INTERNATIONAL INTEGRATED AGRICULTURAL JOURNAL

Volume 01 Number 02
November 2025
p-ISSN: 3124-7865
e-ISSN: 3124-8179

Application of Bamboo Shoot Liquid Fertilizer and Time of Pruning on Peanut Production (*Arachis hypogaea* L.)

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Abstract:
The decreasing trend in peanut productivity in Indonesia over the years is primarily linked to soil degradation resulting from the overuse of synthetic fertilizers. Therefore, it is necessary to apply environmentally friendly methods such as liquid organic fertilizer and pruning to optimize peanut productivity. This research aimed to examine the influence of bamboo shoot liquid fertilizer and pruning time on peanut production. The research was conducted in Antirogo Villcommunity age, Sumbersancy during the period from July to October 2024. Using a Randomized Block Design with two factors. The first factor was the concentration of bamboo shoots liquid fertilizer namely P0 (0 ml/L), P1 (100 ml/L), and P2 (200 ml/L). The second factor was W0 (shoot pruning time which consisted of control), W1 (7 days after flowering), and W2 (14 days after flowering). The results imply that the results indicated that the concentration of bamboo shoots liquid fertilizer of 100 ml/L has a significant effa notable example fresh shoot weight per-sampel. In addition, the shoot pruning treatment conducted 7 days after flowering had a notable effect on the fresh pod weight per-sample. Based on the interaction between the two factors, it has an effect on fresh pod weight per sample, dry pod weight per sample, dry seed weight per sample, and dry seed weight per plot.

Article info:
Submitted:
03-07-2025
Revised:
03-11-2025
Accepted:
06-11-2025

Keywords:
green manure, groundnut, reproduction stage

DOI: https://doi.org/10.53713/iiaj.v1i2.404

INTRODUCTION

Indonesia relies heavily on agriculture as its primary economic pillar. Various agricultural commodities are cultivated there, including peanuts. Peanuts are a rich source of carbohydrates, protein, and fat, making them a valuable contribution to meeting the nutritional needs of the Indonesian people. However, peanut production in Indonesia has shown a downward trend from year to year, based on data from BPS Pangan (2015), indicating a decline in peanut production. Production was recorded at 605,440 tonnes in 2025, then decreased to 570,477 tonnes in 2016, and further declined to reach 495,447 tonnes. One cause of this decline is land degradation resulting from environmentally unfriendly agricultural practices.

One strategy for increasing national peanut production is to implement cultivation technology, such as using liquid organic fertilizer derived from natural materials like bamboo shoots. that utilizes natural materials that are easily found, such as bamboo shoots. Liquid organic fertilizer derived from bamboo shoots contains high levels of C-organic matter and gibberellin hormones (Mindalisma, et.al 2021). When used as an ingredient in fertilizer formulations, bamboo shoots can provide the hormone gibberellin, a growth regulator that can physiologically stimulate plant growth and increase peanut production. According to Sutarto (2017), gibberellins accelerate the growth process, increase production yields, and support the development of the generative phase of the plants.

In addition to applying liquid organic fertilizer, another effort that can be made to increase peanut productivity is through pruning. Pruning is a technique used to control plant growth and stimulate the emergence of new shoots. Pruning peanut plants encourages growth during the generative phase and optimizes the absorption of sunlight and air, which are important for photosynthesis and can reduce the risk of disease. According to Seran (2016), pruning regulates plant growth, ensuring that only productive branches are produced. It is expected that through shoot pruning, plants will increase their level of peanut production.

Both the application of liquid organic fertilizer and pruning demonstrate potential to enhance peanuts. Combining the two techniques is expected to produce synergistic interactions that will significantly increase peanut yields. However, information on the appropriate concentration of bamboo shoots liquid fertilizer and the optimal time for pruning peanuts is still limited and diverse.

METHOD

The research activities were conducted in Antirogo Village, Sumbersari District, Jember Regency, East Java, from July 2024 to October 2024. The air temperature around the research site ranged from 23 °C to 31 °C, with a land elevation of approximately 146 meters above sea level. The average annual rainfall is 136.33 mm, and there are 69 rainy days.

The tools used in the research included writing instruments, hoes, buckets, watering cans, digital scales, sacks, measuring tapes, nameplates, knapsacks, measuring cups, pencils, scissors, gallons, nails, rope, and sickles. The materials used in this research included water, Takar 2 variety peanuts, KCL fertilizer, urea fertilizer, SP-36 fertilizer, EM-4, bamboo shoots, brown sugar, rice wash, shrimp paste, a fungicide containing the active ingredient propineb, and an insecticide containing the active ingredient diafenthiuron.

The experimental design used was a Randomized block design with two factors. The first factor is the concentration of bamboo shoot liquid fertilizer, with three levels, and the second factor is the timing of pruning, also with three levels. The two factors were combined to produce 9 treatment combinations. Each combination was repeated three times, resulting in a total of 27 experimental units. The factors are as follows:

a. The first factor is the concentration of liquid bamboo shoot: P0 = 0 mL/L, P1 = 100 mL/L, and P2 = 200 mL/L.
b. The second factor is the time of pruning: W0 = control, W1 = 7 days after flowering, and W2 = 14 days after flowering.

Table 1. Treatment Combination Between Concentration Of Liquid Bamboo Shoot And Pruning Time

Treatment	Pruning Time		
Liquid Fertilizer bamboo shoot	W0	W1	W2
P0	P0W0	P0W1	P0W2
P1	P1W0	P1W1	P1W2
P2	P2W0	P2W1	P2W2

The data obtained from this study were then analyzed by Analysis of Variance (ANOVA). If the data is significantly different, then the DMRT further tests at the 5% level. If the data is significant, then the DMRT further tests at the 1% level.

Volume 01 Number 02
November 2025
p-ISSN: 3124-7865
e-ISSN: 3124-8179

RESULT

Research on the application of bamboo shoot liquid fertilizer and time of pruning on peanut production (*Arachis hypogaea* L.) that has been carried out obtained the results of analysis of variance as follows:

Table 2. The results of the analysis of variance

Parameters	Results		
	Concentrations Liquid fertilizer	Pruning of Time	P x W
Fresh Pod Weight Per Sample	ns	*	*
Dry Pod Weight Per Sample	ns	ns	*
Dry Seed Weight Per Sample	ns	ns	*
Dry Seed Weight Per Plot	ns	ns	**
Fresh Shoot Weight Per-Sample	*	ns	ns

Notes: Ns (non-significant), * (significant at 0.05), ** (significant at 0.01)

Fresh pod weight per sample

Based on the data on the fresh pod weight per sample that have been analyzed by analysis of variance, the results show a significant effect in the treatment factor of pruning of pruning and there is an interaction of liquid fertilizer bamboo shoot with pruning time, so it will be tested further at the DMRT levels of 0.05 follows:

Table 3. Effect of pruning time on fresh pod weight per sample

Treatment	Average (g)	DMRT 5%
14 days after flowering (W2)	221.3 a	-
7 days after flowering (W1)	220.5 a	17.456
control (W0)	200.3 b	18.306

Notes: Numbers accompanied by different lowercase letters indicate significant differences based on the results of the DMRT test at the 0.05 level.

Table 3 shows that pruning 7 days after flowering has a positive impact on fresh pod weight per sample, which is 220.5 grams. Pruning 7 days after flowering does not differ significantly from pruning 14 days after flowering. These results suggest that increasing peanut production does not always require the most intensive treatment. Rather, treatments that align with the needs of peanut plants require attention.

Table 4. Effect of the interaction between application of liquid fertilizer and bamboo shoot pruning time on fresh pod weight per sample

Treatment	Average (g)	DMRT 5%
P1W2	77.7 a	-
P1W1	77.5 a	5.163
P2W1	74.3 ab	6.284
P2W0	74.0 abc	6.968
P0W2	73.6 abc	7.462
P2W2	70.0 bcd	7.848
P0W1	68.7 bcd	8.164
P0W0	65.7 cd	8.431
P1W0	60.7 d	8.664

Notes: Numbers accompanied by different lowercase letters indicate significant differences based on the results of the DMRT test at the 0.05 level.

According to Table 4, treatment P1W1 (application of 100 mL/L of liquid fertilizer bamboo shoot and pruning 7 days after flowering) had the most significant impact on fresh pod weight per sample, yielding a result of 77.5 grams. It is not significant from P2W2 (application of 200 mL/L of liquid fertilizer bamboo shoot and pruning 14 days after flowering), P0W1 (non application of liquid fertilizer bamboo shoot and pruning 7 days after flowering), P0W0 (no application of liquid fertilizer bamboo shoot and control), and P1W0 (application of 100 mL/L of liquid fertilizer bamboo shoot and control). However, it did not differ significantly from the other treatments.

Dry pod weight per sample

For the parameter of dry pod weight per sample, it is evident that there are significant interactions between the concentration of liquid fertilizer on bamboo shoots and pruning time. Then the DMRT further test can be carried out at 0,05 levels as follows:

Table 5. Effect of the interaction between application of liquid fertilizer, bamboo shoot, and pruning time on dry pod weight per sample

Treatment	Average (g)	DMRT 5%
P2W0	46.0 a	-
P1W1	44.0 ab	3.076
P2W1	42.3 bc	3.744
P2W2	41.4 bc	4.152
P0W2	40.9 bc	4.446
P0W1	40.0 cd	4.676
P1W2	40.0 cd	4.865
P0W0	38.9 cd	5.024
P1W0	35.9 d	5.163

Notes: Numbers accompanied by different lowercase letters indicate significant differences based on the results of the DMRT test at the 0.05 level.

Table 5 shows that the interaction between the two treatments affected the dry pod weight per sample, as indicated by the results of the DMRT further test at a 0.05% level. The P1W1 treatment (application of 100 mL/L of liquid fertilizer from bamboo shoots and pruning 7 days after flowering) produced the highest value of 44 grams and showed the best interaction. The result was not significant from the P2W0 (application of 200 mL/L of liquid fertilizer bamboo shoot and control), but showed a significant difference compared to the P1W0 (application of 100 mL/L of liquid fertilizer bamboo shoot and control), which amounted to 35,9 grams. This finding suggests that increasing the concentration of liquid fertilizer and delaying the pruning time do not always yield the best results. The optimal treatment gave comparable results to the highest treatment, making it more efficient to apply.

Dry seed weight per sample

The observation parameters of dry seed weight per sample were significantly affected by the interaction between the application of liquid fertilizer to bamboo shoots and pruning time. Then the DMRT further test was carried out at the 0.05 % level as follows:

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November 2025
p-ISSN: 3124-7865
e-ISSN: 3124-8179

Table 6. Effect of the Interaction between application liquid fertilizer, bamboo shoot, with pruning time on dry seed weight per sample

Treatment	Average (g)	DMRT 5%
P2W0	34.1 a	-
P1W1	33.2 ab	7.367
P2W1	32.4 abc	7.726
P0W2	30.6 bc	7.949
P0W0	30.3 bc	8.102
P1W2	29.5 cd	8.215
P2W2	29.4 cd	8.296
P0W1	28.9 cd	8.360
P1W0	26.0 d	8.409

Notes: Numbers accompanied by different lowercase letters indicate significant differences based on the results of the DMRT test at the 0.05 level.

Based on the interaction between liquid fertilizer, bamboo shoot, and pruning time, the P1WI treatment (application of 100 mL/L of liquid fertilizer, bamboo shoot, and pruning 7 days after flowering) gave the best average yield, which was 33.2 grams. Meanwhile, the lowest average was obtained from the P1W0 treatment (application of 100 mL/L of liquid fertilizer bamboo shoot and control) with a value of 26 grams.

Dry seed weight per plot

The parameter of dry seed weight per plot revealed a significant interaction between liquid fertilizer, bamboo shoots, and pruning time. Therefore, further tests were carried out using DMRT at the 0.01 level with the following results:

Table 7. Effect of the Interaction between application liquid fertilizer, bamboo shoot, with pruning time on dry seed weight per plot

Treatment	Average (g)	DMRT 1%
P2W2	605.0 a	-
P1W1	596.0 ab	39.209
P0W2	571.3 abc	45.426
P0W0	487.0 bcd	52.099
P1W2	467.7 bcd	54.310
P2W1	418.7 cd	56.142
P2W0	417.7 cd	57.699
P1W0	416.7 cd	59.056
P0W1	354.7 d	32.480

Notes: Numbers accompanied by different lowercase letters indicate significant differences based on the results of the DMRT test at the 0.05 level.

Referring to Table 7, the highest average treatment interaction was observed in P1W1 (application of 100 mL/L of liquid fertilizer from bamboo shoots and pruning 7 days after flowering), with a value of 596.0 grams. This result did not show a significant difference compared to the P2W2 treatment (application of 200 mL/L of liquid fertilizer from bamboo shoots and pruning 14 days after flowering) and P0W2 (no application of liquid fertilizer from bamboo shoots with pruning 14 days after flowering), but was significantly different from the other treatments. Meanwhile, the lowest average value was found in treatment P0W1 (no application of liquid fertilizer bamboo shoot with shoot pruning 7 days after flowering), which was not significantly different from treatment P0W0 (no application of liquid fertilizer bamboo shoot and control). application of 100 mL/L of liquid fertilizer, bamboo shoot, and pruning 7 days after flowering.

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November 2025
p-ISSN: 3124-7865
e-ISSN: 3124-8179

Fresh shoot weight per sample

Based on the data obtained and averaged, as well as the analysis of variance carried out, it is evident that the concentration of liquid fertilizer in bamboo shoots has a significant effect on the Fresh Shoot Weight per Sample. Then the DMRT 0.05 further test was carried out as follows:

Table 8. Effect of Application Liquid Fertilizer Bamboo Shoot on Fresh Shoot Weight Per-Sample

Treatment	Average (g)	DMRT 5%
Concertation 100 ml/L Liquid Fertilizer Bamboo Shoot (P1)	310.1 a	-
Concertation 100 ml/L Liquid Fertilizer Bamboo Shoot (P2)	281.3 b	8.743
Concertation 0 ml/L Liquid Fertilizer Bamboo Shoot (P0)	277.5 b	10.641

Notes: Numbers accompanied by different lowercase letters indicate significant differences based on the results of the DMRT test at the 0.05 level.

The test results in Table 8 show that the P1 concentration treatment (Concentration: 100 ml/L Liquid Fertilizer Bamboo Shoot) produced a Fresh Shoot Weight Per-Sample of 310.1 grams, which was significantly different from the other two concentrations. However, the P2 (Consecration 200 ml/L Liquid Fertilizer Bamboo Shoot) and P0 (Concentration 0 ml/L Liquid Fertilizer Bamboo Shoot) treatments did not show significant differences from each other.

DISCUSSION

Based on research on the application of bamboo shoot liquid fertilizer and pruning of peanut plants, there was an increase in fresh pod weight per sample, dry pod weight per sample, and dry seeds per sample or plot. These results indicate an improvement in pod and seed quality. It is believed that the application of bamboo shoot liquid fertilizer enhances the organic matter content (C-organic content), while the timing of pruning optimizes the pod filling process. Applying bamboo shoot liquid fertilizer to the soil increases the organic matter content and improves the soil's physical properties. Adding organic fertilizers improves soil structure, making it looser and easier for peanut gynophores to penetrate and form pods (Nurmi et. al., 2023). The C-organic content in bamboo shoot liquid fertilizer enhances the efficiency of plant nutrient absorption by enriching the soil's organic matter. This supports the activity of microorganisms that accelerate the decomposition of nutrients, facilitating their absorption by plants. According to Siregar (2017), soil organic matter plays a crucial role in enhancing soil fertility, increasing biological activity, and improving nutrient availability for plants. Conversely, pruning at the right time increases production by breaking apical dominance, directing photosynthesis more effectively toward pod formation. According to Indrayani et. al. (2022), they found that pruning after flowering restrains the plant's vegetative process, allowing photosynthesis to focus on pod formation. Ultimately, plants pruned during the generative phase exhibit improved pod quality because pruning stimulates the growth of productive branches and increases the potential for pod formation. According to Sumiyanah and Imam (2018), found that pruning stimulates the formation of productive branches, increasing the number of filled pods. The aim of pruning to control plant growth, remove unproductive parts, and stimulate the growth of new branches (Anam et. al., 2024).

Applying bamboo shoot liquid fertilizer has a positive impact on the weight of seeds per sample, the weight of seeds per plot, and the weight of the upper wet stems of peanut plants. This increase is supported by the availability of adequate nutrients, which play a role in the photosynthesis process. During photosynthesis, some of the products are stored in the seeds as nutrient reserves. According to Nuryani et al. (2019), an increase in nutrient uptake optimizes the photosynthetic process in plants. This optimizes the formation of carbohydrates and proteins, which are then translocated to the food reserves in the seeds. In addition to increasing seed weight, optimal nutrient availability contributes to an increase in the weight of the top wet Stover of peanut plants. Optimal nutrient availability can facilitate photosynthesis in plants, and good photosynthesis increases plant dry weight (Firman et al., 2023). Breaking apical dominance combined with adequate nutrient availability synergistically increases the efficiency of photosynthetic allocation to seeds. According to Bachriyanti (2023), pruning reduces competition for photosynthetic products among leaves and fruit and reduces the risk of disease.

Bamboo shoot liquid fertilizer contains not only organic matter and nutrients but also the hormone gibberellin, which plays an important role in supporting plant growth and development. Gibberellin stimulates cell development by increasing the activity of cell division and elongation. According to Farida and Nani et al. (2019), gibberellin can stimulate plant growth by accelerating cell division and elongation. In this context, applying gibberellins can positively impact the overall development of plant tissues, including pod formation. According to Wisuda et al. (2022), the use of gibberellin increases cell elongation and division, thereby increasing the number of filled pods and decreasing the number of empty pods. Gibberellin stimulates an increase in photosynthetic production, which is then channeled to the pods, making the pod filling process more effective. Sufficient photosynthesis provides the energy and components necessary for seed development in the pod. According to Jazuli et al. (2021), gibberellins can increase plant photosynthetic production because photosynthesis is an important element that is translocated to filled pods, greatly affecting pod development. Additionally, gibberellins play a role in allocating nutrients from vegetative tissues to generative organs, thereby increasing the efficiency of optimal pod formation. The application of gibberellin (GA) can stimulate flowering and break bud and seed dormancy in certain plants (Wiraatmaja, 2017).

CONCLUSION

Application of 100 ml/L liquid fertilizer made from bamboo shoots to peanuts resulted in an effect on Fresh Shoot Weight per Sample. While pruning on July 7 after flowering, the effect on fresh pod weight per sample. However, there was also available interaction between the concentration of 100 ml/L liquid fertilizer and bamboo shoot pruning 7 days after flowering, as measured by the following parameters: fresh pod weight per sample, dry pod weight per sample, dry seed weight per sample, and dry seed weight per plot.

REFERENCES

Anam, C., Istiqomah, Mariyatul, Q., & Ana, A. (2024). Respon Pertumbuhan dan Produksi Cabe Rawit (*Capsicum frutescens* L.) terhadap Pemangkasan dan Pemupukan Daun. *Dalam Jurnal Berkala Ilmiah Agroteknologi*, *12*(2), 99–109. https://doi.org/10.33005/plumula.v12i2.218

Bachriyanti, A. H. (2023). Pengaruh Varietas Dan Aplikasi Pemangkasan Pucuk Terhadap Produksi Dan Mutu Benih Mentimun (*Cucumis sativus* L.). *Skripsi, Program Sarjana Terapan Politeknik Negeri Jember*.

BPS Pangan. (2015). *Produksi Tanaman Pangan Tahun 2015*. Badan Pusat Statistik, Jakarta - Indonesia. Diambil dari http://www.bps.go.id

Farida, & Nani, R. (2019). Pengaruh Konsentrasi Hormon Giberelin Terhadap Pertumbuhan Dan Hasil Tanaman Okra (*Abelmoschus esculentus* L). *Jurnal Produksi Tanaman*, *44*, 1–8. https://doi.org/http://dx.doi.org/10.31602/zmip.v44i1.1601

Firman, A., Rika, D., & Lisa, N. (2023). Pengaruh Pupuk Organik Cair Limbah Kubis Terhadap Hasil Tanaman Kubis. *Jurnal Polbangtan Malang*, (1), 374–381.

Indrayani, A., Harli A., K., & Hasanuddin, K. (2022). Pengaruh Pemangkasan Dan Pemberian Dosis Pupuk Organik Cair Limbah Air Tahu Terhadap Pertumbuhan Dan Hasil Tanaman Kacang Tanah (*Arachis hypogaea* L.). *Jurnal Agroterpadu*, *1*(1), 18–23. https://doi.org/10.35329/ja.v1i1.2816

Jazuli, M. ., Aini, S. ., & Khodijah, N. . (2021). Pemanfaatan Giberelin Untuk Memacu Pertumbuhan Dan Produksi Melon Menggunakan Hidroponik Sistem Sumbu. *Jurnal Bioindustri*, *4*(1), 1–11. Diambil dari https://trilogi.ac.id/journal/ks/index.php/jbi/article/view/1220

Mindalisma, Chairani, S., & Fitriani. (2021). Respon Pertumbuhan Dan Hasil Tanaman Cabai (*Capsicum annum* L.) Menggunakan Tanah Andisol Di Polibeg Terhadap Kompos Ampas Tahu Dan Pupuk Organik Cair Rebung Bambu. *AGRILAND: Jurnal Ilmu Pertanian*, *9*(3), 228–238. https://doi.org/https://doi.org/10.30743/agr.v9i3.5040

Nurmi, Arief, A., & Sri, B. M. (2023). Pertumbuhan dan Hasil Tanaman Kacang Tanah (*Arachis hypogaea*, L.) dengan Aplikasi Pupuk Organik Arang Sekam dan Kandang Ayam. *Jurnal Produksi Tanaman*, *11*(10), 786–792. https://doi.org/http://dx.doi.org/10.21776/ub.protan.2023.011.10.07 Pertumbuhan

Nuryani, E., Gembong, H., & Historiawati. (2019). Pengaruh Dosis dan Saat Pemberian Pupuk P terhadap Hasil Tanaman Buncis (*Phaseolus vulgaris* L .) Tipe Tegak. *Jurnal Imu Pertanian Tropika dan Subtropika*, *4*(1), 14–17. https://doi.org/https://doi.org/10.31002/vigor.v4i1.1307

Seran, R. N. (2016). Pengaruh Pemangkasan Tunas Lateral dan Bunga terhadap Pertumbuhan dan Hasil Terung (*Solanum melongena* L.). *Jurnal Pertanian Konservasi Lahan Kering*, *1*(02), 93–97. https://doi.org/10.32938/sc.v1i02.20

Siregar, B. (2017). Analisis Kadar C-Organik Dan Perbandingan C/N Tanah Di Lahan Tambak Kelurahan Sicanang Kecamatan Medan Belawan. *Jurnal Warta Dharmawangsa*, *28*, 145–158. https://doi.org/https://doi.org/10.46576/wdw.v0i53.266

Sumiyanah, & Imam, S. (2018). Pengaruh Pemangkasan Pucuk Dan Pupuk Nitrogen Terhadap Pertumbuhan Dan Hasil Tanaman Kedelai (*Glicyne max*. L., Merril) Varietas Anjasmoro. *Agroswagati Jurnal Agronomi*, *6*(1), 693–709. https://doi.org/https://doi.org/10.33603/agroswagati.v6i1.1950

Sutarto, T. (2017). Aplikasi Pupuk Fosfor (P) Dan Hormon Giberelin (GA3) Terhadap Pembentukan Buah Tomat (*Lycopersicum esculentum*) Partenokarpi. *Skripsi, Program Sarjana Universitas Negeri Jember*. Diambil dari http://repository.unej.ac.id/handle/123456789/86960

Wiraatmaja, I. W. (2017). Zat Pengatur Tumbuh Giberelin dan Sitokinin. *Fakultas Pertanian Universitas Udayana*, 1–44.

Wisuda, N. L., Muhammad, D. I., & Hadi, S. (2022). Aplikasi Giberelin terhadap Peningkatan Pertumbuhan dan Produktivitas Kacang Tanah (*Arachis hypogea* L.). *Muria Jurnal Agroteknologi (MJ-Agroteknologi)*, *1*(1), 30–33. Diambil dari https://jurnal.umk.ac.id/index.php/mjagrotek%0AAplikasi