

DAFTAR PUSTAKA

- Beans, L. (2007). Pengaruh dosis dan frekuensi pemberian pupuk organik cair terhadap pertumbuhan dan hasil buncis (*Phaseolus vulgaris* L.) dataran rendah. *Jurnal Ilmu Tanah Dan Lingkungan*, 7(1), 43–53.
- Diantoro, D. A. N., Ginting, C., & Kautsar, V. (2017). Pengaruh tandan kosong dan pupuk P terhadap pertumbuhan *Mucuna bracteata*. 23(5), 48–57.
- Febrianna, M., Prijono, S., & Kusumarini, N. (2018). Pemanfaatan pupuk organik cair untuk Meningkatkan serapan nitrogen serta pertumbuhan dan produksi sawi (*Brassica juncea* L.) pada tanah berpasir. *Tanah Dan Sumberdaya Lahan*, 5(2), 1009–1018.
- Harahap, I.Y.,TC. Hidayat.,Y. Pangaribuan & Listia E. (2010). The efectivines of *Mucuna bracteata* in controlling weed in oil palm plantation. In A.H Soemintapoera and A. Kurniawan (EDS) proceeding the first international seminar of weed science society of Indonesia, Bandung .p C20-C25
- Henri. (2018). pupuk organik cair. *Angewandte Chemie International Edition*, 6(11), 951–952., 5–19.
- Himatan. (2019). Efek penggunaan pupuk berlebih. *Faperta Unpad*.
- Jaya, E. R., Situmeang, Y.P & Andriani, A.A.S.P.R (2021). Effect of biochar from urban waste and *eco enzyme* on growth and yielth of shallots (*Allium ascalonicum*), *SEAS(Sustainable Enviroment Agricultural Science)* 5(2), 105–113. 5.2.3871.105-113
- Jutono. (1981). Prospek inokulasi pada peningkatan produksi kedelai dan Leguminosa lainnya. Departemen Mikrobiologi Fakultas Pertanian Universitas Gadjah Mada Yogyakarta.
- Laksono, P. B., Wachjar, A., & Supijatno, D. (2016). Pertumbuhan *Mucuna bracteata* DC. Pada berbagai waktu inokulasi dan dosis inokulan. *Jurnal Agronomi Indonesia (Indonesian Journal of Agronomy)*, 44(1), 104. 24831/jai.v44i1.12510
- Mulyadi A. (2012). Pengaruh pemberian legin pupuk NPK (15:15:15) dan Urea pada tanah gambut terhadap kandungan N, P, K total pucuk dan bintil akar kedelai (*Glycine max* L). *Jurnal Kaunia*, 1(8), 21–29.
- Patra, R. R. (2021). Pengaruh pemberian pupuk P dan bahan pembenah tanah terhadap jumlah bintil akar dan serapan N tanaman kedelai (*Glycine max* L.) di lahan ultisol natar Lampung Selatan. *stand*, 4–6.

- Rochyani, N., Utpalasari, R. L., & Dahliana, I. (2016). Analisis hasil konversi *eco enzyme* menggunakan nenas (*Ananas comosus*) dan Pepaya (*Carica papaya* L.). 5(2), 135–140.
- Samantha, R., & Almalik, D. (2019a). Pengaruh berbagai dosis pupuk N dan P terhadap nodulasi dan pertumbuhan *Mucuna bracteata*. 3(2), 58–66.
- Samantha, R., & Almalik, D. (2019b). Pengaruh dosis pupuk P dan jenis pupuk organik terhadap nodulasi dan pertumbuhan bibit *Pueraria javanica* Deka. 3(2), 58–66.
- Sinica, O. (2016). Pengaruh pupuk hayati dan pupuk P terhadap pertumbuhan *Mucuna bracteata*. 18(2), 33–37.
- Sumbayak, R. J., & Gultom, R. R. (2020). Pengaruh pemberian pupuk Fosfat dan pupuk organik terhadap pertumbuhan dan hasil kedelai (*Glycine max* L. Merrill). *Jurnal Darma Agung*, 28(2), 253. v28i2.648
- Titiaryanti, N. M., & Hastuti, P. B. (2020). Respon pertumbuhan bibit kelapa sawit di *Pre Nursery* dengan berbagai konsentrasi *eco enzym* dan dosis pupuk NPK. *Jurnal Pertanian Agros Vol. 24(2) Juli* : 598-606.
- Triadiawarman, D., & Rudi, R. (2019). Pengaruh dosis dan interval waktu pemberian pupuk organik cair daun gamal terhadap pertumbuhan dan hasil tanaman sawi (*Brassica Juncea* L.). *Jurnal Pertanian Terpadu*, 7(2), 166–172. v7i2.196
- Yuwono, T. (2006). *Bioteknologi Pertanian*. Gadjah Mada University Press.

LAMPIRAN

Lampiran 1.

a. Sidik ragam (ANOVA) tinggi tanaman

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|-----------------|-------------------------|----|-------------|----------|------|
| Corrected Model | 4832,109 ^a | 15 | 322,141 | ,952 | ,517 |
| Intercept | 4361310,141 | 1 | 4361310,141 | 12886,83 | ,000 |
| P | 1018,422 | 3 | 339,474 | 1,003 | ,400 |
| F | 519,172 | 3 | 173,057 | ,511 | ,676 |
| P * F | 3294,516 | 9 | 366,057 | 1,082 | ,393 |
| Error | 16244,750 | 48 | 338,432 | | |
| Total | 4382387,000 | 64 | | | |
| Corrected Total | 21076,859 | 63 | | | |

Jika sig < 0,05 berarti significant/berbeda nyata.

Jika sig > 0,05 berarti non significant/tidak berbeda nyata.

b. Sidik ragam (ANOVA) jumlah daun

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|-----------------|-------------------------|----|-------------|-----------|------|
| Corrected Model | 305.359 ^a | 15 | 20.357 | .544 | .902 |
| Intercept | 442723.891 | 1 | 442723.891 | 11820.746 | .000 |
| P | 48.547 | 3 | 16.182 | .432 | .731 |
| F | 132.297 | 3 | 44.099 | 1.177 | .328 |
| P * F | 124.516 | 9 | 13.835 | .369 | .944 |
| Error | 1797.750 | 48 | 37.453 | | |
| Total | 444827.000 | 64 | | | |
| Corrected Total | 2103.109 | 63 | | | |

Jika sig < 0,05 berarti significant/berbeda nyata.

Jika sig > 0,05 berarti non significant/tidak berbeda nyata.

Lampiran 2.

a. Sidik ragam (ANOVA) jumlah bintil akar

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|-----------------|-------------------------|----|-------------|---------|-------|
| Corrected Model | 4536,750 ^a | 15 | 302,450 | 1,010 | ,461 |
| Intercept | 165242,250 | 1 | 165242,250 | 551,919 | <,001 |
| P | 516,125 | 3 | 172,042 | ,575 | ,634 |
| F | 28,375 | 3 | 9,458 | ,032 | ,992 |
| P * F | 399,250 | 9 | 443,583 | 1,482 | ,182 |
| Error | 14371,000 | 48 | 299,396 | | |
| Total | 184150,000 | 64 | | | |
| Corrected Total | 18907,750 | 63 | | | |

Jika sig < 0,05 berarti significant/berbeda nyata.

Jika sig > 0,05 berarti non significant/tidak berbeda nyata.

b. Sidik ragam (ANOVA) berat bintil akar

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
|-----------------|-------------------------|----|-------------|----------|------|
| Corrected Model | 4,424 ^a | 15 | ,295 | 2,090 | ,027 |
| Intercept | 163.201 | 1 | 163.201 | 1156.255 | ,000 |
| P | ,408 | 3 | ,136 | ,964 | ,418 |
| F | 1.243 | 3 | ,414 | 2.936 | ,043 |
| P * F | 2.773 | 9 | ,308 | 2.183 | ,040 |
| Error | 6.775 | 48 | ,141 | | |
| Total | 174.400 | 64 | | | |
| Corrected Total | 11.199 | 63 | | | |

Jika sig < 0,05 berarti significant/berbeda nyata.

Jika sig > 0,05 berarti non significant/tidak berbeda nyata.

Lampiran 3.

a. Hasil analisis Duncan

| Berat Bintil Akar | | | | |
|---------------------|---|-------------------------|------|------|
| Duncan ^a | | | | |
| PERLAKUAN | N | Subset for alpha = 0.05 | | |
| | | 1 | 2 | 3 |
| P3F3 | 4 | 1,25 | | |
| P1F0 | 4 | 1,33 | 1,33 | |
| P2F0 | 4 | 1,33 | 1,33 | |
| P0F3 | 4 | 1,35 | 1,35 | |
| P3F0 | 4 | 1,35 | 1,35 | |
| P2F2 | 4 | 1,50 | 1,50 | |
| P1F1 | 4 | 1,53 | 1,53 | |
| P2F1 | 4 | 1,53 | 1,53 | |
| P2F3 | 4 | 1,60 | 1,60 | |
| P3F2 | 4 | 1,60 | 1,60 | |
| P1F2 | 4 | 1,65 | 1,65 | |
| P0F2 | 4 | 1,75 | 1,75 | 1,75 |
| P1F3 | 4 | 1,78 | 1,78 | 1,78 |
| P0F0 | 4 | 1,83 | 1,83 | 1,83 |
| P0F1 | 4 | | 1,90 | 1,90 |
| P3F1 | 4 | | | 2,30 |
| Sig. | | ,079 | ,079 | ,069 |

Lampiran 4.

a. Sidik ragam (ANOVA) jumlah bintil akar efektif

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. |
|-----------------|-------------------------|----|-------------|---------|-------|
| Corrected Model | 3656,859 ^a | 15 | 243,791 | ,862 | ,608 |
| Intercept | 121539,391 | 1 | 121539,391 | 429,697 | <,001 |
| P | 627,797 | 3 | 209,266 | ,740 | ,534 |
| F | 136,297 | 3 | 45,432 | ,161 | ,922 |
| P * F | 2892,766 | 9 | 321,418 | 1,136 | ,357 |
| Error | 13576,750 | 48 | 282,849 | | |
| Total | 138773,000 | 64 | | | |
| Corrected Total | 17233,609 | 63 | | | |

Jika sig < 0,05 berarti significant/berbeda nyata.

Jika sig > 0,05 berarti non significant/tidak berbeda nyata.

b. Sidik ragam (ANOVA) jumlah bintil akar tidak efektif

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|-----------------|-------------------------|----|-------------|---------|-------|
| Corrected Model | 207,734 ^a | 15 | 13,849 | 1,255 | ,267 |
| Intercept | 3349,516 | 1 | 3349,516 | 303,496 | <,001 |
| P | 8,797 | 3 | 2,932 | ,266 | ,850 |
| F | 68,047 | 3 | 22,682 | 2,055 | ,119 |
| P * F | 130,891 | 9 | 14,543 | 1,318 | ,253 |
| Error | 529,750 | 48 | 11,036 | | |
| Total | 4087,000 | 64 | | | |
| Corrected Total | 737,484 | 63 | | | |

Jika sig < 0,05 berarti significant/berbeda nyata.

Jika sig > 0,05 berarti non significant/tidak berbeda nyata.

Lampiran5.

a. Sidik ragam (ANOVA) berat segar tanaman

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|-----------------|-------------------------|----|-------------|---------|-------|
| Corrected Model | 10859,095 ^a | 15 | 723,940 | 1,593 | ,111 |
| Intercept | 146133,220 | 1 | 146133,220 | 321,574 | <,001 |
| P | 1287,007 | 3 | 429,002 | ,944 | ,427 |
| F | 1314,034 | 3 | 438,011 | ,964 | ,417 |
| P * F | 8258,055 | 9 | 917,562 | 2,019 | ,057 |
| Error | 21812,677 | 48 | 454,431 | | |
| Total | 178804,992 | 64 | | | |

Jika sig < 0,05 berarti significant/berbeda nyata.

Jika sig > 0,05 berarti non significant/tidak berbeda nyata.

b. Sidik ragam (ANOVA) berat kering tanaman

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|-----------------|-------------------------|----|-------------|---------|-------|
| Corrected Model | 325,416 ^a | 15 | 21,694 | 1,186 | ,314 |
| Intercept | 3308,119 | 1 | 3308,119 | 180,922 | <,001 |
| P | 47,741 | 3 | 15,914 | ,870 | ,463 |
| F | 38,507 | 3 | 12,836 | ,702 | ,556 |
| P * F | 239,167 | 9 | 26,574 | 1,453 | ,193 |
| Error | 877,668 | 48 | 18,285 | | |
| Total | 4511,202 | 64 | | | |
| Corrected Total | 1203,083 | 63 | | | |

Jika sig < 0,05 berarti significant/berbeda nyata.

Jika sig > 0,05 berarti non significant/tidak berbeda nyata.

Lampiran 6.

a. Sidik ragam (ANOVA) panjang akar

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|-----------------|-------------------------|----|-------------|---------|-------|
| Corrected Model | 4803,937 ^a | 15 | 320,262 | 1,555 | ,124 |
| Intercept | 88655,063 | 1 | 88655,063 | 430,495 | <,001 |
| P | 874,687 | 3 | 291,562 | 1,416 | ,250 |
| F | 107,187 | 3 | 35,729 | ,173 | ,914 |
| P * F | 3822,063 | 9 | 424,674 | 2,062 | ,052 |
| Error | 9885,000 | 48 | 205,938 | | |
| Total | 103344,000 | 64 | | | |
| Corrected Total | 14688,937 | 63 | | | |

Jika sig < 0,05 berarti significant/berbeda nyata.

Jika sig > 0,05 berarti non significant/tidak berbeda nyata.

b. Sidik ragam (ANOVA) berat segar akar

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|-----------------|-------------------------|----|-------------|---------|-------|
| Corrected Model | 63,238 ^a | 15 | 4,216 | 1,126 | ,360 |
| Intercept | 2310,004 | 1 | 2310,004 | 617,229 | <,001 |
| P | 4,636 | 3 | 1,545 | ,413 | ,744 |
| F | 16,696 | 3 | 5,565 | 1,487 | ,230 |
| P * F | 41,907 | 9 | 4,656 | 1,244 | ,292 |
| Error | 179,642 | 48 | 3,743 | | |
| Total | 2552,884 | 64 | | | |
| Corrected Total | 242,880 | 63 | | | |

Jika sig < 0,05 berarti significant/berbeda nyata.

Jika sig > 0,05 berarti non significant/tidak berbeda nyata.

Lampiran 7.

a. Sidik ragam (ANOVA) berat kering akar

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|-----------------|-------------------------|----|-------------|---------|-------|
| Corrected Model | ,641 ^a | 15 | ,043 | ,887 | ,582 |
| Intercept | 22,586 | 1 | 22,586 | 468,828 | <,001 |
| P | ,068 | 3 | ,023 | ,468 | ,706 |
| F | ,161 | 3 | ,054 | 1,116 | ,352 |
| P * F | ,412 | 9 | ,046 | ,951 | ,491 |
| Error | 2,312 | 48 | ,048 | | |
| Total | 25,540 | 64 | | | |
| Corrected Total | 2,954 | 63 | | | |

Jika sig < 0,05 berarti significant/berbeda nyata.

Jika sig > 0,05 berarti non significant/tidak berbeda nyata.

b. Ringkasan ANOVA .

| Parameter | POC | Pupuk P | Interaksi |
|----------------------------------|-----|---------|-----------|
| Tinggi Tanaman | NS | NS | NS |
| Jumlah Daun | NS | NS | NS |
| Panjang Akar | NS | NS | NS |
| Berat Segar akar | NS | NS | NS |
| Berat Kering Akar | NS | NS | NS |
| Berat Segar Tanaman | NS | NS | NS |
| Berat Kering Tanaman | NS | NS | NS |
| Berat Bintil Akar | NS | S | S |
| Jumlah Bintil Akar | NS | NS | NS |
| Jumlah Bintil Akar Efektif | NS | NS | NS |
| Jumlah Bintil Akar Tidak Efektif | NS | NS | NS |

NS : Non Significant/tidak berbeda nyata.

S : Significant/berbeda nyata.

Lampiran 8.

Dokumentasi penelitian (Foto)

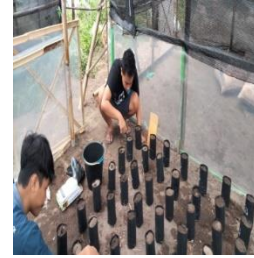
Pengayakan tanah



Pengisian tanah ke polybag



penanaman kecambah



Pemberian pupuk



Pengukuran tinggi & penghitungan jumlah daun



Persiapan panen



Penimbangan berat segar tanaman



Pengukuran panjang dan menghitung jumlah bintil akar



memasukan seluruh tanaman segar untuk di oven



Pengovenan



Penimbangan berat kering tanaman



Tim yang memantu panen



Lampiran 9. Matrik Perlakuan

| POC (P) | Pupuk P (F) | Ulangan 1 | Ulangan 2 | Ulangan 3 | Ulangan 4 |
|------------|------------------|--|--|--|--|
| 0 ml/liter | 0 gram/tanaman | P ₀ F ₀ U ₁ | P ₀ F ₀ U ₂ | P ₀ F ₀ U ₃ | P ₀ F ₀ U ₄ |
| | 1,5 gram/tanaman | P ₀ F ₁ U ₁ | P ₀ F ₁ U ₂ | P ₀ F ₁ U ₃ | P ₀ F ₁ U ₄ |
| | 2,5 gram/tanaman | P ₀ F ₂ U ₁ | P ₀ F ₂ U ₂ | P ₀ F ₂ U ₃ | P ₀ F ₂ U ₄ |
| | 3,5 gram/tanaman | P ₀ F ₃ U ₁ | P ₀ F ₃ U ₂ | P ₀ F ₃ U ₃ | P ₀ F ₃ U ₄ |
| 1 ml/liter | 0 gram/tanaman | P ₁ F ₀ U ₁ | P ₁ F ₀ U ₂ | P ₁ F ₀ U ₃ | P ₁ F ₀ U ₄ |
| | 1,5 gram/tanaman | P ₁ F ₁ U ₁ | P ₁ F ₁ U ₂ | P ₁ F ₁ U ₃ | P ₁ F ₁ U ₄ |
| | 2,5 gram/tanaman | P ₁ F ₂ U ₁ | P ₁ F ₂ U ₂ | P ₁ F ₂ U ₃ | P ₁ F ₂ U ₄ |
| | 3,5 gram/tanaman | P ₁ F ₃ U ₁ | P ₁ F ₃ U ₂ | P ₁ F ₃ U ₃ | P ₁ F ₃ U ₄ |
| 2 ml/liter | 0 gram/tanaman | P ₂ F ₀ U ₁ | P ₂ F ₀ U ₂ | P ₂ F ₀ U ₃ | P ₂ F ₀ U ₄ |
| | 1,5 gram/tanaman | P ₂ F ₁ U ₁ | P ₂ F ₁ U ₂ | P ₂ F ₁ U ₃ | P ₂ F ₁ U ₄ |
| | 2,5 gram/tanaman | P ₂ F ₂ U ₁ | P ₂ F ₂ U ₂ | P ₂ F ₂ U ₃ | P ₂ F ₂ U ₄ |
| | 3,5 gram/tanaman | P ₂ F ₃ U ₁ | P ₂ F ₃ U ₂ | P ₂ F ₃ U ₃ | P ₂ F ₃ U ₄ |
| 3 ml/liter | 0 gram/tanaman | P ₃ F ₀ U ₁ | P ₃ F ₀ U ₂ | P ₃ F ₀ U ₃ | P ₃ F ₀ U ₄ |
| | 1,5 gram/tanaman | P ₃ F ₁ U ₁ | P ₃ F ₁ U ₂ | P ₃ F ₁ U ₃ | P ₃ F ₁ U ₄ |
| | 2,5 gram/tanaman | P ₃ F ₂ U ₁ | P ₃ F ₂ U ₂ | P ₃ F ₂ U ₃ | P ₃ F ₂ U ₄ |
| | 3,5 gram/tanaman | P ₃ F ₃ U ₁ | P ₃ F ₃ U ₂ | P ₃ F ₃ U ₃ | P ₃ F ₃ U ₄ |

Lampiran 10. Layout Penelitian

| | | | | | | | |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| $P_0F_0U_1$ | $P_0F_1U_1$ | $P_0F_2U_1$ | $P_0F_3U_1$ | $P_1F_0U_1$ | $P_1F_1U_1$ | $P_1F_2U_1$ | $P_1F_3U_1$ |
| $P_2F_0U_1$ | $P_2F_1U_1$ | $P_2F_2U_1$ | $P_2F_3U_1$ | $P_3F_0U_1$ | $P_3F_1U_1$ | $P_3F_2U_1$ | $P_3F_3U_1$ |
| $P_1F_3U_2$ | $P_1F_2U_2$ | $P_1F_1U_2$ | $P_1F_0U_2$ | $P_0F_3U_2$ | $P_0F_2U_2$ | $P_0F_1U_2$ | $P_0F_0U_2$ |
| $P_2F_0U_2$ | $P_2F_1U_2$ | $P_2F_2U_2$ | $P_2F_3U_2$ | $P_3F_0U_2$ | $P_3F_1U_2$ | $P_3F_2U_2$ | $P_3F_3U_2$ |
| $P_2F_2U_4$ | $P_2F_3U_4$ | $P_3F_0U_4$ | $P_3F_1U_4$ | $P_2F_1U_4$ | $P_3F_2U_4$ | $P_3F_3U_4$ | $P_2F_0U_4$ |
| $P_1F_0U_4$ | $P_1F_2U_4$ | $P_0F_3U_4$ | $P_1F_1U_4$ | $P_0F_1U_4$ | $P_1F_3U_4$ | $P_0F_0U_4$ | $P_0F_2U_4$ |
| $P_0F_3U_3$ | $P_1F_3U_3$ | $P_0F_0U_3$ | $P_0F_2U_3$ | $P_1F_2U_3$ | $P_0F_1U_3$ | $P_1F_0U_3$ | $P_1F_1U_3$ |
| $P_3F_2U_3$ | $P_3F_3U_3$ | $P_2F_0U_3$ | $P_3F_1U_3$ | $P_2F_3U_3$ | $P_3F_0U_3$ | $P_2F_1U_3$ | $P_2F_2U_3$ |