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The Distinction of Five Taxa of the *Arisaema undulatifolium* Group (Araceae) in Western Japan

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Abstract. The number of leaflets and the length of the peduncle, petiole and pseudostem were examined on 356 plants and the number of ovules per ovary was counted on a total of 45 plants from one eastern and ten western Japanese populations attributed to five taxa in the *Arisaema undulatifolium* group. The present circumscription of the five taxa was supported by the difference in the number of leaflets and the ratio of the peduncle / petiole length in both male and female plants. The high number of ovules, over 11.2 per ovary, is characteristic for the *A. undulatifolium* group. *Arisaema nambae* shows remarkable difference in the ratio of the peduncle / petiole length between male and female plants, and is considered to be the most distinct species in the *A. undulatifolium* group morphologically as well as cytologically. The ranges of variation in the number of leaflets and in the ratio of the peduncle / petiole length scarcely overlap between *A. minus* and *A. yosinagae*. Consequently, *A. minus* is also recognized as a distinct taxon in the *A. undulatifolium* group. To discuss the taxonomic status of *A. yosinagae*, further examination of these characters in the eastern Japanese taxa is necessary.

Key words: Araceae, *Arisaema undulatifolium* group, gender change, leaflet number, ovule number

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In the revision of Japanese *Arisaema*, Ohashi & Murata (1980) circumscribed *A. undulatifolium* in the broad sense and recognized that *A. aequinoctiale* F. Maekawa, *A. limbatum* F. Maekawa, *A stenophyllum* F. Maekawa, *A. yosinagae* Nakai, and *A. nambae* Kitam. were conspecific with *A. undulatifolium* Nakai. Serizawa (1980) recognized the *A. undulatifolium* group as consisting of several species commonly characterized by the earlier flowering season (one week to one month earlier than other species groups growing together), the spathe opening before the extension of the leaves, the short rachises between the leaflets, and the short pseudostem (about half of the total height of the plant). Serizawa's *A. undulatifolium* group was basically identical with *A. undulatifolium* in the broad sense of Ohashi & Murata (1980) but the former also included *A. kawashimae* Serizawa, *A. kishidae* Makino, *A. kishidae* var. *minus* Serizawa, *A. limbatum* var. *conspicuum* Serizawa, and it excluded *A. nambae*. Murata (1986) revised this group based on new characters such as the ratio of the peduncle / petiole length and the number of ovules per ovary, and circumscribed it to include *A. aequinoctiale, A. kawashimae, A. limbatum, A. limbatum* var. *conspicuum*,

A. minus (Serizawa) J. Murata, *A. stenophyllum, A. yosinagae* and *A. nambae*. *Arisaema kishidae* was excluded. In the present study, taxa in this group are treated as distinct species, except for *A. limbatum* var. *conspicuum*, and the delimitation of taxa follows Serizawa (1980). Recently, we examined cytologically eight taxa of the *A. undulatifolium* group, with the exception of *A. kawashimae*, and discovered the chromosome number to be $2n = 26$ in seven taxa, but $2n = 28$ in *A. nambae* (Watanabe *et al.* 1998). For *A. kawashimae*, Serizawa (1980) reported the chromosome number to be $2n = 28$.

This study analyzed additional characters to circumscribe the taxa of the *Arisaema undulatifolium* group in western Japan, paying special attention to the number of leaflets, the ratio of the peduncle / petiole length and the number of ovules per ovary.

Materials and Methods

The geographical distribution of the taxa and the localities of the ten populations studied and of the voucher specimens examined of the *Arisaema undulatifolium* group in western Japan are shown in Fig. 1. The occurrence of *Arisaema limbatum* var. *conspicuum* in Ooita Pref. is reported for the first time. *Arisaema limbatum* var. *limbatum* occurs on the Pacific Ocean side of Tohoku, Kanto and adjacent Chubu districts of eastern Japan. In eastern Japan three additional species are known to occur, i.e., *A. aequinoctiale* endemic to the Boso Peninsula, Chiba Pref., *A. undulatifolium* endemic to the Izu Peninsula, Shizuoka Pref. and *A. stenophyllum* distributed from Hakone to Tanzawa Mountains, Kanagawa Pref. The localities of eleven populations attributed to five taxa and the number of male and female plants examined are listed in Table 1. Voucher specimens examined are listed in the appendix. One population of *A. limbatum* var. *limbatum* from Kanto district in eastern Japan was also investigated to compare with plants in western Japan.

The number of leaflets and the length of the peduncle, petiole of the lower leaf, and pseudostem, were examined on 356 plants (231 male plants and 125 female plants) collected from 11 populations attributed to five taxa. In this study, the peduncle is the part of the stem between the base of the upper leaf and the base of the inflorescence. Since the length of the peduncle and pseudostem of Japanese *Arisaema* do not elongate further after the spathe blade has sufficiently extended (Kobayashi 1995), the measurements and comparison of the length of peduncle, petiole and pseudostem in male and female plants were carried out from early April to early May, when the spathe and leaf blade had sufficiently extended.

The number of ovules per ovary was counted using a stereoscope for 15 to 30 ovaries in a few adjacent series in the infructescence of 45 plants from eight populations attributed to five taxa.

LSD method based on ANOVA was used to check the significance of differences in the averages among populations.

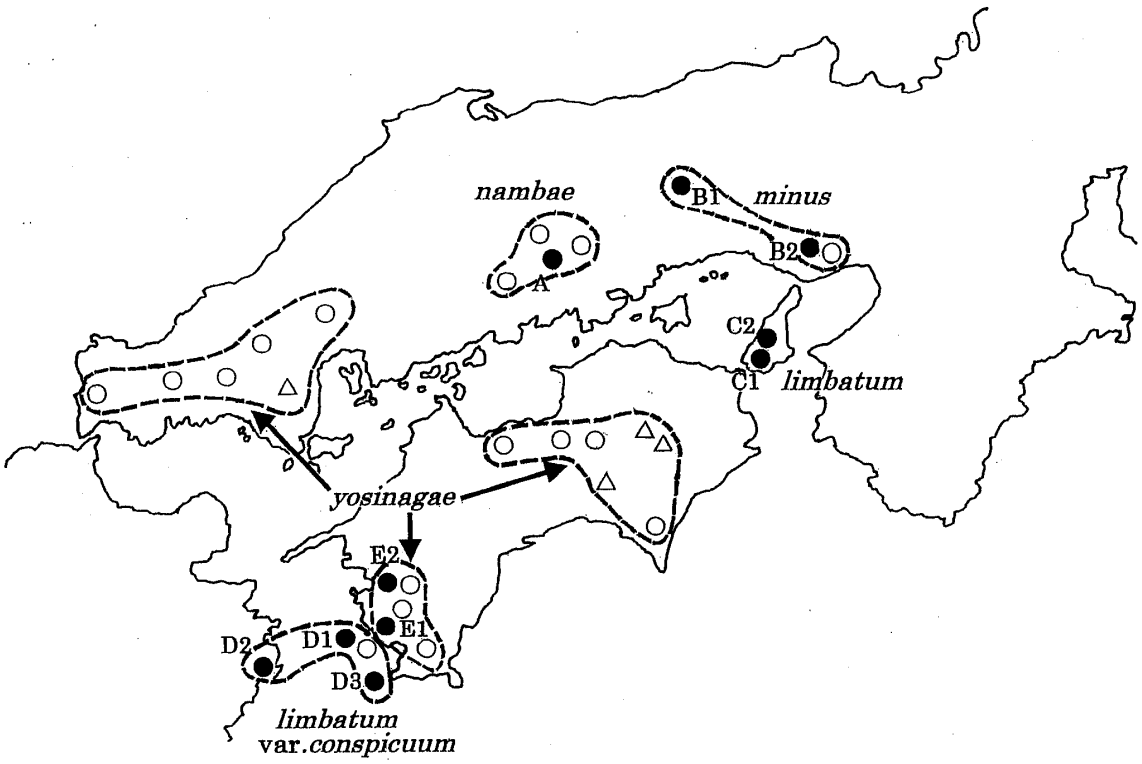

FIG. 1. Map showing the geographical distribution of five taxa and the localities of ten populations examined (●) in the *Arisaema undulatifolium* group of westem Japan. (Circles (○) and triangles (△) indicate the localities based on specimens cited in the appendix and literature, respectively.

TABLE 1. Taxa, localities of eleven populations, and number of male and female plants examined in the *Arisaema undulatifolium* group

Taxa	Populations	Localities	Number of plants examined		
			Male	Female	Total
A. nambae	A	Okayama Pref., Niimi–city	37	13	50
A. minus	B1	Hyogo Pref., Nanko–cho	22	4	26
A. minus	B2	Hyogo Pref., Kobe–city	42	26	68
A. limbatum var. *limbatum*	C1	Hyogo Pref., Mihara–cho	30	13	43
A. limbatum var. *limbatum*	C2	Hyogo Pref., Goshiki–cho	9	0	9
A. limbatum var. *limbatum*	C3	Tokyo Met., Akiruno–city	10	5	15
A. limbatum var. *conspicuum*	D1	Ehime Pref., Nishiumi–cho	13	12	25
A. limbatum var. *conspicuum*	D2	Ooita Pref., Kamae–cho	—	5	5
A. limbatum var. *conspicuum*	D3	Kochi Pref., Sukumo–city	—	3	3
A. yosinagae	E1	Ehime Pref., Johen–cho	20	26	46
A. yosinagae	E2	Ehime Pref., Uwajima–city	48	18	66
Total			231	125	356

Results and Discussion

Table 2 shows the average and standard deviations of the number of leaflets, the length of the peduncle, petiole, pseudostem, and the ratio of the peduncle / petiole length. Populations are arranged in order of the number of leaflets.

Number of leaflets

The average number of leaflets in nine populations ranged from 5.2 to 11.2 in male plants and from 6.0 to 14.4 in females. The lowest number of leaflets was in *Arisaema nambae* and the highest was in *A. yosinagae* (Pop. E2), in both male and female plants. The average number of leaflets in *A. yosinagae* were 2.15 times in male plants and 2.40 in female plants larger than

TABLE 2. Measurements on number of leaflets, length of peduncle, petiole and pseudostem, and length ratio of peduncle / petiole for five taxa in the *Arisaema undulatifolium* group in western Japan. The average and standard deviation are indicated. The different alphabets at the end of numerals in this table mean significant difference by LSD method based on ANOVA ($p < 0.05$)

Taxa (Populations)	Number of plant examined	Number of leaflets	Length of peduncle (cm)	Length of petiole (cm)	Length ratio of peduncle / petiole	Length of pseudostem (cm)
Male						
A. nambae (A)	37	5.2 ± 0.8a	7.0 ± 2.5	10.9 ± 2.3a	0.65 ± 0.20a	13.6 ± 5.9
A. minus (B1)	22	5.9 ± 1.3a,b	6.0 ± 1.8	6.9 ± 2.0b,c	0.88 ± 0.15b	7.9 ± 3.0
A. minus (B2)	42	6.3 ± 1.2b	8.6 ± 2.6	9.9 ± 2.5a	0.88 ± 0.32b	12.8 ± 7.3
A. limbatum var. *limbatum* (C1)	30	7.0 ± 1.0c	8.3 ± 2.3	9.7 ± 2.5d	0.90 ± 0.31b	13.0 ± 5.1
A. limbatum var. *limbatum* (C3)	10	7.2 ± 1.1c	8.2 ± 1.6	7.7 ± 0.8b	1.08 ± 0.24b,c	14.9 ± 5.3
A. limbatum var. *limbatum* (C2)	9	7.9 ± 1.0c,d	8.7 ± 1.8	9.9 ± 4.2a,d	0.98 ± 0.34b,c	15.8 ± 4.9
A. limbatum var. *conspicuum* (D1)	13	8.9 ± 1.3d	8.5 ± 2.3	7.3 ± 2.3b,c	1.22 ± 0.27c	9.2 ± 3.2
A. yosinagae (E1)	20	10.9 ± 1.8e	13.1 ± 3.3	7.9 ± 1.5b	1.69 ± 0.44d	18.1 ± 6.0
A. yosinagae (E2)	48	11.2 ± 1.9e	13.2 ± 3.5	6.0 ± 1.6c	2.30 ± 0.71e	12.4 ± 5.1
Female						
A. nambae (A)	13	6.0 ± 1.0a	19.8 ± 5.5	11.3 ± 1.9a	1.76 ± 0.45a	27.3 ± 10.0
A. minus (B1)	4	7.3 ± 1.1a,b	7.8 ± 2.2	7.7 ± 0.8b,c	1.12 ± 0.12b	11.0 ± 3.4
A. minus (B2)	26	7.7 ± 0.9b	14.1 ± 2.9	11.4 ± 3.0a	1.29 ± 0.35b	21.0 ± 5.1
A. limbatum var. *limbatum* (C1)	13	9.4 ± 1.3c	17.2 ± 9.0	11.8 ± 2.5a	1.45 ± 0.53a,b	28.4 ± 13.0
A. limbatum var. *limbatum* (C3)	5	9.6 ± 1.0c	12.5 ± 2.5	7.8 ± 1.6b,c	1.65 ± 0.32a,b	31.1 ± 2.9
A. limbatum var. *conspicuum* (D1)	12	10.1 ± 1.3c	15.6 ± 3.7	7.8 ± 2.1b,c	1.92 ± 0.45a,c	17.1 ± 8.1
A. yosinagae (E1)	26	11.8 ± 1.5d	18.5 ± 4.0	8.6 ± 1.6b	2.18 ± 0.37c	23.6 ± 5.7
A. yosinagae (E2)	18	14.4 ± 2.6e	17.2 ± 3.5	6.5 ± 1.4c	2.70 ± 0.44d	19.4 ± 7.3

TABLE 3. Frequency of number of leaflets for five taxa in the *Arisaema undulatifolium* group in western Japan. Note gradual increase of leaflet number from *A. nambae* to *A. yosinagae*.

Number of leaflets	Frequency of number of leaflets																
	A. nambae		*A. minus*				*A. limbatum* var. *limbatum*			*A. limbatum* var. *conspicuum*				*A. yosinagae*			
	A		B1		B2		C1		C2	C3		D1		E1		E2	
	m	f	m	f	m	f	m	f	m	m	f	m	f	m	f	m	f
3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4–5	31	6	14	0	17	0	4	0	0	1	0	0	0	0	0	0	0
6–7	5	7	6	3	21	16	21	2	5	7	0	3	0	0	0	2	0
8–9	0	0	2	1	4	10	5	6	4	2	2	6	6	5	2	9	0
10–11	0	0	0	0	0	0	0	5	0	0	3	4	5	12	12	20	2
12–13	0	0	0	0	0	0	0	0	0	0	0	0	1	2	8	14	6
14–15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	4
16–17	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	4
18–19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
20–21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	37	13	22	4	42	26	30	13	9	10	5	13	12	20	26	48	18

m: male plant, f: female plant

those in *A. nambae*. A significant difference was found in the average number of leaflets between taxa in both male and female plants, except between *A. nambae* and *A. minus*, and between *A. limbatum* var. *limbatum* and *A. limbatum* var. *conspicuum*. But a significant difference was not found between populations of the same taxon, even between eastern and western Japanese populations (Table 2). Table 3 shows the frequency of the number of leaflets for five taxa in western Japan: The maximum number and the minimum number of leaflets found in *A. nambae, A. minus, A. limbatum* var. *limbatum, A. limbatum* var. *conspicuum* and *A. yoshinagae* are each 7, 9, 11, 13, 21 and 3, 5, 5, 7, 7, respectively.

Peduncle

The average length of the peduncle ranged from 6.0 cm to 13.2 cm in male plants and from 7.8 cm to 19.8 cm in females. The shortest peduncle was in *Arisaema minus* (Pop. B 1), and the longest was in *A. yosinagae* (Pop. E 2) for males and in *A. nambae* for females (Table 2). A significant difference in the length of the peduncle for males was not found between the western and eastern Japanese populations in *A. limbatum* var. *limbatum*. The ratio of highest / lowest population in peduncle length was 2.20 in male and 2.37 in female. A significant positive correlation between the number of leaflets and the length of the male peduncle was found with $p < 0.01$ ($r = 0.915$). *Arisaema limbatum* var. *limbatum* (Pop. C 2) was excluded from this

analysis because of the paucity of individuals. The results showed a correlation between elongation of the peduncle and increase in the number of leaflets for male plants in these populations. No significant correlation was found in female plants.

Petiole

The length of the petiole varied from 6.0 cm to 10.9 cm in males and from 6.5 cm to 11.8 cm in females. The shortest was in *Arisaema yosinagae* (Pops. E 1 and E 2), and the longest was in *A. nambae* and *A. limbatum* var. *limbatum* (Pop. C 1) for males and females, respectively (Table 2). The ratio of highest / lowest population in petiole length was 1.82 in both males and females. This difference was considerably less than in other characters. Although the order of the nine populations was not reversed in the length of the petiole versus the number of leaflets, a significant negative correlation was found with $p < 0.05-0.1$ ($r = 0.634$ for male plants and $r = 0.618$ for female plants).

Ratio of the peduncle / petiole length

The ratio of the peduncle / petiole length was calculated for nine populations (Table 2). It ranged from 0.65 to 2.30 in males and from 1.12 to 2.70 in females. The lowest ratios were in *Arisaema nambae* for males and *A. minus* (Pop. B1) for females, respectively, and the highest was in *A. yosinagae* (Pop. E2) for both genders. The range of variation was significantly different and scarcely overlapped between taxa. In males of *A. nambae*, the peduncle is significantly shorter than the petiole, but the peduncle elongates to exceed the length of the petiole when the gender changes from male to female. A significant positive correlation was found between the ratio of the peduncle / petiole length and number of leaflets with $p < 0.001-0.01$ ($r = 0.940$ for males and $r = 0.816$ for females).

Pseudostem

The length of the pseudostem varied from 7.9 cm to 18.1 cm in males and from 11.0 cm to 31.1 cm in females. The shortest pseudostem was in *Arisaema minus* (Pop. B1) and the longest was in *A. yosinagae* (Pop. E1) for males and in *A. limbatum* var. *limbatum* (Pop. C 3) for females. A significant difference was not found in the length of the pseudostem between western and eastern Japanese populations in *A. limbatum* var. *limbatum*. The ratio of longest / shortest population in the length of the pseudostem was 2.29 in males and 2.83 in females. The pseudostem of *A. limbatum* var. *conspicuum* (Pop. D 1) was remarkably shorter than that in specimens collected at the same locality in 1979 and deposited at **AICH**. The difference might be due to a change in environmental conditions caused by an increasing grazing pressure by deer. Thus this character does not seem effectively to discriminate these taxa in this group.

Number of ovules per ovary

Murata (1986) examined the number of ovules per ovary extensively in *Arisaema* and concluded that the *A. undulatifolium* group was characterized by a higher number of ovules per ovary (more than 10.5) than in other groups

and taxa. Plants of the *A. undulatifolium* group from western Japan, however, were poorly represented in that study. The number of ovules per ovary for eight populations attributed to five taxa in western Japan ranged from 14.3 to 21.2 (Table 4). The number of ovules per ovary was also significantly correlated with the numbers of leaflets ($p < 0.05$, $r = 0.773$).

TABLE 4. Average, standard deviation, maximum and minimum number of ovules per ovary for five taxa in the *Arisaema undulatifolium* group in western Japan

Taxa	Populations	N	Ave. ± S.D.	Max.	Min.
A. nambae	A	6	14.7 ± 2.1	18.8	11.9
A. minus	B1	4	14.3 ± 2.6	18.1	11.2
A. minus	B2	5	17.9 ± 4.0	22.5	10.8
A. limbatum var. *limbatum*	C1	4	15.7 ± 0.8	16.4	14.6
A. limbatum var. *conspicuum*	D1	7	16.7 ± 3.0	21.8	13.0
A. limbatum var. *conspicuum*	D2	5	17.1 ± 4.2	22.5	10.8
A. limbatum var. *conspicuum*	D3	3	17.6 ± 10.5	29.6	9.9
A. yosinagae	E1	11	21.2 ± 4.4	28.3	14.0

The number of ovules per ovary is the average for 15 to 30 ovaries per plant. N: number of plants examined

Female / male ratio for each character

The female / male ratio in the number of leaflets and in the length of the petiole for eight populations attributed to five taxa averaged 1.21 and 1.10, respectively. The female / male ratio in the lengths of the peduncle and pseudostem averaged 1.74 and 1.75, respectively (Table 5). These figures indicate that the peduncle and pseudostem elongate much more than the petiole when the gender changes from male to female. The female / male

TABLE 5. Female/male ratio in number of leaflets, length of peduncle, petiole and pseudostem, and the ratio of the peduncle/petiole length for five taxa of the *Arisaema undulatifolium* group

Taxa (Populations)	Number of leaflets	Length of peduncle	Length of petiole	Ratio of peduncle / petiole	Length of pseudostem
A. nambae (A)	1.15	2.83	1.04	2.71	2.01
A. minus (B1)	1.24	1.30	1.12	1.27	1.39
A. minus (B2)	1.14	1.64	1.15	1.47	1.64
A. limbatum var. *limbatum* (C1)	1.34	2.07	1.22	1.61	2.18
A. limbatum var. *limbatum* (C3)	1.33	1.52	1.01	1.53	2.09
A. limbatum var. *conspicuum* (D1)	1.13	1.84	1.07	1.79	1.86
A. yosinagae (E1)	1.08	1.41	1.09	1.29	1.30
A. yosinagae (E2)	1.29	1.30	1.09	1.17	1.56
Average	1.21	1.74	1.10	1.60	1.75

ratio in the number of leaflets ranged from 1.08 to 1.34. The lowest value was found in *Arisaema yosinagae* (Pop. E 1) and the highest in *A. limbatum* var. *limbatum* (Pop. C 1). A significant difference was not found between western and eastern Japanese populations of *A. limbatum* var. *limbatum*. In *A. limbatum* var. *limbatum* (Pop. C 1), the number of leaflet increased from 7.0 to 9.4 when the gender had changed from male to female. The female / male ratio in the length of the pseudostem ranged from 1.30 to 2.18 and the female / male ratio in the length of the peduncle ranged from 1.30 to 2.83. The lowest ratios were found in *A. minus* (Pop. B 1) and *A. yosinagae* (Pop. E 2) and the highest in *A. nambae*. *Arisaema nambae* is distinct in the extreme elongation of the peduncle during the change from male to female. The female / male ratio in the length of the petiole ranged from 1.01 to 1.22. The lowest value was found in *A. limbatum* (Pop. C 3)and the highest in *A. limbatum* (Pop. C 1). The petiole did not elongate as much as other characters did when the plants changed from male to female.

Distinction of taxa of the Arisaema undulatifolium *group in western Japan*

The taxa in the *Arisaema undulatifolium* group and their diagnostic characters in western Japan are summarized as follows.

1) Except in female plants of *Arisaema nambae*, the average number of leaflets and the ratio of the peduncle / petiole length in both male and female plants did not differ significantly between populations of the same taxon, but differed significantly between populations of different taxa. These characters are therefore useful in discriminating five taxa of the *A. undulatifolium* group in western Japan.

2) The average number of ovules per ovary in eight populations of five taxa exceeded 11.2, which supports the observation by Murata (1986) that a high number of ovlues per ovary (more than 10.5) is characteristic of the *Arisaema undulatifolium* group.

3) *Arisaema nambae* shows remarkable difference in the ratio of the peduncle / petiole length between male and female. This species and *A. kawashimae* differ also in the chromosome number ($2n = 28$) from all other taxa ($2n = 26$) in the *A. undulatifolium* group (Watanabe *et al.* 1998). *Arisaema nambae* is the most distinct species in the *A. undulatifolium* group.

4) Apart from *Arisaema nambae*, the remaining four taxa are readily separated into two groups by the shape of the mouth of the spathe. *Arisaema limbatum* has wide auricles at the mouth of the spathe. *Arisaema minus* and *A. yosinagae* do not have distinct auricles. The number of leaflets and the ratio of the peduncle / petiole length scarcely overlap between *A. minus* and *A. yosinagae*. Consequently, *A. minus* is recognized as distinct in the *A. undulatifolium* group. *Arisaema yosinagae* appear to be similar to three local species, *A. aequinoctiale, A. stenophyllum* and *A. undulatifolium*, distributed in eastern Japan. Critical morphological examination on eastern Japanese taxa is needed to determine the taxonomic status of *A. yosinagae* and these three taxa.

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Appendix

Voucher specimens examined for five taxa of the *Arisaema undulatifolium* group in western Japan are:

1) *A. limbatum* Nakai et F. Maekawa ex F. Maekawa var. *limbatum* (Mimigata–tennansho)

Mihara–cho, Mihara–gun, Hyogo Pref. (*N. Fukuoka, N. Kurosaki & S. Miyake 5633* **SHO**, Kato, *Fukuoka, Kurosaki & Miyake s. n.* **SHO**, *T. Kobayashi 26864, 26865, 26870* **SHO**), Goshiki–cho, Tsuna–gun, Hyogo Pref. (*S. Nanko s. n.* **SHO**)

2) *A. limbatum* Nakai et F. Maekawa ex F. Maekawa var. *conspicuum* Serizawa (Okinoshima–tennansho)

Kamae–cho, Minamiamabe–gun, Ooita Pref. (*M. Arakane 26995* **AICH**, *M. Arakane 26996* **AICH**); Nishiumi–cho, Minamiuwagun, Ehime Pref. (*S. Serizawa 29053–29061* **AICH**, *T. Kobayashi 26831* **SHO**), Uchidomari, Nishiumi–cho, Minamiuwa–gun, Ehime Pref. (*T. Kobayashi 26830* **SHO**); Sukumo–city, Kochi Pref. (*T. Yamanaka 41991, 42025* **KYO**, *J. Murata 7110* **TI**, *S. Serizawa 13645–holotype* **AICH**, *S. Serizawa 13646–13665* **AICH**)

3) *A. minus* (Serizawa) J. Murata (Harima–mamushigusa)

Nanko–cho, Sayo–gun, Hyogo Pref. (*G. Murata 10565* **KYO**, *J. Murata 9578* **TI**, *S. Serizawa 27838*–holotype **AICH**, *T. Kobayashi 12813* **SHO**), Yamada–cho, Kita–ku, Kobe–city, Hyogo Pref. (*T. Kobayashi 10211, 13410, 15270, 25673* **SHO**), Nishi–ku, Kobe–city, Hyogo Pref. (*T. Kobayashi 20184, 31449, 31460* **SHO**), Suma–ku, Kobe–city, Hyogo Pref. (*T. Kobayashi 31435–31437, 32735–32738* **SHO**)

4) *A. nambae* Kitam. (Takahashi–tennansho)

Takahashi–city, Okayama Pref. (*Z. Tashiro s. n.* **KYO**, *SN s.n.–holotype* **KYO**, *S. Nanba s. n.–isotype* **TI**, *S. Takato s. n.* **KYO**, *T. Kobayashi 14930* **SHO**) Kamogawa–cho, Mitsu–gun, Okayama Pref. (*R. Nishihara s. n.* **TNS**), Niimi–city, Okayama Pref. (*T. Kobayashi 28526* **SHO, OSA, AICH**); Shin–ichi–cho, Ashina–gun, Hirosima Pref. (*Z. Tashiro. s. n.* **KYO**)

5) *A. yosinagae* Nakai (Yoshinaga–mamusigusa)

Johen–cho, Minamiuwa–gun, Ehime Pref. (*S. Serizawa 29065*–29069, 36525–36533 **AICH**, *T. Kobayashi 26837, 26838* **SHO**), Uwajima–city, Ehime Pref. (*S. Serizawa 36540* **AICH**, *T. Kobayashi 34219* **SHO**), Niihama–city, Ehime Pref. (*K. Ochi 7* **XYO**, *T. Kobayashi 17738* **SHO**), Mt. Gorosawayama, Ehime Pref. (*M. Mitui s. n.* **TNS**); Mt. Kuishiyama, Kochi Pref. (*S. Serizawa 15534* **AICH**, *T. Yoshinaga s. n.* **TI**), Sasayama, Sukumo–city, Kochi Pref. (*S. Serizawa 36509* **AICH**), Sasadaira–Oohira, Sukumo–city, Kochi Pref. (*S. Serizawa 36511* **AICH**), Tosashimizu–city, Kochi Pref. (*S. Serizawa 36498* **AICH**); Yamashiro–cho, Miyosi–gun, Tokushima Pref. (*C. Abe 32360* **AICH**, *S. Takato 29* **KYO**, *T. Kobayashi 30240* **SHO**), Sakinohama, Tokushima Pref. (*T. Yoshinaga s. n.* **TI**); Toyota–cho, Toyoura–gun, Yamaguchi Pref. (*S. Serizawa 29072* **AICH**), Mito–cho, Mine–gun, Yamaguchi Pref. (*S. Serizawa s.n.*

AICH), Tokuji-cho, Saba-gun, Yamaguchi Pref. (*H. Mazaki 35230* **AICH**, *T. Kobayashi 30238, T. Kobayashi 30355, T. Kobayashi 30358* **SHO**); Mt. Suzuno-otaniyama, Shimane Pref. (*S. Kurata s. n.* **KYO**); Hiroshima-city, Hiroshima Pref. (*S. Serizawa 27942* **AICH**)

摘　　要

小林禧樹[1]・邑田仁[2]・渡辺邦秋[3]：ナガバマムシグサ群（サトイモ科）の分類形質の検討 — 西日本における5分類群，10集団のデータ解析 —

ナガバマムシグサ群内の5分類群に属する，西日本の10集団及び関東地方の1集団，併せて356個体について，雌雄株に分けて小葉数，花梗，葉柄及び偽茎の長さを計測し，また8集団の45個体について子房あたりの胚珠数を算定し，次のことを明らかにした。

1) タカハシテンナンショウの雌個体を除き，小葉数と葉柄に対する花梗の長さの比はこの研究で採用した分類群のまとまりと最もよく対応しており，分類群内では有意な差がなく，分類群間で有意な差を示した。

2) 1子房あたりの胚珠数は調べたどの集団においても11.2以上であり，ナガバマムシグサ群が10.5以上の胚珠数で特徴づけられるとする邑田(1986)の結論を支持するものであった。

3) タカハシテンナンショウは性転換に際して葉柄に対する花梗の長さの比が特に著しく増大する。また，子房あたりの胚珠数を除き，調査した形質や染色体数でナガバマムシグサ群の他の分類群とは明確に異なる。

4) タカハシテンナンショウ以外の4分類群は仏炎苞の口部が耳状に張り出すかどうかで容易に2群に分けられる。一方は口部が耳状に張り出すミミガタテンナンショウ（オキノシマテンナンショウを含む）であり，もう一方は，ハリママムシグサとヨシナガマムシグサを含む。本研究によりハリママムシグサとヨシナガマムシグサの間では小葉数や葉柄に対する花梗の長さの比の変異域がほとんど重ならないことが示された。従ってハリママムシグサは明確に識別できる分類群である。一方，ヨシナガマムシグサは，東日本のナガバマムシグサ，ハウチワテンナンショウ，ヒガンマムシグサと似ており，今後，これら東日本の集団の形態変異について詳細に検討する必要がある。

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