://www.public.iastate.edu/~mariposa/species.html>). It is quite likely that flocks of *V. cardui* approaching the Maltese Islands from the South tend to fly over the high ground and seacliffs along the south/western stretches of the coastline – indeed, the observations at Dingli tend to support this view. This would explain why on this particular day butterflies were noted flying in a consistent direction along a central SW – NE axis, rather than spreading out across the islands. In what may be related behaviour, the present author has often noted higher than usual numbers of these species at the hilltop at Gordan, Gozo.

Following the main passage of 31 May – 1 June, smaller passages were reported during subsequent days. On the morning of 9 June, between 0735 and 0805, ca. 100 *V. cardui* were noted flying over Blata l-Bajda and a passage was noted at Sliema; that afternoon, 'higher than usual' numbers were observed at Dwejra, Malta. The following day, on the afternoon

of 10 June, ca. 100 were observed flying North in singles, at Luqa airfield. On 13 June, at Ta' Ċenċ, Thyme bushes were teeming with *V. cardui*; while 'an abundance' was noted around St. Aloysius' College, Birkirkara. On 22 June, small numbers of *V. cardui* were noted flying towards land at Pembroke.

**Table 2. Observations of *V. cardui* migration on 31 May and 1 June 2003.**

DATE	TIME	LOCALITY	OBSERVATION	OBSERVER
31.05	evening	Ta' Xbiex	Several hundred thousand flying NE	J.J. Borg
	evening	St. Julian's	'Larger than usual' numbers noted	P. Portelli
	late evening	Żebbuġ	ca. 100 individuals at a street light	S. Suda
01.06	0300	Pieta'	2500+ (probably many more) around street lights	I. Balzan
	early morning	Ta' Xbiex	Several hundred dead individuals noted	J.J. Borg
	0720 to 0745	Central Malta	Hundreds noted flying in a NNE'ly direction	M.A. Falzon
	0700 to 0800	Dingli	8 – 10 per second flying in a northerly direction	D. Attard
	1030	Vittoriosa	Several hundred feeding and resting on <i>L. camara</i>	M.A. Falzon
	0730 to 0800	Central Malta	'Heavy migration' in an ENE direction	D. Cachia
	0700 to 0730	Central Malta	ca. 5000 seen flying past	O. Cardona
	early morning	St. Julian's	Hundreds per minute flying past in a northerly direction	P. Portelli
	morning	Buskett and Bahrija	'Higher than usual' numbers observed, especially at Bahrija	A. Casha
	morning	San Anton (Attard)	Hundreds, many dead or visibly weak	M. Sammut
afternoon	Rabat	50 – 80 on <i>Lantana camara</i>	J.J. Borg	

#### FACTORS AFFECTING MIGRATION PATTERNS

At this point one may attempt to link migration and weather variables. Such an exercise must at best be tentative, since there are no systematic records that would allow hypotheses correlating weather and migration to be established and tested statistically. Valletta (1952) gives some weather variables (presumably daily averages) for the passage of 27 March of that year. The temperature rose from 10°C on 25 March, to 21°C on 26 March, and up to 29°C on 29 March. The wind changed direction to SSW and its speed increased from 2 knots on 26 March to 24 knots on 29 March. Sammut (1989) reports that, for the passage of 24 – 25 April 1989, the wind 'during these two days' was slight to moderate ENE. Table 3 presents a selection of weather variables for the passage of 31 May – 1 June 2003. Since this is the best-monitored migration to date, hourly measures of weather can in this case be compared to the sequence of passage as recorded by various observers in various places.

**Table 3. Hourly measures of weather variables recorded between 1445 on 31 May 2003 and 1045 on 1 June 2003.**

31 <sup>st</sup> May 2003				1 <sup>st</sup> June 2003			
TIME (local)	TEMP. (°C)	WIND SPEED (knots)	WIND DIRECTION (°)	TIME (local)	TEMP. (°C)	WIND SPEED (knots)	WIND DIRECTION (°)
1445	24.6	7	240	0045	19.2	2	170
1545	24.9	5	230	0145	18.5	0	-
1645	23.9	5	220	0245	17.6	0	-
1745	24.0	5	210	0345	17.7	1	180
1845	24.1	2	230	0445	18.2	3	180
1945	22.9	3	020	0545	17.1	0	-
2045	21.0	5	020	0645	17.7	0	-
2145	20.5	2	040	0745	20.0	0	-
2245	19.9	0	-	0845	22.9	3	070
2345	19.3	0	-	0945	23.3	10	100
Mean Pressure for the period = 1013.8hPa (1013.3 – 1014.5hPa)				1045	23.9	6	100

Interestingly, one notes that the recorded onset of migration, that is late afternoon / early evening of 31 May, coincided with a complete shift in wind direction, from 230° (WSW) at 18H45 to 020° (NNE) at 19H45.

In sum, passages of *V. cardui* in the Maltese Islands appear to be regular, broadly seasonal, and possibly related to wind speed and direction. There is much scope for local systematic long-term research on the migration of *Vanessa* sp., and Lepidoptera in general, in the Maltese Islands.

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