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AGRONOMICAL CHARACTERS OF *Triticum aestivum* L. CULTIVAR KYONE PHYU FROM SIX DIFFERENT COLLECTION SITES

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Abstract

Wheat is grown on more land area than any other commercial crop and continues to be the most important food grain source for human. *Triticum aestivum* L. cultivar Kyone Phyu have been cultivated in Myanmar as a source of bread wheat since 1890. Spike morphology, seed fertility of these varieties were also studied in an attempt to determine the relationship between external appearances. Cultivars Kyone Phyu from six different collection sites such as Sintkaing, Wundwin, Sagaing, Chaung Oo, Monywa and Pindaya Township were collected and studied their morphological and yield characters. However, environmental factors, the degree day temperature, rainfall and relative humidity were also strongly affected on the formation of branching spikelets. It was observed that the above mentioned characters were varied among the samples collected from six growing different places.

Keywords: Morphological, yield, *Triticum aestivum*

Introduction

Wheat is a major diet component because of the wheat plant's agronomic adaptability, ease of grain storage and ease of converting grain into flour for making edible, interesting and satisfying foods. The cultivation of wheat (*Triticum* spp.) reaches far back into history. Nowadays, more than 200 cultivars of hexaploid wheat (i.e. including, pure line, hybrid line, induced mutation line, introducing cultivars from many research center (especially from CIMMYT), various selection line from various sources were cultivated on many sown acres of Myanmar Land. Spike morphology and yield characters were also studied in an attempt to find out the relationship between yield characters and their genetic resources. Kalsikes and Lec (1972) stated that genotype and environmental conditions are also important for wheat and triticale as it is in other crops, to other cultivated cereals, Sears (1956) and to all cultivated from species Shigenaga (1987). Several studies have been made by Coutinho (1936), Camara (1944), Riley *et al*., (1958), Tsunewaki (1963), Upadhya and Swaminathan (1963), Morris and Sears (1967), and Larsen and Kimber (1973). Although many papers concerning about the agronomy, yield characters, disease and pest resistant, biochemistry and adaptability were available, the information concerning with genetic resources of each and individual cultivars or varieties that grown in Myanmar were still far left behind. By knowing this information, it can be explored from every point of view to improve the wheat cultivars with desired characteristics. In the present study, the information of where wheat grown, the cultivars that the farmers chosen depending on their growing field and its environmental conditions. The yield characters that changes according to their growing land were also investigated.

Materials and Methods

Materials The hexaploid wheat cultivars namely Kyone Phyu, (cultivated in most parts of the wheat growing regions as commercial crops) were collected from six various parts of the Upper Myanmar wheat growing regions. The information concerning with the materials used were described in Table: 1 respectively.

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Table 1 ***Triticum aestivum*** **L. cultivar Kyone Phyu growing regions in upper Myanmar and cultivars that growing in that region**

No.	State (Division)	Township cultivated	Name of cultivars	Purpose of cultivation	Ploidy level	Genome constitution
1.	Mandalay Division	Sintkaing Township	Kyone Phyu	Commercially	6x	AABBDD
2.		Wundwin Township	Kyone Phyu	Commercially	6x	AABBDD
3.	Sagaing Division	Sagaing Township	Kyone Phyu	Commercially	6x	AABBDD
4.		Chaung Oo Township	Kyone Phyu	Commercially	6x	AABBDD
5.		Monywa Township	Kyone Phyu	Commercially	6x	AABBDD
6.	Southern Shan State	Pindaya Township	Kyone Phyu	Commercially	6x	AABBDD

Methods

Samples and data of wheat that studied were collected from government experimental farms and from farmers in the field. Samples were collected from Southern Shan State, Mandalay Division and Sagaing Division. Spikes and seeds were collected for further study. Their morphological characters and seed characters were recorded with photographs.

Studies on spike morphology and yield characters

When the plants were fully matured, thirty spikes from each of the cultivar collected randomly from studying the spike characters as well as yield characters. Thirty spikes for each cultivar Kyone Phyu from different collection sites were examined. Spike length, number of spikelets per spike, density of spikelets, number of florets per spike, fertility of first and second florets (gene control character) number of seeds per spike, number of tiller per plants were measured and recorded.

Statistical analysis

Equal student 't' test that stated by Steel and Torrie (1960) was used to compare the differences of the yield characters studied in this research works.

Results

Morphological characters of *Triticum aestivum* L. cultivar Kyone Phyu

Plant 20-90cm tall, forming (2-6 seminal roots and many secondary roots), often strongly tillering (up to 8 tillers per plant, depending on cultivar and environment, but normally 2-5). Stem smooth. Leaf blade long and 2-3cm wide glabrous or pubescent. Spike 4-15cm long. Caryopsis ventrally with a central groove, reddish brown, yellow, white or intermediate hues. Seed color is white creamy color (Plate: 1).

Plant characters

Most plants (i.e. Kyone Phyu) cultivated in various parts of the studied areas, exhibited healthy plants. The leaf characters showed somewhat waxy, (the characters of rye) which is resistant to leaf transpiration and give rust resistant. The Kyone Phyu wheat grown in Monywa township have been observed that it have moderately sensitive (i.e. susceptible to) leaf rust.

Cultivar Kyone Phyu from Pindaya have strong resistance to leaf and stem rust compare to Kyone Phyu from the other sites. Although this cultivar was less interest by the farmers in Mandalay and Sagaing division farmers. It was widely cultivated in Southern Shan State both in Southern and in Northern. Because of its stiff awn characters, it can defend from the birds (Plate: 2, 3).

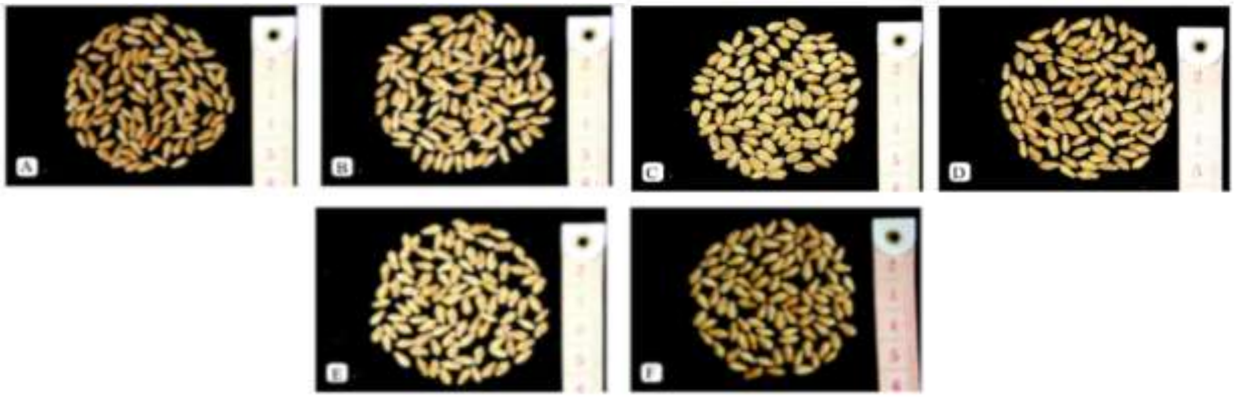

Plate 1 Seeds character of *Triticum aestivum* L. cultivar Kyone Phyu A. Sintkaing; B. Wundwin C. Sagaing; D. Pindaya E. Chaung Oo; F. Monywa

Originally, Kyone Phyu is almost awnless cultivars. After planting for more than a century in Myanmar, some possessed awnless, some with short awn and some exhibited moderately awn. The seeds obtained from six various wheat growing region are grown in Men Chumary II of Mandalay University Campus field. The morphological characters exhibited that some are similar to Kyone Phyu some little showed compactoid spike character and some exhitited similar to triticale (hybrid of wheat and rye also known as first man made cereal) spikes.

For the seed characters, all the seeds obtained from the present research showed that they are all like the wheat seed characters i.e. short and plump, colouring from white to moderately brown. Kyone Phyu possess white to creamy white in seed colour (Plate: 1).

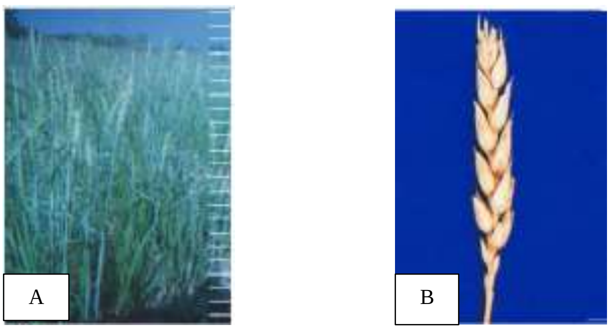

Plate 2 A. Habit of *Triticum aestivum* L. Cultivar Kyone Phyu from Sintkaing
B. Spike of cultivar Kyone Phyu from Wundwin

Spike Characters

Spike length

Pindaya Kyone Phyu resulted the longest spike length among the studied hexaploid cultivar Kyone Phyu while Monywa Kyone Phyu have the shortest length (Fig: 1).

Plate 3 A. Habit of Cultivar Kyone Phyu from Sagaing B. Spike of Cultivar Kyone Phyu from Pindaya C. Habit of cultivar Kyone Phyu from Chaung Oo D. Spike of cultivar Kyone Phyu from Monywa

When tested with ‘t’ test for each collecting sites, comparison between Sintkaing and Wundwin Kyone Phyu, Sintkaing and Sagaing Kyone Phyu, Sintkaing and Chaung Oo Kyone Phyu, Wundwin and Sagaing Kyone Phyu and Pindaya and Chaung Oo Kyone Phyu showed no significant differences (Table: 2). Similarly student ‘t’ test with among the cultivars that Sintkaing and Pindaya, Wundwin and Chaung Oo, all the later two have significantly longer in spike length characters at 5% level (Table: 2; Fig: 1).

Number of spikelets per spike

The highest number of spikelets per spike was observed on Kyone Phyu from Sintkaing (Table: 2; Fig: 2). Comparison made between Sintkaing and Sagaing, Sintkaing and Pindaya, Sintkaing and Monywa, Wundwin and Monywa, Chaung Oo and Monywa all the formers were significantly different at 1% level respectively and comparison between Wundwin and Sagaing, Pindaya and Monywa all the formers were significantly different at 5% level respectively (Table: 2). No significant differences were observed from the rest comparison (Table: 2; Fig: 2).

Density of spikelet

Pindaya Kyone Phyu have the poorest density of spikelet among the six studied cultivar Kyone phyu collected from different sites, while Monywa Kyone Phyu have the highest density of spikelet (Table: 2). when comparison made among Kyone Phyu collected from six different sites, Sintkaing showed significantly superior than Pindaya and Chaung Oo, Sagaing than Pindaya, Wundwin than Pindaya and Chaung Oo at 5% and 1% level respectively (Table: 2; Fig: 3).

Number of florets per spike

The range between 70 and 80 florets number per spike was observed on cultivars Chaung Oo Kyone Phyu while range between 50 and 60 was observed on Monywa Kyone Phyu (Fig: 4). Although these two kinds of Kyone Phyu showed the highest and lowest number of florests per spike comparison between Sintkaing and Sagaing, Sintkaing and Pindaya, Sagaing and Pindaya, Sagaing and Monywa Kyone Phyu didn't exhibit significantly differences from one to another (Table: 3; Fig: 4).

Table 2 Comparison between the spike length, number of spikelets per spike and density of spikelet of *Triticum aestivum* L. cultivar Kyone Phyu from six different collection sites.

No.	Comparison	Spike Length		Number of Spikelet per spike		Density of spikelet	
		Mean ± S.E	't' Value	Mean ± S.E	't' Value	Mean ± S.E	't' Value
1	SK-WD	9.167 ± 0.898 8.850 ± 1.089	1.209ns	17.867 ± 1.454 17.267 ± 1.153	1.739ns	1.966 ± 0.238 1.984 ± 0.308	-0.250ns
2	SK-SG	9.167 ± 0.898 8.683 ± 1.012	1.927ns	17.867 ± 1.454 16.367 ± 1.722	3.580**	1.966 ± 0.238 1.916 ± 0.358	0.625ns
3	SK-PDY	9.167 ± 0.898 9.817 ± 1.242	-2.285*	17.867 ± 1.454 16.767 ± 1.453	2.880**	1.966 ± 0.238 1.730 ± 0.234	3.806**
4	SK-CO	9.167 ± 0.898 9.450 ± 0.943	-1.171ns	17.867 ± 1.454 17.067 ± 1.590	2.000ns	1.966 ± 0.238 1.824 ± 0.253	2.185*
5	SK-MY	9.167 ± 0.898 7.583 ± 0.708	7.472**	17.867 ± 1.454 15.933 ± 1.031	5.843**	1.966 ± 0.238 2.118 ± 0.236	-2.452*
6	WD-SG	8.850 ± 1.089 8.683 ± 1.012	0.605ns	17.267 ± 1.153 16.367 ± 1.722	2.338*	1.984 ± 0.308 1.916 ± 0.358	0.773ns
7	WD-PDY	8.850 ± 1.089 9.817 ± 1.242	-3.150**	17.267 ± 1.153 16.767 ± 1.453	1.453ns	1.984 ± 0.308 1.730 ± 0.234	3.528**
8	WD-CO	8.850 ± 1.089 9.450 ± 0.943	-2.239*	17.267 ± 1.153 17.067 ± 1.590	0.548ns	1.984 ± 0.308 1.824 ± 0.253	2.162*
9	WD-MY	8.850 ± 1.089 7.583 ± 0.708	5.257**	17.267 ± 1.153 15.933 ± 1.031	4.648**	1.984 ± 0.308 2.118 ± 0.236	-1.861ns
10	SG-PDY	8.683 ± 1.012 9.817 ± 1.242	-3.818**	16.367 ± 1.722 16.767 ± 1.453	-0.957ns	1.916 ± 0.358 1.730 ± 0.234	2.325*
11	SG-CO	8.683 ± 1.012 9.450 ± 0.943	-2.984**	16.367 ± 1.722 17.067 ± 1.590	-1.609ns	1.916 ± 0.358 1.824 ± 0.253	1.136ns
12	SG-MY	8.683 ± 1.012 7.583 ± 0.708	4.803**	16.367 ± 1.722 15.933 ± 1.031	1.164ns	1.916 ± 0.358 2.118 ± 0.236	-2.525*
13	PDY-CO	9.817 ± 1.242 9.450 ± 0.943	1.270ns	16.767 ± 1.453 17.067 ± 1.590	-0.750ns	1.730 ± 0.234 1.824 ± 0.253	-1.469*
14	PDY-MY	9.817 ± 1.242 7.583 ± 0.708	8.430**	16.767 ± 1.453 15.933 ± 1.031	2.520*	1.730 ± 0.234 2.118 ± 0.236	-6.258**
15	CO-MY	9.450 ± 0.943 7.583 ± 0.708	8.525**	17.067 ± 1.590 15.933 ± 1.031	3222**	1.824 ± 0.253 2.118 ± 0.236	-4.594**

S.E = Standard Error; Ns = Nonsignificant; * , ** = significantly different at 5% and 1% level respectively
S.K = Sintkaing; WD = Wundwin; SG = Sagaing; PDY = Pindaya; CO = Chaung Oo; MY = Monywa.

Table 3 Comparison between the number of florets per spikelet, number of florets per spike and fertility of 1st and 2nd florets of *Triticum aestivum* L. cultivar Kyone Phyu from six different collection sites.

No	Comparison	Numbers of florets per spikelet		Number of florets per spike		Fertility of 1st and 2nd floret	
		Mean ± S.E	't' Value	Mean ± S.E	't' Value	Mean ± S.E	't' Value
1	SK-WD	3.422 ± 0.535 4.135 ± 0.287	-6.310**	56.567 ± 9.222 62.567 ± 7.352	-2.740*	26.800 ± 3.655 26.967 ± 5.480	-0.137ns
2	SK-SG	3.422 ± 0.535 3.516 ± 0.374	-0.777ns	56.567 ± 9.222 54.667 ± 8.183	0.830ns	26.800 ± 3.655 29.167 ± 4.906	-2.084*
3	SK-PDY	3.422 ± 0.535 3.682 ± 0.379	-2.131*	56.567 ± 9.222 55.200 ± 7.521	0.619ns	26.800 ± 3.655 27.900 ± 3.953	-1.100ns
4	SK-CO	3.422 ± 0.535 4.230 ± 0.318	-6.966**	56.567 ± 9.222 71.200 ± 8.199	-6.387**	26.800 ± 3.655 30.667 ± 5.198	-3.277**
5	SK-MY	3.422 ± 0.535 3.351 ± 0.220	0.664ns	56.567 ± 9.222 51.300 ± 6.334	2.535*	26.800 ± 3.655 27.300 ± 5.928	-0.387ns
6	WD-SG	4.135 ± 0.287 3.516 ± 0.374	7.034**	62.567 ± 7.352 54.667 ± 8.183	3.867**	26.967 ± 5.480 29.167 ± 4.906	-1.611ns
7	WD-PDY	4.135 ± 0.287 3.682 ± 0.379	5.148**	62.567 ± 7.352 55.200 ± 7.521	3.772**	26.967 ± 5.480 27.900 ± 3.953	-0.797ns
8	WD-CO	4.135 ± 0.287 4.230 ± 0.318	-1.188ns	62.567 ± 7.352 71.200 ± 8.199	-4.222**	26.967 ± 5.480 30.667 ± 5.198	-2.637*
9	WD-MY	4.135 ± 0.287 3.351 ± 0.220	11.701**	62.567 ± 7.352 51.300 ± 6.334	6.252**	26.967 ± 5.480 27.300 ± 5.928	-0.222ns
10	SG-PDY	3.516 ± 0.374 3.682 ± 0.379	-1.677 ns	54.667 ± 8.183 55.200 ± 7.521	-0.258ns	29.167 ± 4.906 27.900 ± 3.953	1.026ns
11	SG-CO	3.516 ± 0.374 4.230 ± 0.318	-7.846**	54.667 ± 8.183 71.200 ± 8.199	-7.686**	29.167 ± 4.906 30.667 ± 5.198	-1.130ns
12	SG-MY	3.516 ± 0.374 3.351 ± 0.220	2.037ns	54.667 ± 8.183 51.300 ± 6.334	1.752ns	29.167 ± 4.906 27.300 ± 5.928	1.307ns
13	PDY-CO	3.682 ± 0.379 4.230 ± 0.318	-5.957**	55.200 ± 7.521 71.200 ± 8.199	-7.744**	27.900 ± 3.953 30.667 ± 5.198	2.281ns
14	PDY-MY	3.682 ± 0.379 3.351 ± 0.220	4.068**	55.200 ± 7.521 51.300 ± 6.334	2.136*	27.900 ± 3.953 27.300 ± 5.928	0.454ns
15	CO-MY	4.230 ± 0.318 3.351 ± 0.220	12.208**	71.200 ± 8.199 51.300 ± 6.334	10.343**	30.667 ± 5.198 27.300 ± 5.928	2.300*

S.E = Standard Error; Ns = Nonsignificant; * , ** = significantly different at 5% and 1% level respectively
S.K = Sintkaing; WD = Wundwin; SG = Sagaing; PDY = Pindaya; CO= Chaung Oo; MY = Monywa.

Table 4 Comparison between the number of seeds per spikelet, number of seeds per spike, fertility of seeds per spike and number of tillers per plant of *Triticum aestivum* L. cultivar Kyone Phyu from six different collection sites.

No.	Comparison	Number of seeds per spikelet		Number of Seeds per spike		Fertility of Seeds per spike		Number of tillers per plant	
		Mean ± S.E	**'t' Value**	**Mean ± S.E**	**'t' Value**	**Mean ± S.E**	**'t' Value**	**Mean ± S.E**	**'t' Value**
1	SK-WD	2.019 ± 0.375 2.533 ± 0.206	-6.425**	26.900 ± 5.031 35.500 ± 3.234	-8.125**	25.500 ± 4.849 34.667 ± 3.534	-8.229*	3.033 ± 1.278 4.233 ± 1.257	-3.604**
2	SK-SG	2.019 ± 0.375 2.813 ± 0.248	-9.452**	26.900 ± 5.031 40.467 ± 3.490	-9.441**	25.500 ± 4.849 39.500 ± 3.677	-12.389**	3.033 ± 1.278 3.967 ± 1.251	-2.813**
3	SK-PDY	2.019 ± 0.375 3.483 ± 0.352	-15.250**	26.900 ± 5.031 54.233 ± 4.161	-22.965**	25.500 ± 4.849 53.433 ± 4.287	-23.339**	3.033 ± 1.278 4.700 ± 1.754	-4.136**
4	SK-CO	2.019 ± 0.375 3.350 ± 0.257	-8.067**	26.900 ± 5.031 55.933 ± 4.711	-23.071**	25.500 ± 4.849 54.400 ± 4.439	-23.669*	3.033 ± 1.278 4.733 ± 1.632	-4.416**
5	SK-MY	2.019 ± 0.375 2.319 ± 0.230	-3.659**	26.900 ± 5.031 32.767 ± 4.161	-5.253**	25.500 ± 4.849 32.033 ± 4.154	-5.508**	3.033 ± 1.278 4.200 ± 1.275	-3.484**
6	WD-SG	2.533 ± 0.206 2.813 ± 0.248	-4.667**	35.500 ± 3.324 40.467 ± 3.490	-5.550**	34.667 ± 3.534 39.500 ± 3.667	-5.103**	4.233 ± 1.257 3.967 ± 1.251	0.809^{ns}
7	WD-PDY	2.533 ± 0.206 3.483 ± 0.352	-12.500**	35.500 ± 3.324 54.233 ± 4.161	-18.941**	34.667 ± 3.534 53.433 ± 4.287	-18.184**	4.233 ± 1.257 4.700 ± 1.754	-1.165^{ns}
8	WD-CO	2.533 ± 0.206 3.350 ± 0.257	-5.237**	35.500 ± 3.324 55.933 ± 4.711	-19.078**	34.667 ± 3.534 54.400 ± 4.439	-18.722**	4.233 ± 1.257 4.733 ± 1.632	-1.309^{ns}
9	WD-MY	2.533 ± 0.206 2.319 ± 0.230	3.754**	35.500 ± 3.324 32.767 ± 4.161	2.763**	34.667 ± 3.534 32.033 ± 4.159	2.600*	4.233 ± 1.257 4.200 ± 1.275	0.099^{ns}
10	SG-PDY	2.813 ± 0.248 3.483 ± 0.352	-8.375**	40.467 ± 3.490 54.233 ± 4.161	-13.657**	39.500 ± 3.677 53.433 ± 4.287	-13.282**	3.967 ± 1.251 4.700 ± 1.754	-1.833^{ns}
11	SG-CO	2.813 ± 0.248 3.350 ± 0.257	-3.442**	40.467 ± 3.490 55.933 ± 4.711	-14.202**	39.500 ± 3.677 54.400 ± 4.439	-13.925**	3.967 ± 1.251 4.733 ± 1.632	-2.005^{ns}
12	SG-MY	2.813 ± 0.248 2.319 ± 0.257	7.841**	40.467 ± 3.490 32.767 ± 4.161	7.639**	39.500 ± 3.677 32.033 ± 4.159	7.242**	3.967 ± 1.251 4.200 ± 1.275	-0.702^{ns}
13	PDY-CO	3.483 ± 0.352 3.350 ± 0.257	0.816^{ns}	54.233 ± 4.161 55.933 ± 4.711	-1.457^{ns}	53.433 ± 4.287 54.400 ± 4.439	-0.844^{ns}	4.700 ± 1.754 4.733 ± 1.632	-0.074^{ns}
14	PDY-MY	3.483 ± 0.352 2.319 ± 0.230	16.394**	54.233 ± 4.161 32.767 ± 4.161	19.640**	53.433 ± 4.287 32.033 ± 4.159	19.797**	4.700 ± 1.754 4.200 ± 1.275	1.241^{ns}
15	CO-MY	3.350 ± 0.257 2.319 ± 0.230	11.988**	55.933 ± 4.711 32.767 ± 4.161	19.851**	54.400 ± 4.439 32.033 ± 4.159	19.794**	4.733 ± 1.632 4.200 ± 1.275	1.384^{ns}

S.E = Standard Error; Ns = Nonsignificant; * , ** = significantly different at 5% and 1% level respectively
S.K = Sintkaing; WD = Wundwin; SG = Sagaing; PDY = Pindaya; CO= Chaung Oo; MY = Monywa.

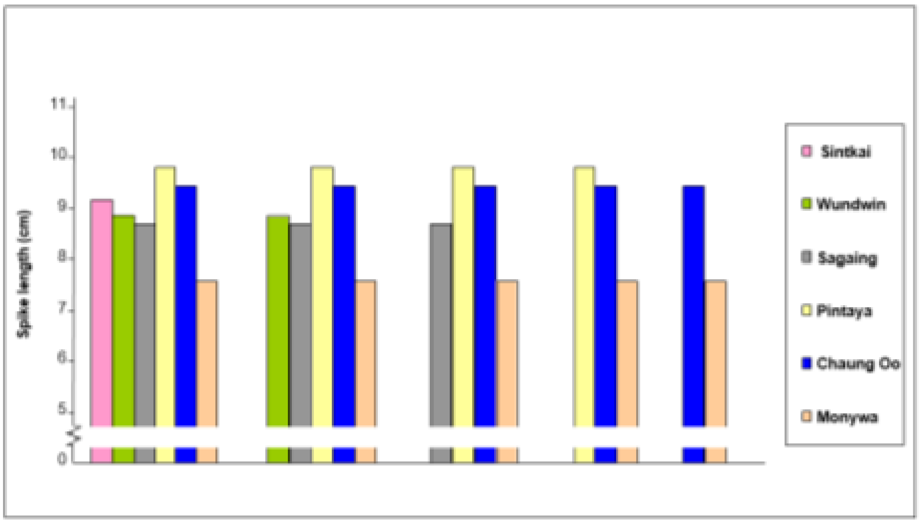

Figure 1 Comparison on spike length of *Triticum aestivum* L. cultivar Kyone phyu from six different collection sites.

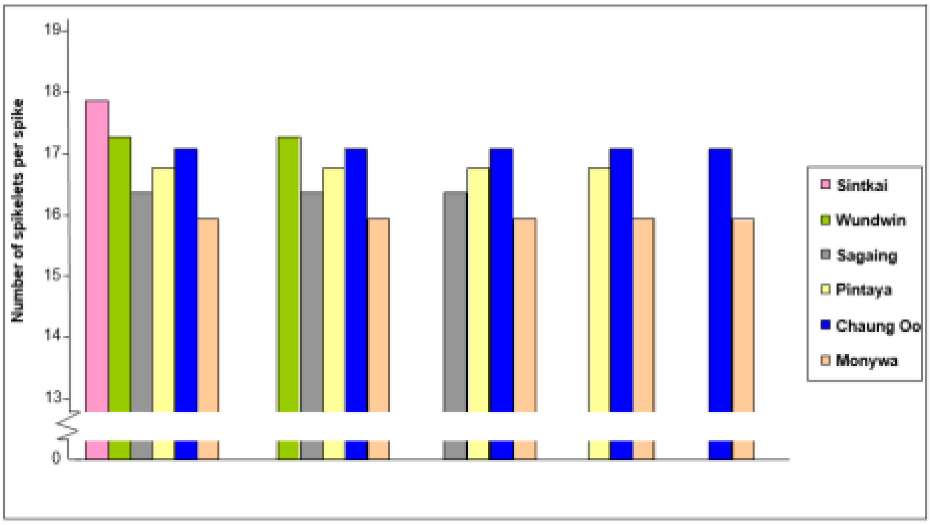

Figure 2 Comparison on number of spikelets per spike of *Triticum aestivum* L. cultivar Kyone phyu from six different collection sites.

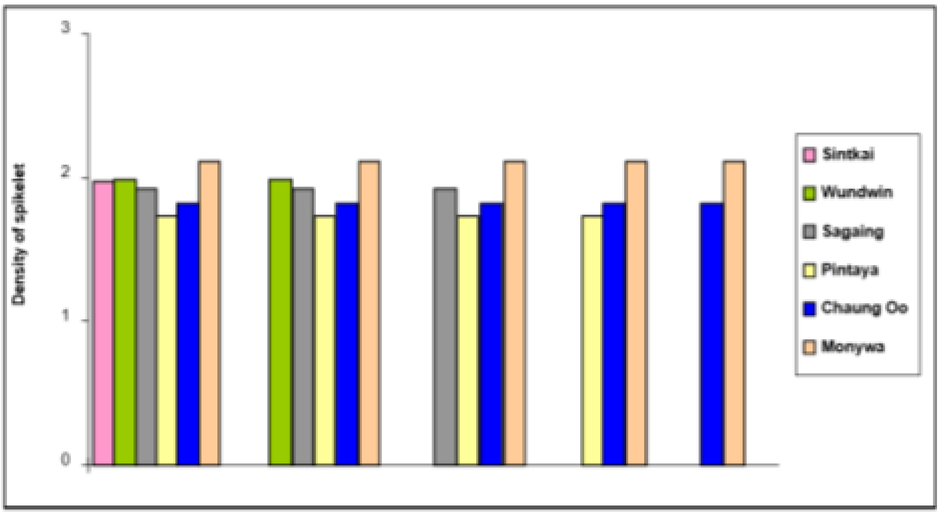

Figure 3 Comparison on density of spikelet of *Triticum aestivum* L. cultivar Kyone phyu from six different collection sites.

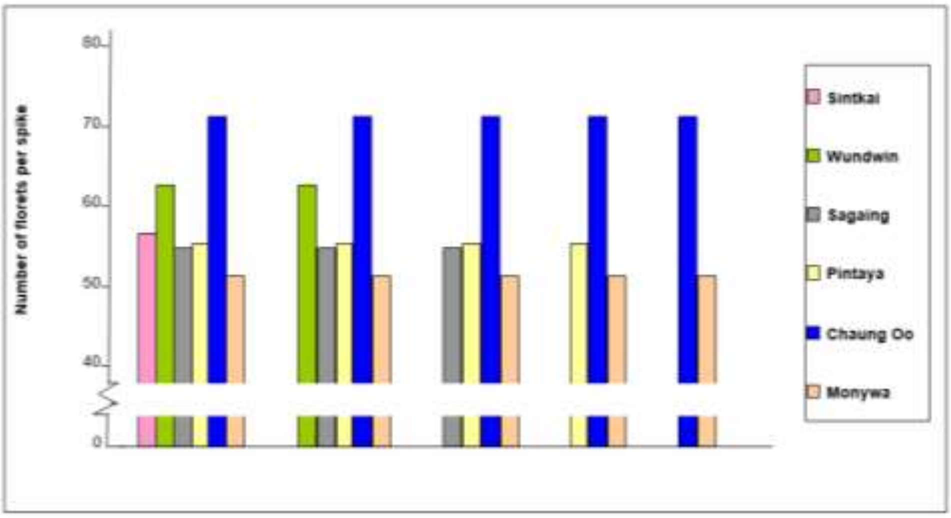

Figure 4 Comparison on number of florets per spike of *Triticum aestivum* L. cultivar Kyone phyu from six different collection sites.

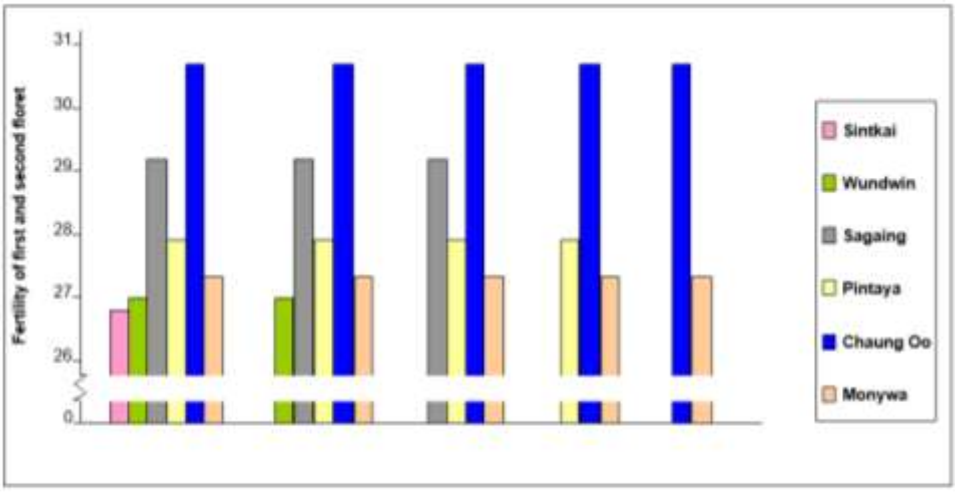

Figure 5 Comparison on fertility of 1st and 2nd floret of *Triticum aestivum* L. cultivar Kyone phyu from six different collection sites.

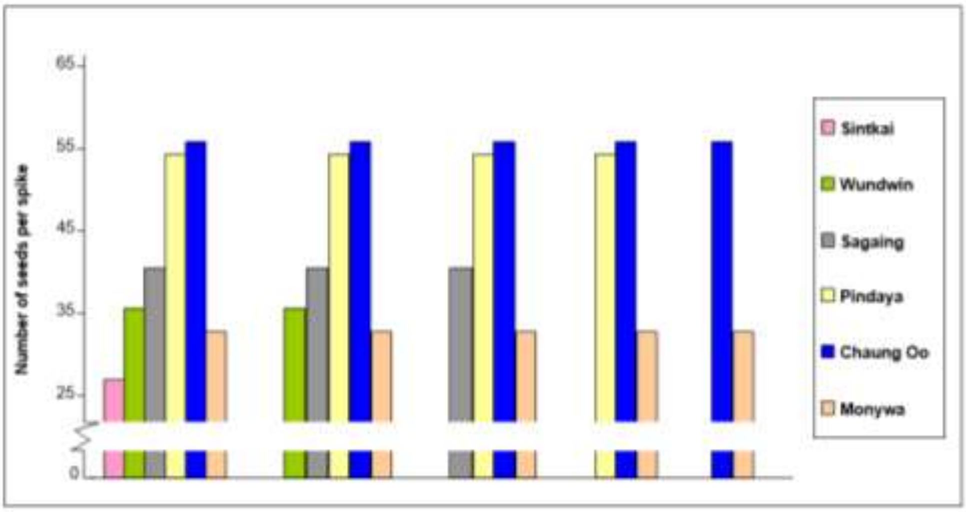

Figure 6 Comparison on number of seeds per spike of *Triticum aestivum* L. cultivar Kyone phyu from six different collection sites.

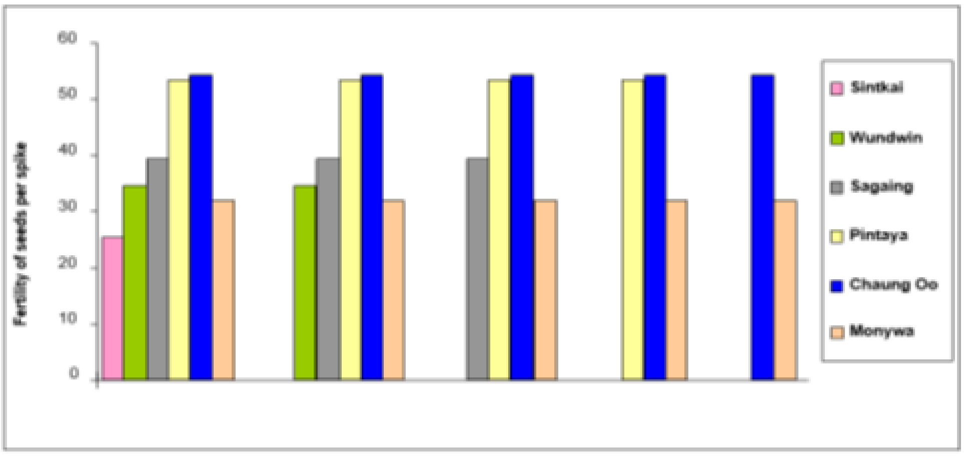

Figure 7 Comparison on fertility of seeds per spike of *Triticum aestivum* L. cultivar Kyone phyu from six different collection sites.

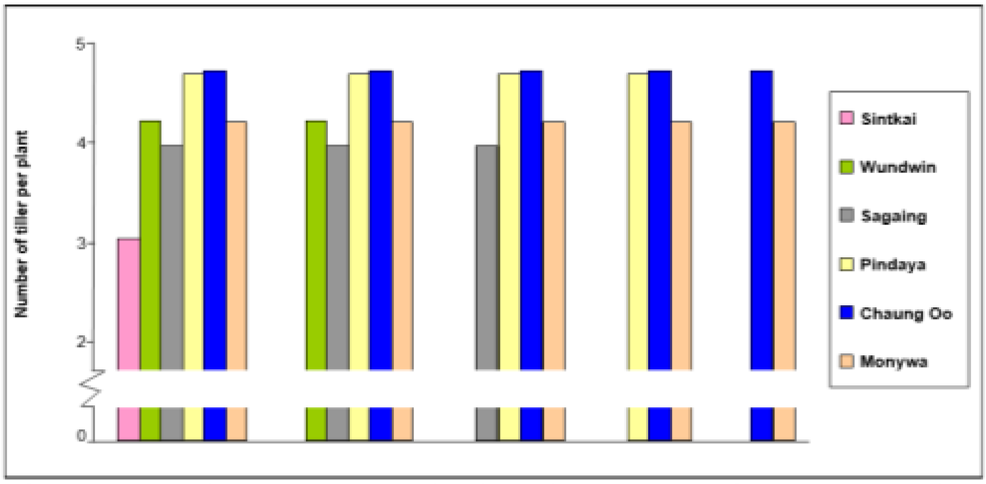

Figure 8 Comparison on number of tiller per plant of *Triticum aestivum* L. cultivar Kyone phyu from six different collection sites.

Fertility of 1st and 2nd florets

Chaung Oo Kyone Phyu have the highest fertility of 1st and 2nd florets have 30.667 in fertility while Sintkaing Kyone Phyu resulted the lowest fertility having only26.80 (Table: 3). Comparison between Kyone Phyu of Sintkaing with Sagaing, Wundwin with Chaung Oo, Chaung Oo with Monywa exhibited significantly differences at 5% level, while comparison of Sintkaing with Chaung Oo Kyone Phyu showed significantly difference at 1% level of fertility on 1st and 2nd florets, the other comparison did not result any differences respectively (Table: 3; Fig: 5).

Number of seeds per spike

Sintkaing Kyone Phyu have the lowest mean number of seeds per spike which followed by Monywa Kyone Phyu (Table: 4). When comparison made among the cultivars Kyone Phyu from six different collection sites, only the comparison between Kyone Phyu of Pindaya with Chaung Oo did not show significantly different from one to another while the rest fourteen comparisons resulted significantly differences at 1% level respectively (Table:4; Fig: 6).

Fertility of seeds per spike

Kyone Phyu of Chaung Oo and Sintkaing have the highest and lowest fertility of seeds per spike among the cultivars Kyone Phyu from six different collection sites studies for the fertility of seeds per spike character showed that Kyone Phyu as similar number of seeds per spike characters, except comparison between Pindaya with Chaung Oo Kyone Phyu that they didn't show any significant differences from one to another and the other comparison were observed significantly differences at 1% level (Table: 4; Fig: 7).

Number of tillers per plant

Chaung Oo Kyone Phyu have 4.733 tillers per plant, the highest mean number and Sintkaing Kyone Phyu have 3.033 tillers per plant, which is the smallest number among the cultivars Kyone Phyu studied from six different collection sites. By using equal student 't' test and compared among the cultivars Kyone Phyu from six different collection sites, it was observed that except Sintkaing Kyone Phyu resulted significantly inferior than the rest cultivars Kyone Phyu of five different collection sites, the rest cultivars Kyone Phyu of five different collection sites exhibit that they haveno significantly differences from one to another at 5% and 1% level respectively (Table: 4, Fig: 8).

Discussion

Transformation in morphological characters as well as chromosomal characters in number of speciesof Family Graminae have been demonstrated by Lorz *et al*., (1985), Hsan (1990) stated that this transformation in characters is largely influenced by the environmental condition such as light, temperature, availability of water an available of nutrition in the cultivated soils. There are many research works with environment related to wheat culms, tillers, spike, ear, and yield characters and many reliable data concerning with wheat and the concepts and facts are available.

In the present study it was also observed that cultivar Kyone Phyu grown in Pindaya exhibited more resistant to leaf rust showed that the environmental condition is also one of the Key factor of controlling leaf rust. The present data also exhibit that cultivar Kyone Phyu have wide range of adaptability.

Khin Than Htwe (1997) stated that some morphological characters on hexaploid wheat cultivar Kyone Phyu have been studied in Myanmar. Khin Mg Oo (1980) stated that the local wheat variety Kyone Phyu that have low spike density and lesser number of florets per spike and chromosome diminution (i.e. a shorter chromosome complement) have somewhat influence by the environment.

Spike length, number of spikelet per spike, density of spikelet, number of florets per spike, fertility of first and second florets, number of seeds per spike, fertility of seed per spike are the factors that have a key role in yield characters (Sears & Sears, 1978). These characters is mainly found superior in wheat plants with branching characters compared to those with no branching characters (Hsan, 1990, Hla Myint Than, 1997).

In the present investigation, it was observed that Kyone Phyu of Monywa have significantly superior in spike length than the other five cultivars Kyone Phyu (Table: 2). Number of spikelet per spike of Monywa Kyone Phyu have significantly the highest numbers that followed by Wundwin Kyone Phyu. For fertility of 1st and 2nd florets, Chaung Oo Kyone Phyu showed significantly superior than Sintkaing Kyone Phyu and first and second florets of Sintkanig and Sagaing Kyone Phyu (Table: 3).

Tiller number of individual plants of hexaploid wheat cultivar Kyone Phyu i.e. Sintkaing with Wundwin, Sagaing, Pindaya, Chaung Oo and Monywa Kyone Phyu were significantly differences at 5% and 1% level respectively. The rest of all cultivars Kyone Phyu did not exhibit significantly difference. Spike characters of cultivars Kyone phyu from six different collection sites were described in plate (Plate: 2 and 3).

In the present investigation, it was observed the spike and seed characters, of even a cultivar have been varied slightly from one to another collection sites. It showed that it may be the effect of the seasonal condition i.e. soil, elevation as well as available water. Awn character that is one of the spike characters seems to be due to the adaptability of the cultivar. This research is carried out to growth character of the some cultivars cultivated in different places.

Thus, the present results showed that the present finding will be useful to create good future outcome for the cultivated wheat in both cultivation as well as in improvement process. The result of present finding will serve as an important informations for those who are going to carried out their further research works with local cultivar Kyone phyu in Myanmar.

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