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Adaptability of the Prospective of IPB Cayenne Pepper Varieties (*Capsicum frutescens* L.) in South Sumatra Tidal Lands

Uji Adaptasi Calon Varietas Cabai Rawit (*Capsicum frutescens L.*) *IPB di Lahan Pasang Surut Sumatera Selatan*

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ABSTRAK

Pengujian daya adaptasi calon varietas cabai rawit IPB di lahan pasang surut Sumatera Selatan telah dilaksanakan pada bulan Juli 2020 hingga Februari 2021 di Desa Banyu Urip Kecamatan Tanjung Lago Kabupaten Banyuasin Sumatera Selatan. Tujuan penelitian untuk mendapatkan calon varietas yang berpotensi untuk dikembangkan di lahan pasang surut. Pengujian menggunakan Rancangan Acak Kelompok dengan 3 ulangan. Perlakuan varietas cabai rawit IPB, terdiri dari 5 calon varietas (F10-145291-10-7-1-1-2-1-3B, F11-145291-115-15-8-1-1-2-5-3B, F11-160291-3-12-5-51-1-1-2-2-B, F8-145291-14-9-3-12-1B, F10-145174-9-71-5-3-1-2B) dan 5 varietas komersil (Harita, Gennie, Bara, Lentera, Baskara) sebagai varietas pembanding. Cabai ditanam pada petak berukuran 3 m x 5 m dengan jarak tanam 60 cm x 70 cm. Analisis ragam menggunakan uji F dan uji lanjut BNJ. Calon varietas cabai rawit IPB F8-145291-14-9-3-12-1B, F11-160291-3-12-5-51-1-1-2-2-B dan F10-145291-10-7-1-1-2-1-3B berpotensi untuk dikembangkan di lahan pasang surut Sumatera Selatan dengan produktivitas masing-masing 7.89 t/ha, 7.82 t/ha dan 7.21 t/ha.

Kata kunci: pemuliaan, varietas pembanding, produksi

ABSTRACT

Adaptability of the prospective of IPB cayenne pepper varieties in tidal lands of South Sumatra was carried out from July 2020 to February 2021 in Banyu Urip Village, Tanjung Lago Subdistrict, Banyuasin District, South Sumatra. The research aimed to obtain prospective varieties that potential to be developed in tidal lands. The test used a Randomized Block Design with 3 replications. The treatment consisted of 5 prospective varieties of IPB cayenne pepper (F10-145291-10-7-1- 1-2-1-3B, F11-145291-115-15-8-1-1-2-5-3B, F11-160291-3-12-5-51-1-1-2-2-B, F8-145291-14-9-3-12- 1B, F10-145174-9-71-5-3-1-2B) and 5 commercial varieties (*Harita, Gennie, Bara, Lentera, Baskara*) as comparing varieties. Chilli was planted on a plot of 3 m x 5 m with a spacing of 60 cm x 70 cm. The analysis of variance used the F test and the HSD follow-up test. Prospective varieties of IPB cayenne pepper F8-145291-14-9-3-12-1B, F11-160291-3-12-5-51-1-1-2-2-

B and F10-145291-10-7-1-1-2-1-3B had the potential to be developed in tidal lands of South Sumatra with respective productivity of 7.89 t/ha, 7.82 t/ha and 7.21 t/ha.

Keywords: breeding, comparing varieties, production

INTRODUCTION

The need for chilli consumption is increasing as the population increases. Chilli production to meet the national needs does not show a significant increase and even tends to decrease. One of the factors that causes a decrease in production is due to a decreasein harvested area. According to the Ministry of Agriculture (2019), there was a decline in the harvested area of cayenne pepper in Indonesia from 172,847 ha in 2018 to 166,943 ha in 2019. The harvested area in South Sumatra also decreased for 3 consecutive years, from 1,966 ha in 2017, 1,576 ha in 2018, and 1,289 ha in 2019. The Ministry of Agriculture (2020) targeted an increase in production of 7% for all types of chilli. The production of cayenne pepper in 2019 was 1.37 million tons with a productivity of 7.8 t/ha. In 2020, the production of cayenne pepper was targeted to be 1.46 million tons, with a harvested area of 187,995 ha and a productivity of 7.8 t/ha.

It is necessary to continue to improve genetics and cultivation systems so that the chilli production is optimal to increase productivity. There are several efforts to increase the productivity of chilli plants, including through the assembly of new environmental-specific superior varieties (Syukur et al., 2010; Widyawati et al., 2014; Yunandra, et al., 2017). Through the use of superior varieties, it is expected to increase the chilli production to maintain a balance between supply and demand. However, it is necessary to pay attention to the level of adaptation of each variety to the environment, including suboptimal or marginal environments.

The area of tidal swamp lands as a suboptimal land in Indonesia is 20.11 million ha, approximately 9.53 million ha (47.39%) potential for agricultural activities. However, there is only 4.18 million ha (43.86%) of this potential lands having been reclaimed by the local residents and the government (Susilawati et al., 2017). The area of tidal paddy fields in South Sumatra is 227,330 ha, of which 166,317 ha (73.16%) is located in Banyuasin District, including in Tanjung Lago Subdistrict (Department of Agriculture of South Sumatra Province, 2016). Based on the area, the development and optimization of tidal land is very potential for the expansion of agriculturalland.

One of the efforts to increase chilli productivity is to adopt the new superior varieties adaptable to tidal lands. Various obstacles in tidal land, both soil type, overflow type and agro-ecosystem will greatly affect plant growth and production. For this reason, it isnecessary to conduct an in-depth study of prospective varieties of cayenne pepper. This research aimed to obtain the prospective varieties of IPB cayenne pepper that are superior and able to adapt well in the tidal land of Banyuasin District, South Sumatra Province, so that it has thepotential to be developed to increase their productivity, especially in the tidal land of South Sumatra.

MATERIALS AND METHODS

Materials and Methods

The materials used were 10 varieties of IPB cayenne pepper, seedling media, manure, dolomite, silver black plastic mulch, urea fertilizer, TSP, KCl, leaf fertilizer and pesticides. While the device used were seedling trays, stakes, hoe, sickle, scissors, knife, machete, Solo back sprayer, raffia string, scales, meter, calipers, labels, stationery and documentation.

Research Methodology

The study was carried out from July 2020 to February 2021 in potential acid sulfate tidal land with the type C overflow,

Banyu Urip Village, Tanjung Lago Subdistrict, Banyuasin District, South Sumatra Province.

The study used a randomized block design (RBD), with the treatment of chilli varieties from IPB, consisting of 5 tested prospective cayenne pepper varieties (F10-145291-10-7-1-1-2-1-3B, F11-145291-115-15-8-1-1-2-5-3B, F11-160291-3-12-5-51-1-1-2-2B, F8-145291-14-9-3-12-1B, F10-145174-9-71-5-3-1-2B) and 5 commercial varieties (Harita, Gennie, Bara, Lentera, Baskara) as comparing varieties. All varieties were the result of crosses from the Center for Tropical Horticultural Studies, IPB University. The treatment was repeated 3 times, so this study consisted of 30 experimental units (plots). The chilli planting plot was 3 m x 4 m in size, the distance between plots was 0.75 m and the distance between replicates was 1 m. In each plot, 10 sample plants were taken.

Cultivation techniques used were chilli cultivation standards. The seeding was on the seedling tray until the seedlings were 5 weeks old with compost, manure and husk charcoal (ratio 1:1:1). The land processing was conducted with a hand tractor followed by the application of 20 t/ha compost base fertilizer and dolomite lime on eachbed and then covered with black plastic mulch two weeks before transplanting. The drain ditches to regulate the entry and exit of tidal water were made around the land and boundaries between replicates. The five-week-old seedlings were planted after sowing witha spacing of 60 cm x70 cm. The plant maintenance included watering, embroidery, pruning, and stake installation. The fertilization with N 120 kg/ha, P2O5 80 kg/ha, K2O 120 kg/ha were applied at planting time, then the fertilizer N 330 kg/ha was given 3 times at theage of 15, 35 and 50 days after planting (DAP) and foliar fertilizer. The chemical pest and disease prevention and control were carried out every week, while the weed control was performed manually depending on the condition of the weeds in the land. Harvesting was conducted gradually with one week harvest interval for 10 harvests.

The variable observations were made by referring to the chilli plant descriptor of the International Plant Genetic Resources Institute (1999). The data were analyzed using the analysis of variance (ANOVA) with a further test of HSD at the 5% level. The relationship between variables was determined based on the Pearson correlation test. The data analysis used the SAS 9.0 program (Stroup et al., 2018).

RESULTS

Plant Growth

The results of analysis of variance showed that the treatment of IPB cayenne pepper varieties significantly affected the plant height, dichotomous height, stem diameter, leaf length, leaf width, flesh thickness, fruit length, fruit diameter, number of fruit per plant, weight per fruit, fruit weight per plant and productivity of chilli plants, but had nosignificant effect on the weight of 1,000 seeds, flowering and harvesting age of chilli plantsplanted in the tide land of South Sumatra (Table 1).

The highest plant height in the prospective varieties of F10-145291-10-7-1-1-2-1-3B (54.24 cm) was not significantly different from the prospective variety of F-11-160291-3-12-5-51-1-1-2-2-B (47.54 cm), F-8-145291-14-9-3-12-1B (52.32 cm), and the comparing varieties of Gennie, Bara, Lantern, and Baskara which had a plant height of 53.68 cm, 51.28 cm, 52.24 cm, and 50.66 cm respectively (Table 2). The data in Table 2 showed that the highest dichotomous height in the comparing variety of Gennie (32.14 cm) was significantly different from all tested varieties and other comparing varieties. The lowest dichotomous occurred in the comparing genotype Harita with an average dichotomous height of 20.01 cm.

The largest stem diameter was found in the prospective variety of F10-145291-10-7-1-1-2-1-3B (1.67 cm), not significantly different from the prospective variety F-11-

145291-115-15-8-1-1-2-5-3B (1.62 cm) and F-11-160291-3-12-5-51-1-1-2-2-B (1.50 cm), but significantly different from the other two prospective varieties and all comparing varieties (Table 2).

The longest leaves on the prospective variety of F-10-145174-9-71-5-3-1-2B with an average of 13.24 cm, and the shortest leaves on the prospective variety of F-11-145291-115-15-8-1-1-2-5-3B with an average leaf length of 7.29 cm, significantly different from other prospective varieties and all comparing varieties. Meanwhile, the widest leaves were found in the comparing variety Baskara (3.99 cm) which was not significantly different from that of Gennie (3.97 cm), and the prospective variety of F10-145291-10-7-1-1-2-1-3B and F8-145291-14-9-3-12-1B which had leaf widths of 3.79 cm and 3.86 cm (Table 3).

The treatment of cayenne pepper varieties had no significant effect on the flowering and harvesting age (Table 1). Flowering age of cayenne pepper varieties tabulated in Table 3 ranged from 82.00-84.33 DAP, while the harvesting age ranged from 109.00-111.33 DAP.

Table 1. The results of the analysis of variance on the growth and production of IPB cayennepepper in tidal lands of South Sumatra

The Observed Variables	F Calculate
Plant height (cm)	3.08 *
Dichotomous height (cm)	7.08 *
Stem diameter (cm)	4.66 *
Leaf length (cm)	2.72 *
Leaf width (cm)	10.45 *
Flowering age (dap)	1.00 ns
Harvest age (dap)	0.73 ns
Thickness of flesh (mm)	4.32 *
Fruit length (cm)	18.54 *
Fruit diameter (cm)	9.12 *
Weight of 1,000 seeds (g)	0.71 ns
Number of fruit per plant	4.79 *
Weight per fruit (g)	3.48 *
Fruit weight per plant (g)	4.92 *
Chilli plant productivity (t/ha)	4.92 *

Note: * = significant effect, ns = not significant effect based on variance analysis

Table 2. Average plant height, dichotomous height, and stem diameter of IPB cayenne pepper in tidal land of South Sumatra

Variety Treatment	Plant Height (cm)	Dichotomous Height (cm)	Stem Diameter (cm)
Variety prospects			
F10-145291-10-7-1-1-2-1-3B	54.24 a	27.25 bc	1.67 a
F11- 145291-115-15.8-1-1-2-5-3B	37.98 d	23.49 d	1.62 a
F11-160291-3-12-5-51-1-1-2-2-B	47.58 abc	23.81 d	1.50 ab
F8-145291-14-9-3-12-1B	52.32 ab	25.49 cd	1.38 bc
F10-145174-9-71-5-3-1-2B	42.66 cd	23.74 d	1.32 c
Comparing varieties			
Harita	44.99 bcd	20.01 e	1.30 c
Gennie	53.68 a	32.14 a	1.38 bc
Bara	51.28 ab	28.68 b	1.32 c
Lentera	52.24 ab	23.78 d	1.36 bc
Baskara	50.66 ab	24.48 cd	1.37 bc

Note: The mean number followed by different letters in each variable means that the treatment is significantly different based on the BNJ test at 5% level

Crop Production

The prospective variety of F-8-145291-14-9-3-12-1B had the thickest flesh (1.07 mm) significantly different from the other varieties, except with prospective varieties of F10-145291-10-7-1-1-2-1-3B, F-11-145291-115-15-8-1-1-2-5-3B and the comparing variety of Baskara which had fruit thickness of 0.92 cm, 1.05 cm and 0.90 cm, respectively (Table 4) .

Based on the average data in Table 4, the prospective variety of F-11-160291-3-12-5-51-1-1-2-2-B had an average fruit length of 5.13 cm, not significantly different from that of the comparing varieties of Baskara (5.44 cm) and Lantern (5.95 cm).

The prospective varieties of F8-145291-14-9-3-12-1B and F10-145174-9-71-5-3-1-2B had an average fruit diameter of 0.87 cm, not significantly different from that of comparing varieties of Lentera (0.87 cm) and Baskara which had a larger fruit diameter of 0.90 cm (Table 4).

The data in Table 1 shows that the treatment of cayenne pepper varieties had no significant effect on the weight of 1,000 seeds. The prospective variety of F10-145174-9-71-5-3-1-2B presents the heaviest weight of 1000 seeds of 7.37 g. Meanwhile, the lightest weight of 1,000 seeds was produced by the comparing variety Gennie of 6.70 g (Table 4).

The prospective variety of F10-145291-10-7-1-1-2-1-3B produced the highest number of fruits per plant (482.18 pieces), not significantly different from the prospective varieties of F-11-160291-3-12-5-51-1-1-2-2-B (418.40 pieces), F8-145291-14-9-3-12-1B (396.33 pieces) and comparing varieties Gennie (441.03 pieces) and Bara (430.63 pieces) (Table 5). There was a positive correlation between the number of fruits per plant and plant height (Table 6), the prospective varieties of F10-145291-10-7-1-1-2-1-3B, F11-160291-3-12-5-51-1-1-2-2-B, F8-145291-14-9-3-12-1B and comparing varieties of Gennie and Bara having high plant height characters (Table 2) produced a higher number of fruits per plant (Table 5).

The weight per fruit of all prospective varieties of cayenne pepper was still lower than that of comparing varieties. The heaviest chillies produced by the comparing variety of Lentera (2.67 g) were not significantly different from those of Baskara (2.32 g), but significantly different from the other varieties (Table 5). There was a relationship between weight per fruit and fruit length (Table 6). The weight per fruit was heavier in the prospective varieties of F11-160291-3-12-5-51-1-1-2-2-B and F8-145291-14-9-3-12-1B and the comparing varieties of Lentera and Baskara because they were supported by longer fruit (Table 5).

The heaviest fruit weight per plant was produced by the comparing variety Lentera (608.93 g), which was significantly different from those of all varieties. The lowest fruit weight per plant was in the prospective variety of F11-145291-115-15-8-1-1-2-5-3B, with an average of 192.62 g (Table 5). There was a correlation between the plant height, number of fruit per plant, fruit length and weight per fruit with fruit weight per plant (Table 6). The prospective varieties of F11-160291-3-12-5-51-1-1-2-2-B and F8-145291-14-9-3-12-1B and the comparing varieties of Lentera and Baskara produced heavier fruit weight per plant because they were supported by higher plant characters, more fruit per plant, longer fruit and heavier weight per fruit.

The cayenne pepper productivity was correlated with fruit weight per plant which was influenced by the plant height, fruit length, number of fruits per plant and weight per fruit (Table 6). The productivity of prospective varieties of F8-145291-14-9-3-12-1B, F11- 160291-3-12-5-51-1-1-2-2-B and F10-145291-10-7-1-1-2-1-3B respectively 7.89 t/ha, 7.82 t/ha and 7.21 t/ha, not significantly different from the productivity of the comparing varieties of Baskara (8.89 t/ha) and Lentera which produced the highest productivity of namely 9.74 t/ha (Table 5).

Table 3. Average leaf length, leaf width, flowering age and harvest age of IPB cayenne pepper in tidal land of South Sumatra

Variety treatment	Leaf Length (cm)	Leaf Width (cm)	Flowering Age (dap)	Harvest Age (dap)
Variety prospects				
F10-145291-10-7-1-1-2-1-3B	9.80 b	3.79 ab	82.00	109.00
F11- 145291-115-15.8-1-1-2-5-3B	7.29 c	2.74 e	82.00	111.33
F11-160291-3-12-5-51-1-1-2-2-B	9.12 b	3.02 de	82.00	109.00
F8-145291-14-9-3-12-1B	9.46 b	3.86 ab	82.00	109.00
F10-145174-9-71-5-3-1-2B	13.24 a	2.86 de	82.00	111.33
Comparing varieties				
Harita	9.50 b	3.18 cd	84.33	109.00
Gennie	9.28 b	3.97 a	82.00	111.33
Bara	9.51 b	3.55 bc	82.00	109.00
Lentera	9.81 b	2.63 e	82.00	111.33
Baskara	10.10 b	3.99 a	82.00	109.00

Note: The mean number followed by different letters in each variable means that the treatment is significantly different based on the BNJ test at 5% level

Table 4. Average thickness of flesh, fruit length, fruit diameter and weight of 1,000 seeds of IPB cayenne pepper in tidal land of South Sumatra

Variety Treatment	Thickness of Flesh (mm)	Fruit Length (cm)	Fruit Diameter (cm)	Weight of 1,000 Seeds (g)
Variety prospects				
F10-145291-10-7-1-1-2-1-3B	0.92 abc	3.67 de	0.75 d	6.50
F11- 145291-115-15.8-1-1-2-5-3B	1.05 ab	3.93 cd	0.82 bc	6.43
F11-160291-3-12-5-51-1-1-2-2-B	0.65 d	5.13 b	0.72 d	5.73
F8-145291-14-9-3-12-1B	1.07 a	4.34 c	0.87 ab	5.90
F10-145174-9-71-5-3-1-2B	0.79 cd	3.35 e	0.87 ab	7.37
Comparing varieties				
Harita	0.79 cd	3.84 cde	0.83 b	6.57
Gennie	0.64 d	3.41 de	0.77 cd	5.70
Bara	0.75 cd	3.82 cde	0.73 d	6.33
Lentera	0.88 bc	5.95 a	0.87 ab	6.67
Baskara	0.90 abc	5.44 ab	0.90 a	6.70

Note: The mean number followed by different letters in each variable means that the treatment is significantly different based on the BNJ test at 5% level

Table 5. Average number of fruit per plant, weight per fruit, fruit weight per plant and productivity (t/ha) of IPB cayenne pepper in tidal land of South Sumatra

Variety Treatment	Number of Fruit Per Plant	Weight Per Fruit (g)	Fruit Weight Per Plant (g)	Chilli Plant Productivity (t/ha)
Variety Prospects				
F10-145291-10-7-1-1-2-1-3B	482.18 a	1.18 c	450.71 bc	7.21 bc
F11- 145291-115-15.8-1-1-2-5-3B	157.79 e	1.42 bc	192.62 e	3.08 e
F11-160291-3-12-5-51-1-1-2-2-B	418.40 abc	1.59 bc	488.47 bc	7.82 abc
F8-145291-14-9-3-12-1B	396.33 abc	1.67 bc	493.43 bc	7.89 abc
F10-145174-9-71-5-3-1-2B	291.00 d	1.35 bc	311.40 de	4.98 de
Comparing Varieties				
Harita	329.57 cd	1.36 bc	366.37 cd	5.86 cd
Gennie	441.03 ab	1.48 bc	437.03 bc d	6.99 bcd
Bara	430.63 abc	1.94 b	469.60 bc	7.51 bc
Lentera	369.63 bcd	2.67 a	608.93 a	9.74 a
Baskara	364.67 bcd	2.32 a	555.73 b	8.89 ab

Note: The mean number followed by different letters in each variable means that the treatment is significantly different based on the BNJ test at 5% level

Table 6. The results of the correlation test on the growth and production on IPB cayenne pepper in the tidal land of South Sumatra

	PH	DH	SD	LL	LW	FA	HA	TF	FL	FD	NF	W/F	W/P	P
PH	1.00	0.60*	-0.11	0.06	0.67*	-0.25	-0.34	-0.17	0.22	-0.18	0.91*	0.34	0.83*	0.83*
DH		1.00	0.08	-0.07	0.60*	-0.55	0.13	-0.30	-0.33	-0.45	0.56	-0.05	0.20	0.20
SD			1.00	-0.48	-0.04	-0.33	-0.01	0.35	-0.08	-0.38	-0.07	-0.40	-0.30	-0.30
LL				1.00	-0.03	-0.05	-0.02	-0.25	-0.15	0.34	0.14	-0.01	0.11	0.11
LW					1.00	-0.27	-0.13	-0.17	0.09	-0.15	-0.25	-0.27	-0.21	0.34
FA						1.00	-0.27	-0.13	-0.17	0.09	-0.15	-0.25	-0.21	-0.21
HA							1.00	-0.02	-0.12	0.25	-0.50	0.06	-0.36	-0.36
TF								1.00	0.12	0.54	-0.43	0.07	-0.16	-0.16
FL									1.00	0.32	0.32	0.83*	0.69*	0.69*
FD										1.00	-0.46	0.40	0.07	0.07
NF											1.00	0.08	0.71*	0.71*
W/F												1.00	0.72*	0.72*
W/P													1.00	0.99
P														1.00

Note: PH = plant height, DH = dichotomous height, SD = stem diameter, LL = leaf length, LW = leaf width, FA = flowering age, HA = harvest age, TF = thick flesh, FL = fruit length, FD = fruit diameter, NF = number of fruit, W/F = weight per fruit, W/P = weight per plant, P = productivity, * = real

DISCUSSION

Plant Growth

The growth of prospective varieties of IPB cayenne pepper showed no significant difference with that of commercial varieties as the comparing varieties grown in tidal land of South Sumatra. The prospective varieties of F10-145291-10-7-1-1-2-1-3B has the highest plant height, prospective varieties of F10-145291-10-7-1-1-2-1-3B, F-11-145291-115-15-8-1-1-2-5-3B and F11-160291-3-12-5-51-1-1-2-2-B had larger stem diameters, the prospective variety of F10-145174-9-71-5-3-1-2B possessed the longest leaves, and the prospective varieties of F10-145291-10-7-1-1-2-1-3B and F8145291-14-9-3-12-1B had broad leaves that were not significantly different from those of the comparing varieties (Table 2 & 3). The tested prospective varieties of chilli plants had growth diversity based on the genotype of each variety. The plant growth and development is a measure of the response of plant genetic characteristics to environmental factors in which they grow. According to Hayati (2012); Dermawan et al. (2019); and Fitria et al. (2021), the unequal response to the environmental factors where it grows is related to the genotype composition of each variety that affects the characteristics of genetic potential, ranging from morphological characteristics to production ability.

The flowering and harvesting ages of chilli plants were not significantly different between the prospective varieties and the comparing varieties (Table 3). The results were the same for the flowering and harvesting ages of curly chillies in tidal lands of South Sumatra (Mareza et al., 2021). Improvements to the character of flowering and harvestingage of chilli plants through breeding programs need to be carried out to produce better production components (Yunandra et al., 2017). The desired superior varieties of chilli plants are varieties that have characters including flowering age and early harvesting age (Pessoa et al., 2019).

Crop Production

The prospective varieties of F8-145291-14-9-3-12-1B, F10-145291-10-7-1-1-2-1-3B, and F11-145291-115-15-8-1-1-2-5-3B had thicker flesh than the comparing varieties (Table 4). The thickness of the flesh will affect the weight of the fruit per plant, with the thicker the flesh, the weight of the fruit per plant will also be heavier (Rahayu & Purnamaningsih, 2018).

The prospective variety of F11-160291-3-12-5-51-1-1-2-2-B had an average fruit length that was not significantly different from the that of comparing varieties of Lentera and Baskara (Table 4). According to Syukur and Rosidah (2014), genetic factors are very influential on the character of chilli fruit length. Several industrial activities in Indonesia, which use chilli as their raw material, require a certain length to determine the quality of the chilli used (National Standardization Agency, 1998).

The mean fruit diameter of the prospective varieties of F8-145291-14-9-3-12-1B and F10-145174-9-71-5-3-1-2B was not significantly different from that of the comparing varieties of Lentera and Baskara (Table 4). It was suspected that the size of the fruit diameter would affect the weight of the chilli fruit. The results of the research by Rahayu and Purnamaningsih (2018) show that the larger the diameter of the fruit, the heavier the weight of the chilli. The size of fruit diameter is also one of the criteria used by the National Standardization Agency (1998) for industries whose processed ingredients use chilli.

The weight of 1,000 seeds was not significantly different in all varieties of cayenne pepper tested. The same results were also reported by Mareza et al. (2021) that the varietal treatment had no significant effect on the weight of 1,000 curly chilli seeds. The weight of 1,000 seeds of this study ranged from 5.70-7.37 g (Table 3), which was higher than the average weight of Inayah's research (2020) with a range of 3.1-4.3 g. Large seeds tend to germinate faster and produce larger and more vigor seedlings than smaller seeds because they have a larger embryo size and food reserves. The vigor test can be used to predict seed germination in the field (Ghassemi-golezani et al., 2010).

There was a positive correlation between the number of fruits per plant and plant height(Table 6). The prospective varieties of F10-145291-10-7-1-1-2-1-3B, F11-160291-3-12-5-51-1-1-2-2-B, F8-145291-14-9-3-12-1B and the comparing varieties of Gennie and Bara which had high plant (Table 2) produced higher number of fruits per plant (Table 5). It is suspected that the photosynthesis process in the taller plants can be more optimal because the opportunity for plants to get sunlight is greater than the short plants, making it possible for plants to increase yield components and yield (Rofidah *et al.*, 2018). According to Sabaghnia et al. (2015); Yunandra et al. (2017); and Juharni et al. (2020), assimilate produced by plants during the vegetative phase determines the ability of chilli plants to produce fruit after entering the reproductive phase.

The weight per fruit of all tested varieties was lower than that of the comparing varieties. The weight per fruit was related to the fruit length; the prospective varieties of F11-160291-3-12-5-51-1-1-2-2-B and F8-145291-14-9-3-12-1B and the comparing varieties of Lentera and Baskaras having long fruits possessed a heavier weight per fruit (Table 5). The fruit weight is related to the ability of plants to translocate assimilate resulting from the photosynthesis process for fruit formation (Dalimunthe et al., 2016; Rahayu & Purnamaningsih, 2018).

The fruit weight per plant correlated with the plant height, number of fruits per plant, fruit length and weight per fruit (Table 6). The prospective varieties of F11-160291-3-12- 5-51-1-1-2-2-B and F8-145291-14-9-3-12-1B and the comparing varieties of Lentera and Baskara with higher plant characters, total more fruit, long fruit and heavy fruit weight would produce heavier fruit weight per plant. Similarly, the study of Murniati et al. (2013) and Rofidah et al. (2018) show that the weight of the fruit per plant is getting heavier with a greater number of fruits per plant and the heavier the weight per fruit.

The productivity of cayenne pepper correlated with the weight of the fruit produced bythe plant which was related to plant height, fruit length, number of fruits per plant and weight per fruit (Table 6). Plant growth and production according to

Zuhry et al. (2012); Dalimunthe et al. (2016), and Fitria et al. (2021) are the expression and genetic response of plants to the environment, where the yield components and quantitative yields obtained during the generative phase are largely determined by the plant growth. The prospective varieties of F8-145291-14-9-3-12-1B, F11-160291-3-12-5-51-1-1-2-2-B and F10-145291-10-7-1-1-2-1-3B had the potential to be developed in tidal lands of South Sumatra because each of them had a productivity of 7.89 t/ha, 7.82 t/ha and 7.21 t/ha, respectively (Table 5). The productivity of the prospective varieties was the same as the target of the national cayenne pepper productivity of the Ministry of Agriculture in 2020, which was 7.8 t/ha.

CONCLUSSION

The prospective varieties of IPB cayenne pepper of F8-145291-14-9-3-12-1B, F11-160291-3-12-5-51-1-1-2-2-B and F10-145291-10-7-1-1-2-1-3B had the potential to be developed in tidal lands of South Sumatra with the productivity of 7.89 t/ha, 7.82 t/ha and 7.21 t/ha, respectively.

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