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NOTES ON A NUMERICAL ANALYSIS OF *ARGODREPANA MARILO* WILKINSON AND RELATED SPECIES (Drepanidae: Lepidoptera)

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Abstract: Since the description of the new species *Argodrepana marilo* Wilkinson (*Pacif. Ins.* 1970a: 24) numerical taxonomic tests have been carried out to check its affinities. Results of a cluster analysis and principal coordinates analysis are given.

Eighty-five tests relating to the ♂ characters were used to obtain the following results. These tests have been reported previously (loc. cit.). The analyses were carried out on all the known species of *Argodrepana* and on this genus alone. (Previous numerical analyses have included *Argodrepana* with other drepanid genera).

Fig. 1 is the S-matrix produced from cluster analysis to give the percentage similarity between all pairs of species in the genus. As with the other predominantly white species, *marilo* is seen to have least affinity with *tenebra* (6) and *umbrosa* (7). From the similarities, a table of nearest neighbors is derived in fig. 2 which shows that phenetically, *marilo* is most closely related to *auratifrons* (3) and *denticulata* (4).

species	*S-matrix*								
verticata	1	100.0							
galbana	2	93.6	100.0						
auratifrons	3	79.9	83.1	100.0					
denticulata	4	80.0	85.0	87.4	100.0				
ruficosta	5	76.1	77.4	87.3	84.5	100.0			
tenebra	6	65.5	64.0	70.8	66.9	71.2	100.0		
umbrosa	7	66.4	66.2	68.6	72.3	73.1	85.8	100.0	
marilo	8	59.8	60.4	74.4	71.0	65.3	59.0	58.4	100.0

Fig. 1. Similarity matrix for the species of the genus *Argodrepana* expressed as a percentage.

The dendrogram (fig. 3) shows *marilo* to be incorporated at the 72.5 % level, thus the 8 species form a compact genus. A principal coordinates analysis produced the remaining 3 figures (fig. 4, 5, 6) which are 2-dimensional sections of each combination of the first 3 vectors. At first sight it might seem that *marilo* is something of an outlier, but with only 8 species this enables the scale to be very much enlarged resulting in the apparent dissimilarity. In reality it draws attention to the fact that

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NEIGHBORS

		1st		2nd		3rd		4th		5th	
		(Sp)	(%S)	(Sp)	(%S)	(Sp)	(%S)	(Sp)	(%S)	(Sp)	(%S)
verticata	1	2	93.6	4	80.0	3	79.9	5	76.1	7	66.4
galbana	2	1	93.6	4	85.0	3	83.1	5	77.4	7	66.2
auratifrons	3	4	87.4	5	87.3	2	83.1	1	79.9	8	74.4
denticulata	4	3	87.4	2	85.0	5	84.5	1	80.0	7	72.3
ruficosta	5	3	87.3	4	84.5	2	77.4	1	76.1	7	73.1
tenebra	6	7	85.8	5	71.2	3	70.8	4	66.9	1	65.5
umbrosa	7	6	85.8	5	73.1	4	72.3	3	68.6	1	66.4
marilo	8	3	74.4	4	71.0	5	65.3	2	60.4	1	59.8

Fig. 2. *Argodrepana* species showing their nearest neighbors. Columns marked (Sp) give the species numbers, and marked (%S) give the percentage similarity coefficients between neighbors.

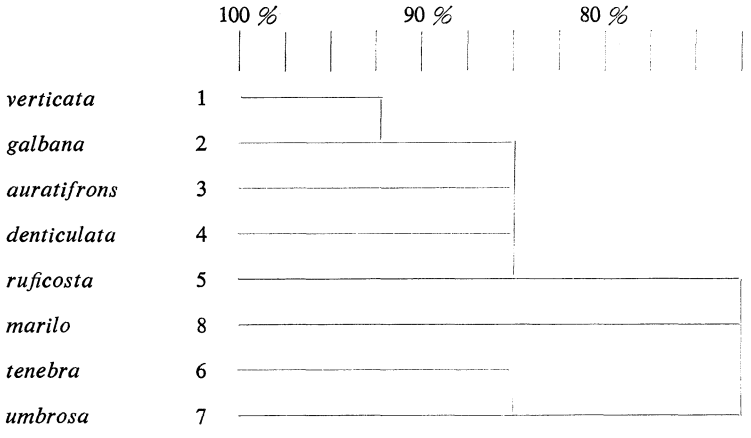

Fig. 3. Dendrogram of the *Argodrepana* species showing the phenetic relationship.

3 pairs of species are extremely closely related phenetically. The first pair, *verticata* (1) and *galbana* (2) are very similar and probably also phylogenetically very near, and the same may be true, to a lesser extent, for the second pair, *auratifrons* (3) and *denticulata* (4). The proximity of the third pair, *tenebra* (6) and *umbrosa* (7), to each other and their distance from the other species is probably the result of a large number of tests being based on color. Morphological tests tend to increase the distance between the pair but bring them in closer to the rest. Thus it is not so much that *marilo* is dissimilar but that other species are particularly close. This is evidenced by the minimum spanning tree together with the similarity coefficients (fig. 4).

Numerical taxonomic methods have been applied to the genus *Argodrepana* not only on its own, but together with the genera *Ditrigona* Moore and *Teldenia* Moore. Separate analyses were also carried out using firstly, 97 characters, including those of the ♀

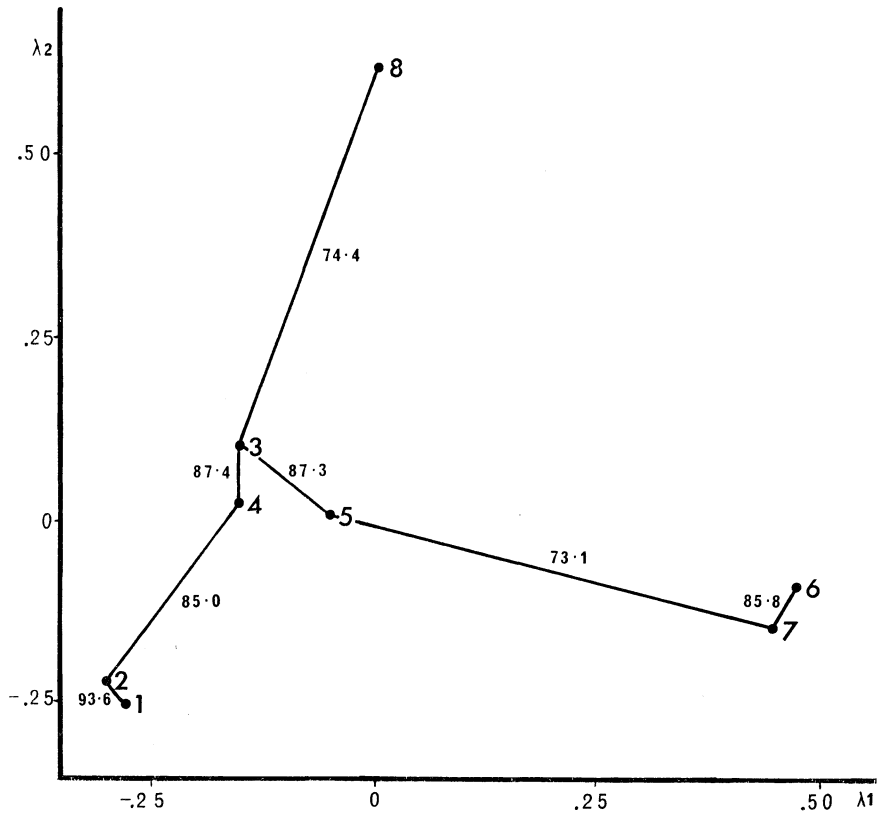

Fig. 4. A 2-dimensional diagram of the genus *Argodrepana* representing vector 1 against vector 2 with minimum spanning tree and percentage similarities.

and secondly, 85 characters excluding the ♀. Also *marilo* was added by Gowers Add-a-point method (Wilkinson 1970b, c), to a pre-existing principal coordinates analysis. For *Argodrepana* all the results were very similar and often identical. No method produced any discrepancy. Thus on the basis of the known characters, fig. 1-6 represent accurate assessments of the phenetic relationship of each species.

REFERENCES

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1970b. Adding a point to a principal coordinates analysis. *Systematic Zoology* **19** (3): 258-63.

1970c. On the taxonomy of *Dipriodonta sericea* Warren (Lepidoptera: Drepanidae). *Proc. R. Ent. Soc. Lond.* (B) **39** (7-8): 89-98, 9 fig., 1 pl.

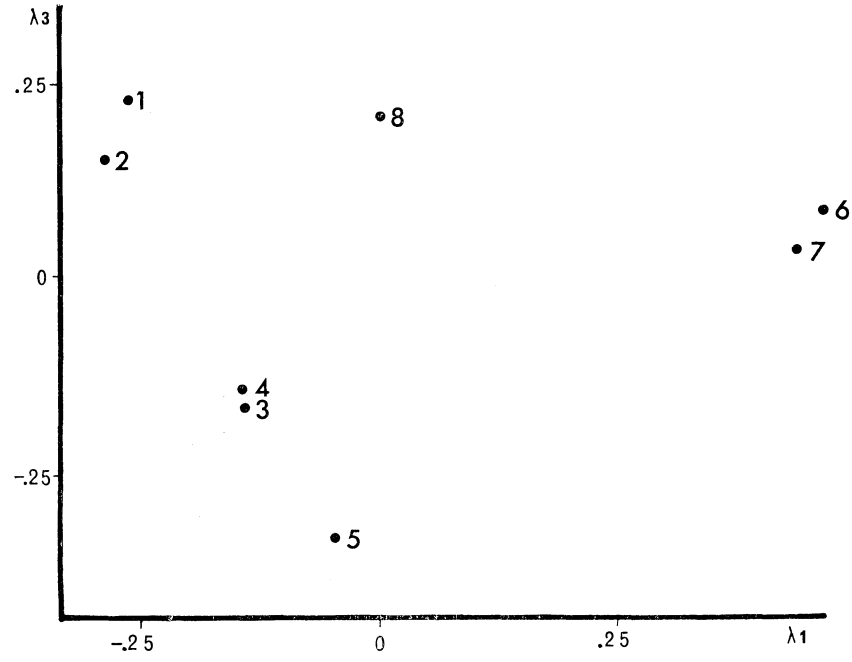

Fig. 5. Two-dimensional diagram representing vector 1 against vector 3 of the genus *Argodrepana*.

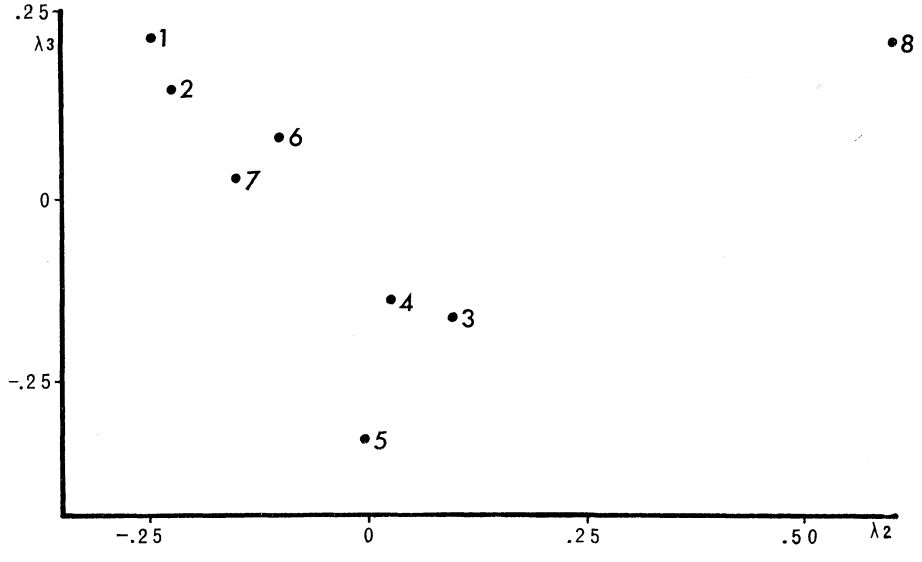

Fig. 6. Sectional diagram representing the genus *Argodrepana* of vector 2 against vector 3.