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Morphological and biological character of *Lilium zairii*

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ABSTRACT

The seeds from a natural stand of *Lilium zairii* – first named after the place of their discovery - were collected in 1982 in Zaire (Africa) by Henryk Mackiewicz. Original seeds, flowering plants and bulbs were investigated in the Research Institute of Pomology and Floriculture in Skierniewice and compared with *Lilium formosanum*, the most similar species among the Longiflorum Section of Lilies. The morphological and biological characters of *Lilium formosanum* and *Lilium zairii* are presented in this paper. Further investigations on chromosomal and molecular analysis to establish the taxonomic relation of the mentioned genotype are in preparation.

Research and observations of *Lilium zairii* convinced us of the plant being a separate species of the genus *Lilium*.

Former scientific research (Mynett, 1989) concentrated on the comparison of *Lilium zairii*, a working name in the state of exploration, with *Lilium formosanum* and *Lilium longiflorum*.

Lilium formosanum can be found in South Africa, Transvaal (Walters, 1983), as a naturalized species. Besides this no *Lilium* species has ever been discovered on the African continent, and all other species occur solely in the northern hemisphere of the globe (Feldmaier, McRae, 1982).

Lilium formosanum, Wallace, has its natural stand in Taiwan (former Formosa), the most close outpost to the southern hemisphere (Mynett, 1992). *Lilium zairii* shows much similarity to *L. formosanum* regarding its habit, growth cycle, flower biology and climatic conditions under which the species occur. *Lilium zairii* has been found on a height of 2000 meters above sea level in the Virunga mountains close to the Lake Tanganyika. *Lilium formosanum* occurs on volcanic slopes in Taiwan up to 3000 m above sea level (Mynett, 1993), therefore, growing conditions are close to those of *Lilium zairii*.

In accordance with the botanical classification of Comber (1949), *Lilium formosanum* belongs to the sixth systematic group of lilies together with the species *Lilium longiflorum*, *Lilium neilgherrense*, *Lilium wallichianum*, *Lilium formosanum* and *Lilium philippinense*, and *Lilium zairii* should be assigned to this group. Concerning horticultural sections (Mynett 1992), it should, due to its structural similarities, be handled as a *Lilium longiflorum* crossbreed.

Examined attributes	<i>Lilium formosanum</i>		<i>Lilium zairii</i>	
	Alternation range	Average value	Alternation range	Average value
Height of plant in cm	92,4 - 140,5	116,6	71,5 - 110,4	90,9
Numbers of leaves	63,7 - 82,2	72,9	57,7 - 69,5	63,6
Length of a leave from center of stem in cm	9,0 - 11,8	10,4	10,2 - 11,5	10,8
Width of a leave from center of stem in cm	1,5 - 1,9	1,7	0,5 - 1,2	0,8
Numbers of flowers in umbel	2 - 5	3,5	1 - 3	2,0
Length of trumpet flower in cm	15,4 - 17,3	16,3	14,5 - 16,2	15,3
Average width of open flower in cm	8,2 - 12,4	10,3	5,0 - 7,2	6,1
Width of calyx in cm	3,3 - 3,8	3,5	3,0 - 3,0	3,0
Width of corolla in cm	4,5 - 4,8	4,6	4,3 - 4,5	4,4
Length of style in cm	8,1 - 8,9	8,5	9,2 - 9,7	9,4
Length of anther in cm	1,2 - 1,5	1,3	2,2 - 2,5	2,3
Length of ripe seed pod in cm	10,2 - 12,5	11,3	10,0 - 11,9	10,9

Examined attributes	<i>Lilium formosanum</i>		<i>Lilium zairii</i>	
	Alternation range	Average value	Alternation range	Average value
Type of germination	Immediately epigeal		Immediately epigeal	
Duration from germination to flowering in days	129 - 150	139	122 - 142	132
Duration from sowing to flowering in months	16,0 - 18,0	17,0	9,5 - 11,5	10,5
Bulb size after plant faded (perimeter in cm)	9,2 - 12,8	11,0	6,5 - 9,8	8,1
Time until shooting after 3 months dormancy at 5 - 10 °C (in days)	28 - 40	34	20 - 30	25
Amount of months to reflower after dormancy	7,5 - 8,5	8,0	4,5 - 6,5	5,5

Examined attributes	<i>Lilium formosanum</i>		<i>Lilium zairii</i>	
	Alternation range	Average value	Alternation range	Average value
Proportion of surviving pollen after 6 week storage in dehydrator (in %)	92,5 - 100,0	96,2	72,5 - 88,9	80,7
Size of pollen in µm				
- length	88,5 - 104,9	96,7	101,5 - 108,5	105,0
- width	65,8 - 82,9	74,3	70,6 - 77,4	74,0
Size of seed in mm				
- length	7,8 - 9,9	88,5	4,8 - 6,7	5,7
- width	3,8 - 5,5	4,6	3,2 - 4,8	4,0
Germination rate in %	41,0 - 58,5	49,7	78,2 - 92,0	85,1
Amount of seeds per pod (germinability unchecked)	967 - 990	978	992 - 1230	1111

The seeds of *Lilium zairii*, brought from Africa by Henryk Mackiewicz, were sown at the INSAD in Skiernewice and flowered for the first time in 1985. Plants have been compared with crossbreeds of *Lilium longiflorum* and other species of trumpet-flowered lilies – *Lilium brownii*, *Lilium henryi*, *Lilium leucanthum*, *Lilium regale* and *Lilium sargentiae*.

Three years of detailed research on the plants habit and growth cycle made clear that *Lilium zairii* has its closest similarity with *Lilium formosanum*. However, numerous distinct attributes indicate that we are confronted with separate systematic items. This is also underlined by comparative research on the morphological (Tab. 1), evolutionary (Tab. 2), and genetic-biological attributes (Tab.3) between *Lilium zairii* and *Lilium formosanum*.

At our Institutes Department of Biotechnology of Ornamental Plants some more work will be done on chromosomal identification and molecular analysis, which shall finally decide if *Lilium zairii* is a form of *Lilium formosanum* or if the genetic differences are large enough to make it possible to recognize *Lilium zairii* as a systematic item of its own.

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