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Distribution and Some Morphological Characters of Wild Rice in Tanzania

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Introduction

In November in 1984, the writers have trip in Tanzania for a collection of the wild and cultivated rices under the project, "Studies on the Distribution and Ecotypic Differentiation of Wild and Cultivated Rice Species in Africa", supported by a Grant from the Ministry of Education, Science and Culture of the Japanese Government. In this opportunity, wild rices distributed in Tanzania were studied.

On the distribution of wild rice in Tanzania, some reports have already been published [1-4]. Though Tanzania has been considered to be one of the most important distribution areas of wild rice, accumulation of complete data on these aspect is far from being perfect. Taking these facts into account, the present study was made to accomplish the distribution and ecotypic differentiation of wild rice in Tanzania. In the present paper, the habitat and the record of the morphological characters of unhusked grains of wild rice were described. Judging from the route maps and seed characters measured, the localities collected and observed during this trip were thought to be different from the whole Tanzania.

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Abstract of distribution and habitat of wild *Oryza* species

The localities concerned in this trip were only eastern part of Tanzania. Geographical distribution of wild rice found were briefly illustrated in Fig. 1. In this figure, route of the trip and the growing areas of the wild rice are given.

Most of the seed samples collected were divided into two, one of which was deposited in TARO, Tanzania, and another one was carried back to Kagoshima University.

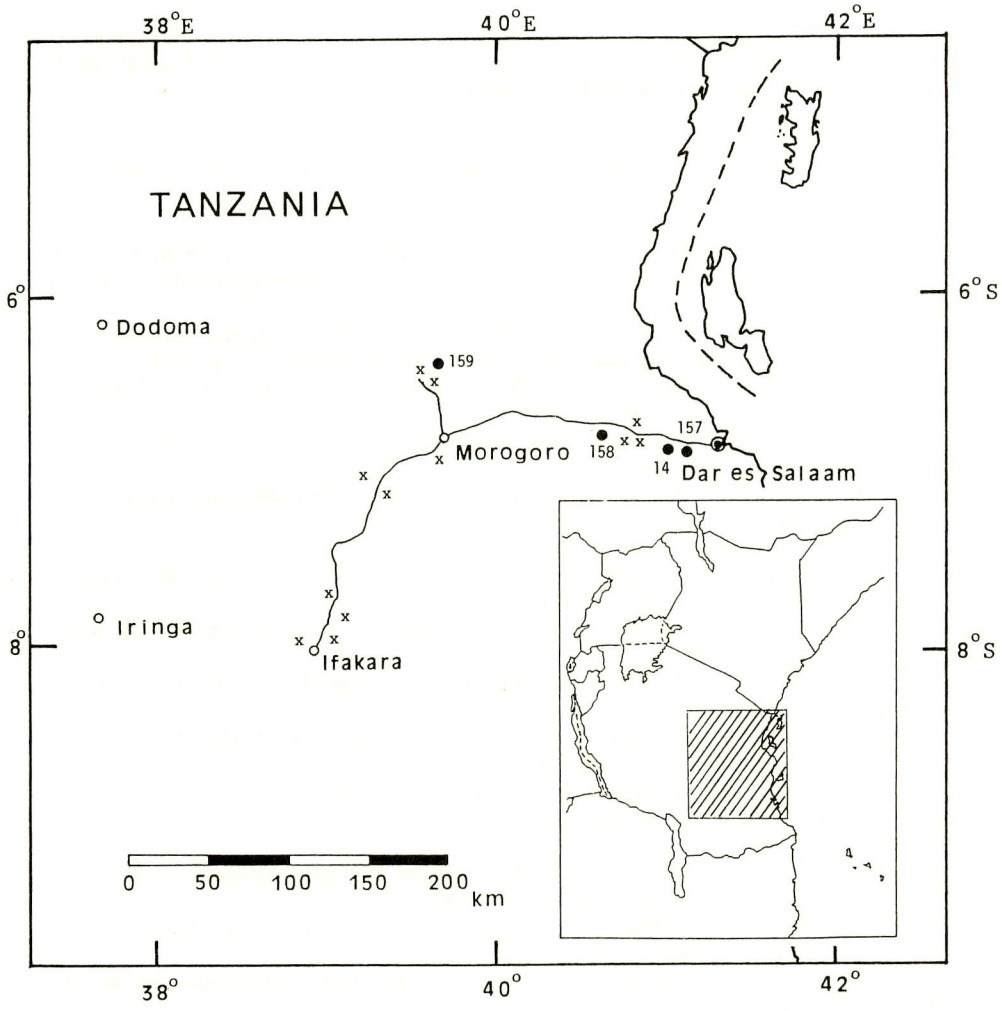

Fig. 1. Map showing several localities where the wild rice in Tanzania were collected and observed. Solid line; route of observation, filled circle; collection area, cross mark; growing area where the samples were observed but not collected, open circle; main town. Code–numbers used in the figure are corresponding to the strain number used in the tables.

Oryza longistaminata CHEV. et ROEHR.

Populations of the species were found in several districts, *i.e.*, Kimara, Kibara, Mlandizi, Chalinze, Bagmago, Morogoro, Mikumi, Ifakara. They had a creeping growth in a pond or swamp.

Oryza punctata KOTSCHY

Populations of the species were found in many districts, *i.e*, Kibara, Mlandizi, Chalinze, Dakawa. They were found in a road–side pasture, edge of swamp or pond.

Distributions of wild rices collected and only observed were listed up in Table 1. In this table, collection number, species name, date of collection or observation, detailed locality and some information of habitat were described.

Table 1. Distribution and habitat of the wild rice collected and observed in Tanzania, 1984. Abbreviations: **L**; *Oryza longistaminata* CHEV. et ROEHR., **P**; *Oryza punctata* KOTSCHY, –; only observed and no collection, m; meter or meters, km; kilometer or kilometers, *N, E, S, W*; north, east, south and west sides of main road, respectively

Collected No.	Species	Date	Place	Detailed locality, habitat and remarks
W157	**P**	Nov. 20	Dar es Salaam	*S* Kimara Village. Separated ca. 100 m from main road. Large pond, 100 m × 200m. *Miscanthus* sp. dominant. Growing sporadically in north and west edges.
W14	**L**	Nov. 20	Kibara	*S* Kibara Village. Half-dried up pond, 100 m × 200 m. Sweat potatoes, beans cultivating. Found only 3 plants in *Miscanthus* sp. field.
–	**L**	Nov. 20	Mlandizi	*N,S* ca. 30 km east from Mlandizi. Pond, 50 m × 50 m. Growing sporadically in edge.
–	**L**	Nov. 20	Mlandizi	*S* ca. 25 km east from Mlandizi. Pond, 100 m × 100 m. Growing thickly in the whole area.
–	**L**	Nov. 20	Mlandizi	*S* ca. 23 km east from Mlandizi. Pond, dia. 100 m. Growing thickly in edge.
–	**L**	Nov. 20	Mlandizi	*S* ca. 21 km east from Mlandizi. Large pond, dia. 100 m. Growing thickly in edge.
–	**P**	Nov. 20	Mlandizi	*S* ca. 10 km east from Mlandizi. Small waste land. Growing sporadically.
–	**P**	Nov. 20	Mlandizi	*S* ca. 9 km east from Mlandizi. Small waste land. Growing sporadically.
–	**P**	Nov. 20	Mlandizi	*N,S* ca. 7 km east from Mlandizi. Large *(S)* and small *(N)* waste lands. Growing sporadically.
–	**L**	Nov. 20	Mlandizi	*N* Just east of Ruvu River. Paddy field, large plateau continued about 4 km. Growing sporadically.
W158	**P**	Nov. 20	Chalinze	*S* ca. 10 km east from Chalinze. Road-side pasture, slowly down from the road. Growing sporadically.
–	**L**	Nov. 20	Chalinze	*N* ca. 2 km west from Chalinze. Large pond, dia. 100 m. Growing sporadically in edge.
–	**P**	Nov. 20	Chalinze	*N,S* ca. 40 km west from Chalinze. Road-side ditch. Growing only a few plants.
–	**L**	Nov. 20	Chalinze	*S* ca. 50 km west from Chalinze. Pond, dia. 50 m. Growing sporadically.
–	**L**	Nov. 20	Bagmago	*N* ca. 10 km east from Bagmago. Small pond. Red soil. Slightly higher land from the main road.
–	**L**	Nov. 20	Morogoro	*S* Suburbs of Morogoro. Large river and the Mindu dam (a distant view). Growing sporadically in edge.
–	**L**	Nov. 20	Mikumi	*W* ca. 10 km north from entrance of Mikumi National Park. Growing sporadically in road-side ditch.
–	**L**	Nov. 21	Mikumi	*E* In 10 km north of southern entrance of Mikumi National Park. Small pond, dia. 10 m. Growing sporadically.
–	**L**	Nov. 21	Ifakara	*E* ca. 10 km from entrance of Ifakara. Pond, dia. 100 m. Growing sporadically.
–	**L**	Nov. 21	Ifakara	*E* Near Rice Research Institute, TARO, Tanzania Agricultural Research Organization. Flooded area and pond near Rufiji Ferry.
–	**L**	Nov. 21	Ifakara	– In Rice Research Institute, TARO. Collected only rachis and rachilla, shedding down, in experimental field. It is said that *O. longistaminata* is the most serious weeds for paddy rice, *O. sativa.*
–	**P**	Nov. 23	Dakawa	*E,W* Continued about 3 km from a joint of Dodoma and Dakawa. Road-side ditch. Growing sporadically
W159	**P**	Nov. 23	Dakawa	– In the field of Dakawa Research Station. In swampy

area. 5 m × 20 m, guitar-shaped. Growing in 30 cm depth central and edge regions of long axis directions, which separated about 10 m by waste land, 10 m width, from the road. Clean water. Clayey soil.

– **L** Nov. 24 Dar es Salaam *E* Near Kuduchi. Paddy field of *O. sativa*. Growing in edge.

– **P** Nov. 24 Dar es Salaam *E,W* Near Kuduchi. Road-side ditch. Growing sporadically.

Some morphological characters of unhusked grains

One strain of *Oryza longistaminata* and 3 strains of *Oryza punctata* were collected in this trip, and they were used for morphological investigations of unhusked grains. Ten grains in general were used for the measurement of each strain. Measurements were done in length, width and thickness of grains, and done at the most eminent section of the respective characters. Calculations were done for the ratios of length to width, of length to thickness, and of width to thickness. The whole data referring to the six characters were illustrated by the average values in the whole grains.

I. *Oryza longistaminata*

The results are given in Table 2. Lengths for the individual grain level ranged from 9.95 mm to 8.05 mm. Average and its standard deviations in the whole grains were found to be 9.05 ± 0.46. Widths for the individual grain level ranged from 2.75 mm to 2.45 mm. Average and its standard deviations in the whole grains were found to be 2.58 ± 0.07. Thicknesses for the individual grain level ranged from 1.95 mm to 1.50 mm. Average and its standard deviations in the whole grains were found to be 1.79±0.09.

Ratios of length to width (abbreviated as L/W) for the individual grain level ranged from 3.83 to 3.25. Average and its standard deviations in the whole grains were found to be 3.50 ± 0.14. Ratios of length to thickness (L/T) for the individual grain level ranged from 6.13 to 4.45. Average and its standard deviations in the whole grains were found to be 5.07 ± 0.32. Ratios of width to thickness (W/T) for the individual grain level ranged from 1.70 to 1.31. Average and its standard deviations in the whole grains were found to be 1.45±0.07.

Table 2. Six morphological characters of unhusked grains; *Oryza longistaminata* (W14) and *Oryza punctata* (W157, W158 and W159)

Strain No.	Length (mm)	Width (mm)	Thickness (mm)	L/W	L/T	W/T
14	9.05±0.46	2.58±0.07	1.79±0.09	3.50±0.14	5.07±0.32	1.45±0.07
157	6.70±0.54	2.47±0.10	1.55±0.09	2.71±0.19	4.33±0.38	1.60±0.11
158	6.19±0.22	2.53±0.10	1.58±0.14	2.45±0.13	3.95±0.36	1.61±0.16
159	6.32±0.34	2.50±0.16	1.56±0.10	2.54±0.27	4.08±0.40	1.61±0.08

Ⅱ. *Oryza punctata*

The results are given in also Table 2. Lengths for the individual grain level ranged from 7.90 mm (No.157) to 5.85 mm (No.159). In the strain level, the longest (6.70 mm) was obtained in No.157. The shortest (6.19 mm) was noted in No.158. Average and its standard deviations in the whole strains were found to be 6.40±0.22. In the standard deviations of each strain, *i.e.*, intra-population's variations, the largest (0.54) was obtained in No.157. The smallest (0.22) was noted in No.158. Average and its standard deviations in the whole strains were found to be 0.37±0.13.

Widths for the individual grain level ranged from 2.80 mm (No.159) to 2.25 mm (Nos.157 and 159). In the strain level, the widest (2.53 mm) was obtained in No.158. The narrowest (2.47 mm) was noted in No.157. Average and its standard deviations in the whole strains were found to be 2.50±0.03. In the standard deviations of each strain, the largest (0.16) was obtained in No.159. Average and its standard deviations in the whole strains were found to be 0.12±0.03.

Thicknesses for the individual grain level ranged from 1.85 mm (No.158) to 1.35 mm (also No.158). In the strain level, the thickest (1.58) mm was obtained in No.158, which was the same as in case of the width. The thinnest (1.55 mm) was noted in No.157, which was the same as in case of the width. Average and its standard deviations in the whole strains were found to be 1.56 ± 0.01. In the standard deviations of each strain, the largest (0.14) was obtained in No.158. The smallest (0.09) was noted in No.157. Average and its standard deviations in the whole strains were found to be 0.08 ±0.06.

Ratios of length to width (L/W) for the individual grain level ranged from 3.04 (No.157) to 2.09 (No.159). In strain level, the largest (2.71) was obtained in No.157, which was the same as in case of the length. The smallest (2.45) was noted in No.158. Average and its standard deviations in the whole strains were found to be 2.57±0.11. In the standard deviations of each strain, the largest (0.27) was obtained in No.159, which was the same as in case of the width. The smallest (0.13) was noted in No.158, which was the same as in case of the length. Average and its standard deviations in the whole strains were found to be 0.20±0.06.

Ratios of length to thickness (L/T) for the individual grain level ranged from 5.27 (No.157) to 3.25 (No.159). In the strain level, the largest (4.33) was obtained in No.157, which was the same as in cases of length and L/W. The smallest (3.95) was noted in No.158, which was the same as in cases of the length and L/W. Average and its standard deviations in the whole strains were found to be 4.12±0.16. In the standard deviations of each strain, the largest (0.40) was obtained in No.159. which was the same as in cases of the width and L/W. The smallest (0.36) was noted in No.158, which was the same as in cases of the length and L/W. Average and its standard deviations in the whole strains were found to be 0.38±0.02.

Ratios of width to thickness (W/T) for the individual grain level ranged from 1.96 (No.158) to 1.38 (No.158). In the strain level, the largest (1.61) was obtained in Nos.158 and 159. The smallest (1.60) was noted in No.157, which was the same as in cases of the

width and thickness. Average and its standard deviations in the whole strains were found to be 1.61 ± 0.01. In the standard deviations of each strain, the largest (0.16) was obtained in No.158, which was the same as in case of the thickness. The smallest (0.08) was noted in No.159. Average and its standard deviations in the whole strains were found to be 0.12 ± 0.03.

Summary

During the trip in November in 1984 in Tanzania, 4 strains of wild rice, *i.e.*, 1 of *Oryza longistaminata* CHEV. et ROEHR. and 3 of *Oryza punctata* KOTSCHY, were collected and some populations of them were observed. Their localities and habitats were reported in detail. Locality names are as follows; Kimara, Kibara, Mlandizi, Chalinze Bagmago, Morogoro, Mikumi, Ifakara and Dakawa.

From the analyses of grain characters of unhusked grains, average values of *O. longistaminata* were found to be 9.05 mm, 2.58 mm, 1.79 mm, 3.50, 5.07 and 1.45 in length, width, thickness, ratios of length to width, of length to thickness, and of width to thickness, respectively. In *O. punctata*, average values and those standard deviations in the whole strains were to be $6.40 \text{ mm} \pm 0.22$, $2.50 \text{ mm} \pm 0.03$, $1.56 \text{ mm} \pm 0.01$, 2.57 ± 0.11, 4.12 ± 0.16 and 1.61 ± 0.01 in the same order, respectively. It may be noticeable that population of No.157, collected in pond near Kimara, showed large values in length, ratios of length to width, and of length to thickness.

In the analyses of the data obtained in the field survey, morphological and genetical characters, ecotypic and varietal differentiations of the species may be discussed in the future.

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