Amino acid analysis of the phloem sap of rice and honeydew excretion of whitebacked planthopper, *Sogatella furcifera*

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The chemical composition of phloem sap is very important in understanding the mechanism of host resistance of rice to the whitebacked planthopper (WBPH), *Sogatella furcifera*, a phloem-feeder. Using stylectomy method, 30 d old plants' phloem sap of rice varieties Zhefu 802 and TN1, which were susceptible to WBPH, were collected by cutting the stylet of WBPH when the WBPH were sucking the phloem sap of rice. Honeydew was collected by confining 2-3 WBPH brachypters on the same plant with a parafilm sachet for 12 h. Two microliters of phloem sap and honeydew were used for amino acid analysis on Hitachi L-8500A automatic amino acid analyzer.

In the phloem sap and honeydew from both TN1 and Zhefu 802, aspartic acid, serine, asparagine, glutamic acid, glutamine, and valine were found to be the major among the 18 ones detected, accounting for 72.5-81.3% of the total (see table). The total amount of amino acids in honeydew was about one forth of that in phloem sap due to the digestion by the insect. Aspartic acid and glutamic acid concentration in honeydew was about one half of those in the phloem sap, while it was twice more for asparagine than that in the phloem sap. There was no change in concentration of glutamine between phloem sap and honeydew. □

Amino acid composition of the phloem sap and honeydew excreted by the whitebacked planthopper, *Sogatella furcifera* (JIRCAS, Japan, 2000).

Amino acid	Retention time	Phloem sap				Honeydew			
		TN1		Zhefu 802		TN1		Zhefu 802	
	(min)	μg/μl	%	μg/μl	%	μg/μl	%	μg/μl	%
Asp	10.37	3.64	13.05	3.69	10.09	0.46	5.47	0.52	6.44
Thr	15.09	0.80	2.87	1.14	3.12	0.21	2.50	0.19	2.35
Ser	16.72	2.10	7.53	2.52	6.89	0.40	4.76	0.32	3.97
Asp-NH2	19.25	3.12	11.18	5.89	16.10	2.65	31.51	1.88	23.30
Glu	20.50	3.49	12.51	3.88	10.61	0.44	5.23	0.53	6.57
Glu-NH2	22.18	6.94	24.87	9.08	24.82	2.41	28.66	2.60	32.22
Pro	32.05	0.35	1.25	0.53	1.45	0.00	0.00	0.00	0.00
Gly	34.24	0.04	0.14	0.04	0.11	0.05	0.59	0.03	0.37
Ala	35.86	0.47	1.68	0.40	1.09	0.04	0.48	0.06	0.74
Val	40.90	1.08	3.87	1.47	4.02	0.48	5.71	0.31	3.84
Met	43.39	0.08	0.29	0.13	0.36	0.00	0.00	0.01	0.12
Ile	46.69	0.71	2.54	1.08	2.95	0.20	2.38	0.11	1.36
Leu	48.37	0.86	3.08	1.37	3.75	0.10	1.19	0.09	1.12
Tyr	50.82	0.56	2.01	0.90	2.46	0.17	2.02	0.07	0.87
Phe	53.94	0.55	1.97	0.87	2.38	0.20	2.38	0.08	0.99
Lys	87.57	0.89	3.19	1.19	3.25	0.02	0.24	0.10	1.24
His	92.72	0.31	1.11	0.41	1.12	0.08	0.95	0.04	0.50
Arg	109.78	0.78	2.80	1.23	3.36	0.02	0.24	0.13	1.61
Sub-total		26.77	95.95	35.82	97.92	7.93	94.29	7.07	87.61
Others		1.13	4.05	0.76	2.08	0.48	5.71	1.00	12.39
Total		27.90	100.00	36.58	100.00	8.41	100.00	8.07	100.00