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NATURAL HISTORIC DISTRIBUTION OF *ARISTOLOCHIA CLEMATITIS* L IN ROMANIAN SOUTHERN DOBROGEA, IMPLICATIONS FOR CONSERVATION

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Aristolochia clematitis L is a toxic basal angiosperm extremely important for several reasons, of which I hereby focus on its essential role (as food-plant) for the conservation of two Papilionidae species from Romanian fauna: *Zerynthia polyxena* (Dennis et Schiffermuller,1775) and *Z.(Allancastria) cerisyi ferdinandi* (Stichel,1907). I investigated *A. clematitis* distribution in Romanian Southern-Dobrogea, with a special emphasis on the populations growing in natural habitats and their function as reservoirs of stock plants for the recolonization of natural and anthropic habitats. Consequently, I mention in this work only the sites where *A. clematitis* formed presumably primary populations in natural habitats, with the assumption that these natural populations are more prone to long-term survival, and therefore remain available to lepidopteran colonists in the future, although the populations in uncultivated, abandoned and/or anthropic/disturbed habitats seem to be much more numerous (but more unstable and less reliable).
This work involved an approximately 30km wide band along the Northern side of the Romanian-Bulgarian frontier, where the only historically known Romanian populations of *Zerynthia cerisyi ferdinandi* occur.
I present herein the sites where this plant was found during the last 35 years, with some ecological and phenological aspects related to the conservation the steno-monophagous endangered butterfly *Zerynthia cerisyi ferdinandi*.

Key words: *Aristolochia*, Chorology, Conservation, *Zerynthia*, Papilionidae.

INTRODUCTION

Aristolochia clematitis, commonly called in Romanian "marul lupului", Oesterluzei in German, (english birthwort), is a deciduous basal angiosperm, perrenating by rhizomatous roots, with whirling 1–1.5 m tall stems, and cordiform (heart-shaped) leaves.

The apetalous, pale greenish-yellow flowers, grouped in axilary clumps, are concolor in *A. clematitis*, but striated dark-red to brown in *A. rotunda*, and bloom in southern Dobrogea from late April to September.

Aristolochia flowers are strictly entomophilous, with a highly specialized morphology, and have a zygomorphic, tubular perianth, containing the stamens fused with the style into a short, columnar gynostemium[1,2,3,4], and have a very intresting pollination system involving deceptive use of scents mimycking decayng flesh to lure (mostly Dipteran) pollinators[5,6,7,8,9,10,4].

Generic name *Aristolochia* originated in the Greek words aristos meaning best and locheia meaning childbirth or delivery, because, due to the flower shape resembling the genital female tract, and following the medieval "Doctrine of Signatures", various parts of the plant *A. clematitis* were used mainly to alleviate problems related to the female genitourinary tract, birth and birth-canal-hence also the English vernacular of birthwort.

Aristolochia species are of paramount importance for the conservation of two Papilionidae species from Romanian fauna as they are the only known foodplants for *Zerynthia polyxena* (Dennis et Schiffermuller, 1775) and *Z. (Allancastria) cerisyi ferdinandi* (Stichel, 1907), of which *Zerynthia*

polyxena has shown during the last years a marked decline all over Europe, and therefore is considered as a species of community interest listed in the Habitat Directive 92/43 EEC under annex IV. In Romania and elsewhere in Europe, butterflies of the genus *Zerynthia* lay their eggs on the leaves of several species of *Aristolochia*. The emerging caterpillars are mono or stenophagous on Aristolochia sp., and thus can only survive if enough *Aristolochia* biomass is available in suitable habitats, and at the right moment, as the phenology of these butterflies is relatively complicated.

Therefore, the comprehensive knowledge of the chorology, phenology, phytochemistry, ecology (and their interdependence) of the *Aristolochia* species is of paramount importance for the ultimate survival of the butterflies that rely on them for their nourishment and existence.

Continuing my previous work on chorology and conservation of interesting plant or insect taxa ([11-20]) I present herein the results of more than 30 years of field research in the southern extreme part of Romanian Dobrogea, where reside the only known Romanain populations of *Z.(Allancastria) cerisyi ferdinandi* (Stichel, 1907).

MATERIALS AND METHODS

The area involved in the present work is situated north of the Bulgaria/Romania border, including a band of approximately 20 km wide, limited to the north by a virtual line passing through the villages Oltina, Viile, Florile, Ion Corvin, Adamclisi, Cobadin, Amzacea, Pecineaga, Limanu. The survey was by no means exhaustive, being more focused on the areas where populations of *Zerynthia (Alancastria) cerysii ferdinandi* had been previously reported. Thus, some areas were over-surveyed for several years while others were much less thoroughly surveyed. Therefore, a place not mentioned in the present work might very well harbor a viable population of either species of *Aristolochia*.

On the other hand, the populations surveyed during several years showed fluctuating sizes, some even disappearing altogether and reemerging after several years. In some cases factors contributing to the fluctuating population sizes could be inferred, but in some other instances no factors could be related to the observed fluctuations in population size or location.

The geographical coordinates are given in the WGS84 system, and were collected either on spot using a GPS device with a reported error of less than 5 m, or, for older sites, were inferred from field notes using ACME Mapper 2.1 software.

Exposition was obtained using a manual, magnetic compass.

In order to avoid confusions with related species (A. rotunda / A. pallida) I mention the diagnostic criteria I used to positively assign the individual plants discovered to *A. clematitis* species, criteria that were the following:

– **General habitus**: – tall plants, with whirling stems 1–1.5 m tall, growing in rather dense colonies.

– **Flower habitus**: – yellow, concolor (without dark spots or stripes), multiple, growing often several at each one node.

– **Leaf habitus**: – leaves are cordiform, with pointed apices, with well-defined and longer stalks.

– **Roots/underground stems habitus**: – the plants present elongated tuberiform rhizomes, not rounded, ovalar or spherical bulbiform.

RESULTS DISCUSSIONS

During the last 30 years, my fieldwork research in the region of Dobrogea along the border with Bulgaria, resulted in a number of 165 locations cited, in which I have positively discovered presumably native populations of *AC* living in natural habitats, oftentimes redundantly. The sites where I have found AC in the region studied are listed in tabular format below (Table 1), sorted in descending order from East to West, and from South to North, and lastly, beginning with the last year when the populations were mentioned at that site. Out of these, 129 locations are situated in closer proximity with sites reported in previous works, for which I have positively confirmed the presence of *AC*, strictly based on floriferous specimens or fruits, to avoid confusions with related *A. rotunda* / *A. pallida*. For most of the sites I present some notes about the habitat of the plants and, where available I also mention the exposition of the site.

	Closest human settlement	Site code	Coordinates	Notes	Habitat	Exposition
1	<VV>	VV1	43°45'02.6"N, 28°33'14.6"E	3AC	mound with shrubs	
2		VV2	43°44'55.3"N, 28°33'20.6"E	2AC	mound with shrubs	
3		VV3	43°45'04.4"N, 28°33'41.5"E	1AC	natural ditch	
4	<H>	HagE1	43°47'03.7"N, 28°29'06.9"E	1AC	rocky mound with shrubs	
5		HF1	43°48'27.9"N, 28°27'54.7"E	2AC	forest edge SANTH	SE
6		HF2	43°48'27.7"N, 28°28'02.3"E	1AC	forest edge SANTH	SE
7		HFx4	43°48'27.5"N, 28°27'23.7"E	1AC	slope with apparent limestone rocks & xeric shrubs & forest sloped towards Limanu Lake	SSE
8		HCN1	43°48'16.1"N, 28°27'24.2"E	1AC	Limanu Lake shore, semi-humid grassland, shrubs, SANTH field	SSW
9		HCN8	43°48'11.5"N, 28°26'57.8"E	1AC	slope with apparent limestone rocks & xeric shrubs, sloped towards the "cataracts"	NW
10		HCN9	43°48'07.5"N, 28°26'42.7"E	2AC	forest edge, SANTH	NW
11		HCN10	43°48'01.9"N, 28°26'40.1"E	4AC	forest edge, SANTH	WNW
12		HCN11	43°47'52.9"N, 28°26'43.5"E	2AC	shrubs & forest, SANTH	ESE
13		HCN12	43°47'42.7"N, 28°26'43.5"E	2AC	shrubs & forest, SANTH	ESE
14		Alb1	43°47'37.4"N, 28°26'48.7"E	1AC	shrubs & forest, SANTH	SE
15		HFy1	43°47'27.8"N, 28°27'28.7"E	2AC	forest edge, SANTH	SE
16		HFy2	43°47'23.9"N, 28°27'57.9"E	4AC	forest edge, SANTH	S
17		HFy3	43°47'22.2"N, 28°28'06.9"E	2AC	forest edge, SANTH	S
18		HFy4	43°47'20.8"N, 28°28'16.0"E	3AC	forest edge, SANTH	S
19		HFy5	43°47'17.4"N, 28°28'19.6"E	3AC	forest edge, SANTH	S
20		HFy6	43°47'13.9"N, 28°28'19.8"E	2AC	forest edge, SANTH	S
21		HFy7	43°47'17.5"N, 28°28'26.0"E	3AC	forest edge, SANTH	SE
22		HFy8	43°47'26.0"N, 28°28'27.0"E	2AC	forest edge, SANTH	ESE
23		HFy9	43°47'32.3"N, 28°28'26.4"E	3AC	forest edge, SANTH	E
24		HFy10	43°47'36.8"N, 28°28'25.4"E	2AC	forest edge, SANTH	E
25		HFy11	43°47'37.4"N, 28°28'14.4"E	2AC	forest edge, SANTH	N
26		HFy12	43°47'37.1"N, 28°28'07.7"E	3AC	forest edge, SANTH	N
27		HFy13	43°47'37.8"N, 28°28'00.7"E	2AC	forest edge, SANTH	N
28		HFy14	43°47'38.2"N, 28°27'55.1"E	1AC	shrubs & forest, SANTH	N
29		HFy15	43°47'36.5"N, 28°27'49.4"E	1AC	shrubs & forest, SANTH	N
30		HFy16	43°47'38.6"N, 28°27'46.9"E	2AC	Ravine slope in shrubs & forest, SANTH	NW
31		HFy17	43°47'41.5"N, 28°27'44.2"E	2AC	Ravine slope in shrubs & forest, SANTH	NW
32		HFy18	43°47'41.5"N, 28°27'44.2"E	2AC	Ravine slope in xeric shrubs & forest, SANTH	NW
33		HFy19	43°47'47.1"N, 28°27'39.8"E	2AC	Ravine slope in shrubs & forest	NNW
34	<A>	AlbSat 1	43°47'53.0"N, 28°25'21.8"E	2AC	forest edge, SANTH	NE
35		Albsat2	43°47'54.8"N, 28°25'19.0"E	2AC	forest screen, SANTH	NE
36		albsat3	43°47'56.1"N, 28°25'16.9"E	2AC	forest edge, SANTH	SW
37		Albsat4	43°47'57.8"N, 28°25'14.6"E	2AC	apparent limestone rocks & xeric shrubs, forest edge, SANTH	SW
38		Albsat5	43°48'00.7"N, 28°25'11.9"E	2AC	apparent limestone rocks with xeric shrubs	SSW
39		Albsat6	43°48'03.0"N, 28°25'10.5"E	1AC	apparent limestone rocks with xeric shrubs	SSW
40		AlbSat 10	43°47'47.3"N, 28°25'13.0"E	1AC	apparent limestone rocks with xeric shrubs, slope	S
41		AlbSat 12	43°47'49.0"N, 28°24'53.3"E	1AC	apparent limestone rocks with shrubs, slope	S
42		AlbSat 17	43°47'49.9"N, 28°24'28.2"E	1AC	Ravine slope in shrubs & semi-humid forest	S
43		AlbSat 18	43°47'42.9"N, 28°24'28.5"E	1AC	forest edge, SANTH	SE

44		AlbSat 19	43°47'39.5"N, 28°24'29.1"E	2AC	forest edge, SANTH	ESE
45		ALbSat 20	43°47'36.7"N, 28°24'30.1"E	1AC	forest edge, SANTH	E
46		ALBSa t22	43°47'39.0"N, 28°25'00.4"E	1AC	ditch side in SANTH shrubs	SE
47		AlbSat 23	43°47'35.2"N, 28°25'02.0"E	2AC	ditch side in SANTH shrubs	E
48		AlbSat 24	43°47'31.7"N, 28°25'03.2"E	1AC	ditch side in SANTH shrubs	E
49		AlbSat 25	43°47'24.1"N, 28°25'09.1"E	1AC	ditch side in SANTH shrubs	E
50		AlbSat 26	43°47'29.5"N, 28°25'42.0"E	1AC	ditch side in SANTH shrubs	E
51	**<O>**	OltinaL ac1a	44°08'38.2"N, 27°39'33.4"E	AC	cliff by the lake shore	
52		OltinaL ac2	44°08'23.0"N, 27°39'26.5"E	AC	cliff & Ravine by the lake shore	
53		OltinaL ac2a	44°08'17.6"N, 27°39'23.8"E	AC	cliff by the lake shore	
54		OltinaL ac3	44°07'52.0"N, 27°38'38.9"E	AC	cliff by the lake shore	
55		OltinaL ac4	44°07'42.1"N, 27°39'05.1"E	AC	clearing/shrubs in forest	
56		OltinaL ac5	44°07'24.1"N, 27°39'10.0"E	AC	clearing/shrubs in forest	
57		OltinaL ac6	44°07'08.8"N, 27°38'56.9"E	AC	forest edge	
58		OltinaL ac7	44°06'56.7"N, 27°38'41.2"E	AC	forest edge	
59		OltinaL ac8	44°06'52.1"N, 27°38'39.5"E	AC	clearing/shrubs in forest	
60		OltinaL ac9	44°06'54.5"N, 27°38'49.0"E	AC	forest edge	
61		OltinaL ac10	44°06'48.6"N, 27°39'09.5"E	AC	forest edge	
62		OltinaL ac11	44°06'42.8"N, 27°39'20.0"E	AC	clearing/shrubs forest	
63		OltinaL ac12	44°06'36.9"N, 27°39'26.5"E	AC	clearing/shrubs forest	
64		OltinaL ac13	44°06'09.2"N, 27°39'24.3"E	AC	forest edge	
65		Iortmac Lac	44°05'48.6"N, 27°38'57.5"E	AC	by the lake shore at forest edge	
66	**<B>**	BCF1	44°05'38.0"N, 27°38'39.9"E	AC	forest edge by access road to the quarry	
67		BCF87 a1	44°05'20.4"N, 27°38'16.4"E	AC	limestone cliff	
68		BCF87 a2	44°05'17.3"N, 27°38'15.1"E	AC	limestone cliff	
69		BCF87 a3	44°05'14.6"N, 27°38'14.4"E	AC	limestone cliff	
70		BCF87 a4	44°05'12.2"N, 27°38'13.8"E	AC	limestone cliff	
71		BCF87 a5	44°05'03.1"N, 27°38'16.0"E	AC	forest edge opposite to the tap water source	
72		BCF87 a6	44°04'57.4"N, 27°38'25.1"E	AC	forest edges by the [buildings] complex	
73		BCF87 a7	44°04'50.9"N, 27°38'28.9"E	AC	forest edge by access road to?	
74		BCF87 b1	44°04'52.0"N, 27°38'43.2"E	AC	rocks in forest	
75		BCF88 a1	44°04'53.0"N, 27°38'44.7"E	AC	rocks in forest	
76		BCF88	44°04'52.3"N, 27°38'47.5"E	AC	rocks in forest	

		a2				
77		BCF88 a3	44°04'51.1"N, 27°38'48.2"E	AC	edge of shrubs/forest	
78		BCF88 a4	44°04'49.6"N, 27°38'49.0"E	AC	edge of shrubs/forest	
79		BCF88 a5	44°04'47.7"N, 27°38'53.1"E	AC	Ravine by edge of shrubs/forest	
80		BCF88 a6	44°04'52.2"N, 27°39'02.1"E	AC	forested slope by edge of shrubs/forest	
81		BCF88 a7	44°04'53.1"N, 27°39'05.5"E	AC	forested slope by edge of shrubs/forest	
82		BCF88 a8	44°05'06.8"N, 27°39'11.5"E	AC	dried creek-bed of temporary creek - "derea"	
83		BCF88 a9	44°05'09.6"N, 27°39'13.2"E	AC	edge of shrubs by dried creek-bed of temporary creek -"derea"	
84		BCF88 a10	44°05'11.9"N, 27°39'14.6"E	AC	edge of shrubs by abrupt slope	
85		BCF88 a11	44°05'15.2"N, 27°39'23.5"E	AC	edge of shrubs by abrupt slope	
86		BCF88 a12	44°05'15.1"N, 27°39'24.7"E	AC	edge of shrubs by abrupt slope	N
87		BCF88 a10	44°05'15.0"N, 27°39'27.7"E	AC	edge of shrubs by abrupt slope	N
88		BCF88 a10	44°05'14.3"N, 27°39'31.3"E	AC	edge of shrubs by abrupt slope	N
89		BCF88 a10	44°05'13.4"N, 27°39'36.7"E	AC	edge of shrubs by abrupt slope	N
90		BCF88 a10	44°05'13.4"N, 27°39'44.0"E	AC	edge of shrubs by abrupt slope	N
91		BCF88 a10	44°05'13.8"N, 27°39'46.9"E	AC	edge of shrubs by abrupt slope	N
92		BCF88 a10	44°05'12.9"N, 27°39'49.4"E	AC	edge of shrubs by abrupt slope	N
93		BCF88 a10	44°05'10.8"N, 27°39'52.5"E	AC	edge of shrubs by abrupt slope	N
94		BCF88 a10	44°05'07.1"N, 27°39'57.5"E	AC	edge of shrubs by abrupt slope	N
95		BDN18 8a1	44°05'05.4"N, 27°39'59.4"E	AC	roadside	ENE
96		BDN1 88a1	44°04'59.2"N, 27°40'02.1"E	AC	roadside	E
97		BDN1 88a1	44°04'46.2"N, 27°39'57.8"E	AC	temporary creek ("derea") side by the road	
98		BDN1 88a1	44°04'40.1"N, 27°40'00.7"E	AC	forested temporary creek ("derea") side by the road	
99		BDN1 88a1	44°04'34.3"N, 27°40'07.8"E	AC	forested temporary creek ("derea") side by the road	
100		BDN1 88a1	44°04'33.9"N, 27°40'33.9"E	AC	forested temporary creek ("derea") side by the road	
101		BDN1 88a1	44°04'31.6"N, 27°40'37.7"E	AC	forested temporary creek ("derea") side by the road	
102		BCF89 a1	44°04'04.9"N, 27°38'39.8"E	AC	"derea" edge of shrubs by the road	
103		BCF89 a2	44°04'05.9"N, 27°38'45.3"E	AC	edge of shrubs by forest clearing with rocks	
104		BCF89 b1	44°03'54.9"N, 27°39'00.6"E	AC	edge of shrubs by forested abrupt slope	N
105		BCF89 b2	44°03'56.8"N, 27°39'06.5"E	AC	edge of shrubs by forested abrupt slope	N
106		BCF89 b3	44°03'57.7"N, 27°39'16.4"E	AC	edge of shrubs by forested abrupt slope	N
107		BCF89 b4	44°03'56.3"N, 27°39'33.8"E	AC	edge of shrubs by forested abrupt slope	N
108		BCF89	44°03'53.3"N, 27°39'45.0"E	AC	edge of shrubs by forested abrupt slope	N

		b5				
109		BCF89 b6	44°03'52.3"N, 27°38'45.3"E	AC	edge of shrubs by forested abrupt limestone cliff	E
110		BCF89 b7	44°03'49.6"N, 27°38'42.1"E	AC	edge of shrubs by forested abrupt limestone cliff	E
111		BCF89 b8	44°03'46.7"N, 27°38'40.5"E	AC	edge of shrubs by forested abrupt limestone cliff	E
112		BCF89 b9a	44°03'45.9"N, 27°38'40.5"E	AC	edge of forest by forested abrupt limestone cliff	E
113		BCF89 b9b	44°03'58.9"N, 27°38'52.6"E	AC	edge of forest by cultivated heath	N
114		BCF89 b9c	44°03'57.7"N, 27°38'56.3"E	AC	edge of forest by cultivated heath	N
115		BCF89 b9d	44°03'57.2"N, 27°38'57.9"E	AC	edge of forest by cultivated heath	N
116		BCF89 b9e	44°03'55.0"N, 27°38'59.6"E	AC	edge of forest by "derea"	N
117		BCF89 b10	44°03'52.3"N, 27°38'57.5"E	AC+ZCF	edge of forest by cultivated heath	S
118		BCF90 a1	44°03'51.7"N, 27°38'57.9"E	AC+ZCF	edge of forest by cultivated heath	S
119		BCF90 a2	44°03'44.2"N, 27°38'52.0"E	AC+ZCF	edge of forest by cultivated heath	S
120		BCF90 a3	44°03'44.3"N, 27°38'50.8"E	AC+ZCF	edge of forest by cultivated heath	S
121		BCF90 a4	44°03'45.6"N, 27°38'49.6"E	AC+ZCF	edge of forest by cultivated heath	S
122		BCF90 a5	44°03'46.0"N, 27°38'49.0"E	AC+ZCF	edge of forest by cultivated heath	S
123		BCF90 a6	44°03'23.9"N, 27°38'55.7"E	AC+ZCF	edge of forest by cultivated heath	S
124		BCF90 a7	44°03'22.8"N, 27°38'58.5"E	AC+ZCF	meadow in forest by cultivated heath	N
125		BCF90 a7	44°03'21.9"N, 27°38'59.0"E	AC+ZCF	meadow in forest by cultivated heath	N
126		BCF90 b1	44°03'18.6"N, 27°38'58.3"E	AC+ZCF	cliff base in forest by cultivated heath	S
127		BCF90 b2	44°03'17.9"N, 27°38'57.5"E	AC+ZCF	cliff base in forest by cultivated heath	S
128		BCF90 b2b	44°03'17.7"N, 27°38'56.6"E	AC+ZCF	cliff base in forest by cultivated heath	S
129		BCF90 b2c	44°03'16.4"N, 27°38'54.8"E	AC+ZCF	cliff base in forest by cultivated heath	S
130		BCF90 b2d	44°03'15.8"N, 27°38'53.8"E	AC+ZCF	cliff base in forest by cultivated heath	S
131		BCF90 c1	44°03'07.2"N, 27°38'54.7"E	AC+ZCF	edge of forest by cultivated heath	E
132		BCF90 c2	44°02'47.3"N, 27°38'51.6"E	AC+ZCF	edge of forest by cultivated heath	S
133		BCF90 c3	44°02'47.8"N, 27°38'48.5"E	AC+ZCF	edge of forest by cultivated heath	S
134		BCF94 b1	44°02'50.4"N, 27°38'36.8"E	AC+ZCF	shrubs by the road by cultivated heath by limestone cliff base	S
135		BCF94 b1	44°02'50.5"N, 27°38'38.1"E	AC+ZCF	shrubs by the road by cultivated heath by limestone cliff base	
136		BCF95 a1	44°02'51.0"N, 27°38'36.7"E	AC+ZCF	shrubs by the road by cultivated heath by limestone cliff base	
137		BCF97 a1	44°02'51.0"N, 27°38'38.1"E	AC+ZCF	shrubs by the road by cultivated heath by limestone cliff base	
138		BCF07 a1	44°02'50.9"N, 27°38'40.0"E	AC+ZCF	shrubs by the road by cultivated heath by limestone cliff base	
139		BCF07 a2	44°02'51.4"N, 27°38'38.1"E	AC+ZCF	shrubs by the road by cultivated heath by limestone cliff base	
140		BCF16	44°02'50.5"N, 27°38'38.0"E	AC+ZC	shrubs by the road by cultivated heath by	S

		a1		F	limestone cliff base	
141		BCF17 a1 ADIVs	44°02'50.5"N, 27°38'38.0"E	AC+ZC F	shrubs by the road by cultivated heath by limestone cliff base	S
142		BCF18 a1 BV MADs	44°02'50.5"N, 27°38'38.0"E	AC+ZC F	shrubs by the road by cultivated heath / limestone cliff base	S
143	**<S>**	SIP93a 1	44°02'17.1"N, 27°56'59.3"E	AC	edge of forest by the road by cultivated heath	N
144			44°02'13.4"N, 27°57'03.3"E			
145			44°02'12.5"N, 27°57'10.1"E			
146			44°02'17.0"N, 27°56'51.6"E		in forest	
147		SIP93a 1	44°01'53.3"N, 27°57'00.4"E	AC	edge of forest by the road cultivated heath	N
148			44°01'46.2"N, 27°57'09.8"E	AC	shrubs in forest	
149			44°01'44.2"N, 27°57'07.7"E	AC	meadow by edge of forested slope	
150			44°01'39.7"N, 27°57'15.3"E	AC	shrubs by ditch	
151			44°01'35.5"N, 27°57'28.0"E	AC	shrubs by ditch by the road	
152			44°01'31.1"N, 27°57'32.7"E	AC	shrubs by ditch	
153			44°01'35.4"N, 27°57'44.4"E	AC	shrubs by forested ravine	
154			44°01'39.8"N, 27°57'51.6"E	AC	shrubs by forested ravine	
155		SIPn93 b1	44°03'49.0"N, 27°57'35.6"E	AC	edge of forest by "derea"	N
156		SIPn93 b1	44°03'47.2"N, 27°57'41.0"E	AC	edge of forest by "derea"	N
157		SIPn93 b1	44°03'50.5"N, 27°57'50.3"E	AC	edge of forest	N
158		SIPn93 b1	44°03'49.2"N, 27°57'55.0"E	AC	edge of forest	N
159	**<U>**	URLs9 3b1a	44°05'15.5"N, 27°53'30.3"E	AC	forested ravine	N
160		URLs9 3b1b	44°05'13.3"N, 27°53'23.9"E	AC	forested ravine	N
161		URLs9 3b1c	44°05'06.2"N, 27°53'11.5"E	AC	forested ravine	N
162		StA93 B1a	44°05'22.5"N, 27°49'37.6"E	AC	edge of forest	N
163		StA93 B1b	44°05'28.2"N, 27°49'24.3"E	AC	edge of forest	N
164		StA93 B1b	44°05'28.6"N, 27°49'20.3"E	AC	forested ravine	N
165		StA93 B1b	44°05'29.8"N, 27°49'06.8"E	AC	forested ravine	N

Geographical coordinates are given using the WGS84 system, Abbreviations used in the table: **#AC**=number of colonies of *A. clematitis*; **AC**=more than 4 colonies of *A. clematitis*; **SANTH** =semi-anthropic habitat <**B**> = Baneasa Cta, <**A**> = Albesti Cta, <**H**> = Hagieni Cta, <**S**> = Sipote Cta, <**U**> = Urluia Cta, <**VV**> Vama Veche Cta Exposition Abbreviations E=East, ESE= East-South-East, N=North, S=South, etc.

DISCUSSIONS

My fieldwork research in this region of Southern Dobrogea along the border with Bulgaria showed that during the last 30 years, the number and population sizes of populations of *A.* clematitis established in natural habitats (which I believe to be natural, native, populations, and therefore I refer to as natural populations), are considerably under-studied and poorly know.

These field observations suggest that in S-Dobrogea, although growing in dryer places, *A. clematitis* prefers rather humid habitats, where it thrives along northern forest edges, ditches, creeks, ravines and gullies. In the studied region, *A. clematitis* requires open patches of well lit clearings, but can also cope with some extent of encroachment by shrubs, if this encroachment does not persist for more than 2–3 seasons, after which

A. clematitis is less and less successful and disappears.

During the afore-mentioned period the number and population sizes of natural populations of *Aristolochia clematitis* fluctuated with relatively large margins, due to various factors of which I identified the following as being the most probable:

1 – increased aridity of the sites involved also in the decline of other previously abundant species, due to decreased water availability through irrigation;

2 – encroachment of suitable habitats by shrubs, some of alien origin leading to closure of suitable habitat through natural succession;

3 – grazing by goats, which, despite of the documented toxicity of the leaves and stems of *A. clematitis*, graze readily the young shoots, especially in early spring (when presumably the aristolochic acids content is lower).

Another interesting aspect is that although the plant is declining in natural, previously undisturbed habitats, it is thriving in semi-anthropic and cultivated habitats. Unfortunately, these populations established in cultivated and disturbed habitats seem to provide little to no reliable food sources for the butterflies of interest, as these populations are fluctuating in size and sine they are regarded as a weed (and indeed are very toxic to humans) and consequently destroyed.

Also, even in thriving populations established on neglected cultivated fields, or in brownfields, the plants are often subjected to toxic infestation with pesticides and insecticides used for agricultural reasons in the crop fields where these *Aristolochia* populations thrive.

A. clematitis represents (along with *A. rotunda* / *A. pallida*) one of the only known foodplants for the the populations of the butterflies *Zerynthia polyxena* (Dennis et Schiffermuller, 1775) and *Z. (Allancastria) cerisyi ferdinandi* (Stichel,1907) resident in S-Dobrogea.

Although *Zerynthia polyxena* (Dennis et Schiffermuller, 1775) has a relatively wide distribution across

Romania ([21]), historically it was mentioned only from the Northern part of Dobrogea

(22=Mann 1866 from the surroundings of Tulcea, and 20=Fiebig 1927 – with no specified locality). Historically, *Z. polyxena* was never published from S-Dobrogea until 21=Dinca et Vila (2008), confirmed by 22=Dinca et Vila (2009) as resident, but in 2017 it was abundant at Canaraua Feti where it thrived in some *A. clematitis* stands where no *Z. (Allancastria) cerisyi ferdinandi* could be found, but which were along grazing sites for local sheep and goat herds.

Early spring grazing by goats seems to be especially dangerous and disturbing for the larval stages of both *Z. (Allancastria) cerisyi ferdinandi* (Stichel, 1907), and *Zerynthia polyxena* (Dennis et Schiffermuller, 1775).

CONCLUSIONS

1 – The historic populations of *A. clematitis*, situated in this region of Southern Dobrogea along the border with Bulgaria, often found during the last 30 years with larger numbers of colonies, used to have many more colonies than the sites where the butterflies feeding on *A. clematitis*, *Zerynthia polyxena* (Dennis et Schiffermuller, 1775) and *Z. (Allancastria) cerisyi ferdinandi* (Stichel, 1907) occur.

2 – During the last 30 years, the populations at the sites that were visited multiple times are in decline, for resons that remain to be determined but for which I identified herein several possible factors

3 – Apparently, the butterfly species *Z.(Allancastria) cerisyi ferdinandi* (Stichel, 1907) seems to be more affected by the decline of its food plant *Aristolochia clematitis* than the other species feeding on the same plant, *Zerynthia polyxena* (Dennis et Schiffermuller, 1775).

4 – Further research is stringently needed to understand the dynamics of species interactions between the two butterfly species feeding on *A. clematitis*, *Zerynthia polyxena* (Dennis et Schiffermuller, 1775) and *Z.(Allancastria) cerisyi ferdinandi* (Stichel, 1907), as the data available now (Barca unpublished) seem to show an emerging trend of *Zerynthia polyxena* (Dennis et Schiffermuller, 1775) replacing *Z.(Allancastria) cerisyi ferdinandi* (Stichel, 1907) in sites where some 30 years ago no *Z. polyxena* individuals could be found, despite literature data suggesting that populations of *Z.(Allancastria) cerisyi* and *Z. polyxena* sympatric in Belasitsa and Skakavitsa, Bulgaria, do not exclude each other[25].

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