UDC 633; DOI 10.18551/rjoas.2022-07.15

VARIABILITY OF GROWTH AND YIELD OF FOUR PEANUT VARIETIES IN CENTRAL LOMBOK, INDONESIA

Sudarto[1], **Herawati Nani**[2], **Susanti Yuliana**[2], **Hidayah Baiq Nurul**[1]
[1]National Research and Innovation Agency (BRIN), Indonesia
[2]Institute for Assessment of Agricultural Technology, West Nusa Tenggara Province, Indonesia
*E-mail: darto_darto66@yahoo.co.id

ABSTRACT
Aik Darek Village, Batukliang Sub-District, Central Lombok District, West Nusa Tenggara Province of Indonesia is a technically irrigated rice field with a rice-paddy-grain/vegetable and/or rice-grain-grain cropping patterns. One of the secondary crops cultivated is peanut, grown in monoculture with the *Kelinci* variety. Sources of seeds used generally come from previous crops. Peanut productivity at the farmer level is still relatively low at around 1.6 tonnes/ha, one of the reasons is that farmers still use seeds from previous plantings. The adaptation test of several peanut varieties was conducted from July to December 2014 using a randomized completely block design with 4 varieties of peanut as treatments, namely: 1) *Bison*, 2) *Kancil*, 3) *Kelinci*, and 4) *Bima*. The research was conducted on an area of 0.80 ha consisting of 4 farmers each with an area of 0.20 ha which was also used as replications. Each farmer's land was made as many as 4 plots with the same size. Parameters observed included plant height, number of pods/plant, number of seeds/pods, weight of 100 seeds, fresh pod production and dry pod production. The data collected was then analyzed using analysis of variance (ANOVA) and if there was a significant difference, it was continued with the LSD test at the 5% level. The results of data analysis: plant height, number of pods/plant, number of seeds/pods, weight of 100 seeds, fresh pod production and dry pod production of the 4 tested peanut varieties showed significant differences. *Bison* variety produced 2,086.46 kg/ha dry pods, followed by *Kelinci* 1,702.93 kg/ha.

KEY WORDS
Adaptation, paddy fields, peanut, varieties.

The agricultural development program launched by the Indonesian government is the achievement of food self-sufficiency and sustainable self-sufficiency, increasing added value and farmers' welfare as well as poverty alleviation. This program needs the attention of all parties, including the Agricultural Research and Development Agency (Bappenas, 2015). Implementation of this program, it is necessary to encourage farmer institutions to actively participate by implementing the pattern of intensification of food crops and secondary crops, besides that there is also a guarantee of a basic price so that farming can provide decent profits for farmers (Supadi, 2008; Zakaria, 2010). Government policies in increasing agricultural output to meet food needs began to be transferred to various islands outside Java through the opening of new land, both wet land and dry land (Turmudi, 2002).

Grain farming as a source of basic income and additional income is a promising business to improve the conditions of farmers, grain plants that have the potential to provide vitamins and protein to the community, one of which is peanut (Riska, 2014). Peanut is one of the secondary crops that have high economic value with vegetable protein content ranging from 25-30%, making peanut a source of protein for the people of Indonesia. The high level of peanut consumption must be balanced with an increase in its production. Peanut productivity at the farmer level is still relatively low at around 1.6 tons/ha, one of the reasons is that farmers generally still use local varieties (Kaihatu and Pesireron, 2013). This yield is still low when compared to the potential yield of improved varieties of peanuts which can reach production of 3.6 tons/ha of dry pods (Yayat and Bayu, 2018). According to Kasno and Harnowo (2014), until now the increase in peanut production is determined more by an

increase in harvested area than an increase in productivity. Another problem is about 76% of farmers still grow local varieties of peanut and only about 24% are planting new high yielding varieties. New improved varieties have higher yield potential when compared to local varieties, have early maturity and are resistant to pests and diseases. Improved varieties of peanut have certain superior properties compared to local varieties (Wira Hadianto et al., 2015). Improved varieties of peanut are generally assembled to have beneficial properties, including: 1) high yielding, 2) resistant to pests and diseases, 3) according to the specific environment, 4) early age, 5) the quality of the harvest according to the wishes of consumers (Yayat and Bayu, 2018).

Peanut production in West Nusa Tenggara (WNT) Province in 2017 averaged 1.15 tons/ha of dry pods (BPS, 2018). The peanut farming system in Central Lombok Regency is generally carried out in the first dry season (MK I) or the second dry season (MK II) with low average productivity, this is because farmers generally use seeds from previous plantings. Mulyono and Munibah (2016), stated that the low productivity of peanuts was due to the seeds used being the result of previous harvests, not applying recommended technology and low soil fertility. Furthermore, Kasim and Kadir (2014) also said that one of the causes of low peanut production is the unavailability of quality seeds and farmers do not fully applied cultivation techniques. The problems faced in increasing peanut production in Batukliang sub-district of Central Lombok are caused by the low productivity of peanuts, because they have not applied cultivation technology and utilize new improved varieties of seeds. The use of new improved varieties with good cultivation techniques can increase the productivity of peanuts more than twice (Kasno and Harnowo, 2014). Furthermore, Zakaria et al., (2010) also stated that efforts to increase productivity in a sustainable manner, one of which is to find and provide varieties that are able to adapt well, have high production and are favored by farmers and consumers. Seeing the problems mentioned above, it is necessary to conduct an assessment with the application of site-specific superior technology based on varieties on dryland. With the application of site-specific technologies such as the use of adaptive new improved varieties, fertilization, pest and disease control, it is expected to increase land productivity, farming efficiency and farmers' income (Syafruddin et al., 2015). The purpose of the study was to determine the adaptability of several varieties of peanuts on dryland of Central Lombok Regency, WNT Province of Indonesia. The research was expected to obtain 1-2 varieties that can adapt and provide high yields.

MATERIALS AND METHODS OF RESEARCH

The adaptation test of four varieties of peanuts was conducted in the ricefields of Aik Darek Village, Batukliang District, Central Lombok Regency from July to December 2014 which was a transmigration farming area. The adaptation test used a randomized completely block design (RCBD) with 4 varieties of peanuts as treatments, namely: 1) *Bison*, 2) *Kancil*, 3) *Kelinci*, and 4) *Bima*. The adaptation test was conducted on an area of 0.80 ha consisting of 4 farmers each with an area of 0.20 ha which was also used as replication. Each farmer's land was made as many as 4 plots with the same size. Parameters observed included plant height, number of pods/plant, number of seeds/pods, weight of 100 seeds, fresh pod and dry pod production. The data collected was then analyzed using analysis of variance (ANOVA) and if there was a significant difference, it was continued with the LSD test at the 5% level.

Before sowing, the soil is thoroughly processed using a tractor. Tillage aims to turn the soil over while loosening the soil and removing weeds. After the tillage was completed, each replication was made into 4 plots with a size of 0.05 ha for each plot. Seed sowing was done manually, the number of seeds was 2 seeds per hole, the spacing was 40 x 15 cm. The fertilizers used were 50 kg Urea and 150 kg NPK Phonska per hectare. Fertilizer was applied at the same time as planting. Weed control was conducted twice. Pest and disease control was carried out in an integrated manner, monitoring was done periodically and in the event of pest and disease attacks that exceed the economic threshold, spraying with insecticides was applied. Harvesting was done when the leaves have started to turn yellow by pulling them out. After the extraction was completed, the pods were separated from the peanut stems and

then cleaned of the remaining soil that was still attached to the skin of the pods. Before drying, it was weighed first to determine the wet weight production.

RESULTS AND DISCUSSION

The results of data analysis showed that all parameters of plant height, number of pods per plant, number of seeds per plant, weight of 100 seeds, fresh pod and dry pod production showed significant differences based on LSD test at 5% level (Table 1).

Table 1 – Average components of adaptation of four peanut varieties

Variety	Plant Height (cm)	Number of branches	Number of empty pods	Number of filled pods	Weight of 100 seeds (g)	Weight of fresh pods (kg)	Weight of dry pods (kg)
Bison	49,8 b	13,25 a	7,6 a	28,75 a	38,65 b	6730,54 a	2086,46 a
Kancil	53,9 a	11,42 b	5,3 b	26,75 a	40,65 a	5079,16 b	1574,54 c
Kelinci	48,3 b	9,45 c	5,2 c	22,57 b	37,66 c	5493,33 c	1702,93 b
Bima	54,2 a	12,87 a	3,9 c	19,77 c	39,67 a	4194,25 d	1300,21 d
LSD 5 %	2,44	0,65	0,88	1,50	0,83	166,21	51,61

Notes: The numbers in the column followed by the same letter are not significantly different based on the LSD test at the 5% level.

The results of the analysis of plant height parameters showed significant differences, the highest yield was shown by the *Bima* variety, which was 54.2 cm and followed by the *Kancil* (53.9 cm), *Bison* (49.8 cm) and *Kelinci* (48.3 cm) varieties, respectively. The results of the analysis of the number of branches per plant also showed significant differences. The highest yield of the number of pods per plant was shown by the *Bison* variety, reached 13.25 and followed by *Bima* (12.87), *Kancil* (11.42), and *Kelinci* (9.45) varieties, respectively. The difference in plant height and number of branches is thought to be because these varieties have different advantages according to their genotype. Simanjuntak et al., (2013) stated that the variety treatment had a significant effect on plant height, number of branches, flowering and harvesting ages of peanuts. The results of the analysis of the number of empty pods per plant also showed a significant difference, the highest yield was obtained by Bison variety (7.6) and followed by *Kancil* variety (5.3), *Kelinci* (5.2), and *Bima* variety (3.9). While the results of the analysis of the number of filled pods still produced significant differences, the best results were shown by the *Bison* variety which was 28.75 and followed by the *Kancil* (25.75), *Kelinci* (22.57) and *Bima* (19.77) varieties.

Of the 4 peanut varieties, there were variations in the appearance of seed yields between genotypes. Varieties that give high seed yields have more number of pods. Karasu *et al.* (2009) reported that the morphological characters and yield components that had a direct effect on seed yield were the number of pods per plant. The results of the analysis of the weight of 100 seeds (grams) also showed a significant difference. The highest yield was obtained for the *Kancil* variety, which was 40.65 grams, followed by the *Bima* variety (39.67 grams), *Bison* (38.65 grams), and the *Kelinci* variety (37.66 grams). The results of the analysis of fresh pod production also showed significant differences and the highest yield was shown by the *Bison* variety, which was 6,730.54 kg/ha, followed by the *Kelinci* variety (5,493.33 kg/ha), *Kancil* variety (5,079.16 kg/ha), and the *Bima* variety (4,194.25 kg/ha). While the results of the analysis of dry weight production also obtained significantly different results based on the LSD test at the 5% level. The highest yield was obtained for the *Bison* variety, which was 2,086.46 kg/ha, followed by *Kelinci* variety (1,702.93 kg/ha), *Kancil* variety (1,574.54 kg/ha), and *Bima* variety (1,300.21 kg/ha).

Based on the results of statistical analysis of the parameters above, all of the yield components showed significant differences, it is suspected that genetic factors of those four varieties tested showed dominance so that environmental factors could not affect vegetative or generative growth. Each variety has different advantages according to its genotype, so that all varieties have the same adaptability to their environment. From each plant variety,

there are always differences in the genotypic response to the growing environmental conditions so that this condition can also affect the level of growth and production. In addition, the high and low growth and yield of peanuts are influenced by two factors, namely internal factors and external factors. Internal factors are factors that are influenced by genetic traits or inherited traits such as plant age, plant morphology, yield, capacity to store food reserves, resistance to pests and diseases and others. External factors are environmental factors such as climate, soil and biotic factors (Hadianto et al., 2015). This means that farmers have many choices if they will develop peanut varieties, just choose the varieties with the highest production and are preferred by consumers.

CONCLUSION

The results of data analysis on plant height, number of pods/plant, number of empty pods, number of filled pods, weight of 100 seeds, fresh pod production and dry pod production of the four tested peanut varieties all showed significant differences. Farmers can make choices about which varieties are preferred and will be developed further by considering the availability of varieties in a sustainable manner.

FUNDING

This study was funded by Indonesian Agency for Agricultural Research and Development (IAARD), Ministry of Agriculture, Republic of Indonesia.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interests. The funding agency had no role in the study design, data collection, analysis or interpretation, in writing of the manuscript, or in the decision to publish the result. All authors were contributed equally in preparing and publishing of this scientific paper.

ACKNOWLEDGMENTS

The authors would like to thank staffs at the West Nusa Tenggara Assessment Institute for Agricultural Technology for their assistance during the field experiment. The authors also would like to thank Indonesian Agency for Agricultural Research and Development (IAARD) for funded this research.

REFERENCES

1. BPS, 2018. Biro Pusat Statistik Nusa Tenggara Barat. Mataram.
2. Bappenas, 2015. Draft rencana pembangunan jangka menengah Indonesia. Disampaikan pada Pra Musrembang Propinsi Sulawesi Tengah.
3. Hadianto W, M. Jalil, T. Sarwanidas, dan Zulkifli, 2015. Respon beberapa varietas terhadap pertumbuhan dan produksi tanaman kacang tanah (Arachis hypogea) Egrotek Lestari 1 (1): 73-79.
4. Kaihatu, S. dan Pasireron, M., 2013. Keragaan galur harapan kacang tanah di lahan kering di Kabupaten Maluku Tengah. Jurnal Agrivigor 10 (3): 284 – 291.
5. Karasu, A. A., T. Goksoy, and Z. M. Turan, 2009. Interrelationship of agronomical characteristic of soybean (Glicine max L.Merrill) Grown in difference environments. International Journal of Agriculture and Biology 11 (1): 85 – 88.
6. Kasno, A. dan Harnowo, D., 2014. Karakteristik varietas unggul kacang tanah dan adopsinya oleh petani. Buletin Iptek Tanaman Pangan 9 (1): 13 – 23.
7. Kasim, A. dan Kadir, S., 2014. Potensi produksi varietas unggul baru kacang tanah pada wilayah pengembangan di Kabupaten Nabire. Prosiding Seminar Hasil Penelitian Tanaman Aneka Kacang dan Umbi.

8. Mulyono, J. Munibah, K., 2016. Analisis usahatani kacang tanah sebagai komoditas unggulan di lahan kering di Kabupaten Bantul. Prosiding seminar Hasil Penelitian Tanaman Aneka Kacang dan Umbi.
9. Riska, 2014. Analisis produksi dan pendapatan usahatani kacang tanah di Desa Boya Baliase Kecamatan Morowali Kabupaten Sigi. Jurnal Agroland 21 (1): 49 - 54.
10. Supadi, 2008. Menggalang partisipasi petani untuk meningkatkan produktivitas kedelai menuju swasembada. Jurnal Penelitian dan Pengembangan Pertanian 27(3): 106 - 111.
11. Syafruddin, I. S. Padang, dan Saidah, 2015. Perbaikan pola tanam palawija pada lahan kering di Kabupaten Parigi Moutong Sulawesi Tengah. Jurnal Pengkajian dan Pengembangan Teknologi Pertanian 18 (3): 263 – 272.
12. Simanjuntak, N. C. Bayu, E.S. dan Nuriad, 2013. Uji efektivitas pemberian paclobrutazol terhadap keseimbangan pertumbuhan tiga varietas kacang tanah (Arachis hypogaea L.) Jurnal Agroteknologi 2 (1): 279 – 287.
13. Turmudi, E., 2002. Kajian pertumbuhan dan hasil tanaman dalam sistem tumpangsari jagung dengan empat kultivar kedelai pada berbagai waktu tanam. Jurnal Ilmu-Ilmu Pertanian 4 (2): 89 – 96.
14. Yayat, H. dan B. Suwitono, 2018. Kelayakan usahatani varietas unggul kacang tanah di Kabupaten Halmahera Utara. Jurnal Pengkajian dan Pengembangan Teknologi Pertanian 21 (2): 127 – 136.
15. Zakaria, A.K, 2010. Program pengembangan agribisnis kedelai dalam peningkatan produksi dan pendapatan petani. Jurnal Penelitian dan Pengembangan Pertanian 29(4): 147 - 153.
16. Zakaria A.M, Wahyuning K.S. dan Reni K., 2010. Analisis daya saing komoditas kedelai menurut agroekosistem: Kasus di Tiga Provinsi di Indonesia. Jurnal Agro Ekonomi 28 (1): 21- 37.