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技術/專利：蝴蝶蘭*Phal.* Sogo Yukidian 'V3'海運外銷流程植體元素變化之初探
technology/patent：Research on the change in plant nutrient elements during shipping export process of *Phal.* Sogo Yukidian 'V3'.

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摘要 Abstract

蝴蝶蘭海運輸美流程在裝箱前會進行斷水，斷水意味著肥培的停止，直到抵達目標國蘭園才會再度澆水施肥，此過程中的元素變化仍未明朗。本研究以蝴蝶蘭*Phal.* Sogo Yukidian 'V3'為材料，研究海運輸美流程中，斷水前、斷水後及19℃ 95%RH模擬貯運30天後之元素變化。結果顯示，斷水後貯運前之成熟葉碳、氮、鋅、鉀含量低於斷水前(表1)，可能是斷水期間無肥培供應所致。然而在模擬貯運後，元素卻有回升情形。由於老葉氮元素也有回升現象(表2)，顯示成熟葉元素回升並非來自老葉轉移。含水率數據顯示，貯運期間植體含水率增加，顯示高濕度下的模擬貯運，植株可能吸收微量水分，同時有元素的吸收導致元素含量的回升，值得進一步探討。

The shipping export process of *Phal.* Sogo Yukidian 'V3' from Taiwan to the U.S. involved a water restriction procedure. This means there is no water and fertilizer supply until it arrived the nursery in U.S.. This study used *Phal.* Sogo Yukidian 'V3' plants to figure out the elements concentration change during the shipping export process. The result showed that after the water restriction, carbon, nitrogen, zinc, and potassium concentration of mature leaves decreased. This may because the restriction of the supply of fertilizer with the water. However, after 30 days of shipping under 19℃ and 95%RH, the concentration of those elements rose back. The rose back in element concentration in mature leaves may not due to the supply of the old leaves, since the nitrogen concentration of old leaves rose, too. The water content data showed rose in all parts of the plant after shipping. This implied that plants under high humidity environment during shipping may absorb a small amount of water, and in the same time had some fertilizer with the water. This finding deserves further study.

圖表 Figure & Table

表1. 蝴蝶蘭*Phal.* Sogo Yukidian 'V3'成熟葉在不同貯運階段之礦物元素含量變化。
T1able 1. Mineral elements concentration of mature leaves of *Phal.* Sogo Yukidian during shipping export process.

貯運階段	K (%)	Ca (%)	Mg (%)	Fe (ppm)	Mn (ppm)	Cu (ppm)	Zn (ppm)	P (%)	N (%)	C (%)
斷水前	1.72 ± 0.04	4.24 ± 0.14	0.28 ± 0.01	27.33 ± 1.49	876.76 ± 43.46	-	11.74 ± 0.63	0.18 ± 0.01	1.61 ± 0.07	43.21 ± 0.68
斷水後貯運前	1.69 ± 0.05	4.21 ± 0.10	0.29 ± 0.01	46.41 ± 5.68	687.23 ± 18.18	1.82 ± 0.07	9.94 ± 0.87	0.21 ± 0.03	1.26 ± 0.03	41.03 ± 0.23
模擬貯運出庫	1.90 ± 0.10	4.25 ± 0.23	0.27 ± 0.00	66.38 ± 3.18	632.25 ± 25.18	1.82 ± 0.05	10.67 ± 0.35	0.23 ± 0.01	1.55 ± 0.05	42.20 ± 0.33

z Numbers followed the means represent the standard error.

表2. 蝴蝶蘭*Phal.* Sogo Yukidian 'V3'老葉在不同貯運階段之礦物元素含量變化。
T1able 1. Mineral elements concentration of old leaves of *Phal.* Sogo Yukidian during shipping export process.

貯運階段	K (%)	Ca (%)	Mg (%)	Fe (ppm)	Mn (ppm)	Cu (ppm)	Zn (ppm)	P (%)	N (%)	C (%)
斷水前	2.59 ± 0.13	4.61 ± 0.11	0.54 ± 0.01	39.54 ± 1.32	92.92 ± 25.22	-	16.21 ± 4.23	0.11 ± 0.01	1.26 ± 0.03	41.92 ± 0.33
斷水後貯運前	2.86 ± 0.37	4.20 ± 0.16	0.52 ± 0.03	65.70 ± 5.58	147.67 ± 33.88	2.00 ± 0.07	11.44 ± 1.45	0.12 ± 0.00	1.21 ± 0.03	42.34 ± 0.38
模擬貯運出庫	2.99 ± 0.22	4.37 ± 0.15	0.50 ± 0.02	68.21 ± 0.79	230.83 ± 26.74	1.70 ± 0.17	9.89 ± 0.27	0.15 ± 0.01	1.37 ± 0.06	39.91 ± 0.17

z Numbers followed the means represent the standard error.

表3. 蝴蝶蘭*Phal.* Sogo Yukidian 'V3'植體各部位在不同貯運階段之乾鮮重與含水率。
T1able 1. Fresh weight, dry weight, and water content of different plant part of *Phal.* Sogo Yukidian during shipping export process.

植體部位	貯運階段	鮮重 (%)			乾重 (%)			含水率 (%)		
成熟葉	斷水前	145.24	±	2.82	8.17	±	0.16	94.37	±	0.04
	斷水後貯運前	102.27	±	2.45	6.19	±	0.06	93.94	±	0.11
	模擬貯運出庫	101.57	±	1.38	5.33	±	0.13	94.75	±	0.06
老葉	斷水前	69.09	±	1.57	3.30	±	0.09	95.23	±	0.05
	斷水後貯運前	47.64	±	2.15	2.54	±	0.18	94.69	±	0.17
	模擬貯運出庫	56.16	±	1.72	2.56	±	0.11	95.45	±	0.07
根部	斷水前	407.52	±	4.21	32.14	±	0.62	92.11	±	0.16
	斷水後貯運前	260.68	±	7.35	23.65	±	0.70	90.91	±	0.37
	模擬貯運出庫	259.15	±	18.98	21.33	±	1.45	91.76	±	0.18

z Numbers followed the means represent the standard error.