

雞糞堆肥與牛糞堆肥不同施用量對落花生有機栽培農藝性狀及產量之影響

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摘要

本研究主要探討落花生有機栽培肥培管理，以落花生台南14號與黑仁花生為材料，於100年2月(春作)與8月(秋作)利用完全發酵雞糞+菇類廢棄太空包製成之雞糞堆(全氮3.5%、全磷3.0%、氧化鉀1.8%、有機質63%)與完全發酵牛糞+菇類廢棄太空包製成之牛糞堆(全氮2.0%、全磷2.5%、氧化鉀2.2%、有機質50%)兩種為處理，分為低1500kg/ha、中3000kg/ha、高4500kg/ha不同堆肥施用量，並與一般慣行栽培作比較，收穫時調查落花生農藝性狀及產量組成，結果如下：
春作雞糞堆肥、中、高施用量與慣行栽培對落花生台南14號與黑仁花生之小區鮮莢產量與小區種子產量之影響，台南14號以高施用量與慣行栽培表現最佳，而慣行栽培在台南14號表現較有機栽培為佳，但在黑仁花生之表現與中施用量相似。春作牛糞堆肥、中、高施用量與慣行栽培對落花生台南14號與黑仁花生小區鮮莢產量與小區種子產量影響，台南14號亦以高施用量與慣行栽培表現最佳，而慣行栽培在台南14號表現較有機栽培為佳，但在黑仁花生之表現與中施用量相似。
秋作雞糞堆肥、中、高施用量與慣行栽培對落花生台南14號與黑仁花生之小區鮮莢產量與小區種子產量之影響，台南14號以中施用量與慣行栽培表現最佳，而慣行栽培在台南14號表現較有機栽培為佳。秋作牛糞堆肥、中、高施用量與慣行栽培對落花生台南14號與黑仁花生之小區鮮莢產量與小區種子產量之影響，台南14號亦以中施用量、黑仁花生以低、中施用量表現最佳，而慣行栽培在台南14號與黑仁花生表現較有機栽培為佳。

前言

有機質肥料因所含之營養元素較化學肥料均衡，具有促進作物生長、提升產量及品質效果 (Jacobs, 1990)。合理施用有機質肥料，有助於提升作物生產 (Reddy et al., 2000)。落花生 (*Arachis hypogaea* L.) 是台灣重要之雜糧及食用作物之一，依據2011年台灣農業年報統計，民國99年栽培面積為20917公頃。未來落花生推廣有機栽培，有機肥之施用量可能影響產量與品質，本研究旨在探討落花生有機栽培堆肥不同施用量與慣行農法之落花生農藝性狀及產量上的差異。

材料與方法

以落花生台南14號與黑仁花生為材料，於100年2月春作與8月(秋作)播種於嘉義縣義竹鄉有機農家農田，以雞糞與牛糞堆肥不同施用量(低1500kg/ha、中3000kg/ha、高4500kg/ha)為處理。花生成熟將各處理小區收穫，並將花生莢果乾燥，脫殼後種子進行農藝性狀及產量調查。

結果

Table 1. Effects of different application rates of chicken compost on agronomic characters of organic cultural peanut TN14 in harvest period (spring crop of 2010).

Organic fertilizer application rate (kg/ha)	Plant height (cm)	No. of branch (no.)	Mature pods/plant (no.)	Immature pods/plant (no.)	Total pods/plant (no.)	Mature pod fresh weight (g)	Total seeds/plant weight (g)	Mature pod dry weight (g)
Control	63.57a	3.92c	7.48b	2.29b	9.77b	14.98c	12.13c	7.76c
Low 1500	62.08a	3.97c	7.52b	2.24b	9.76b	15.14bc	12.59c	8.87c
Middle 3000	56.63a	4.18ab	8.26b	1.63b	9.89b	15.96bc	14.44bc	9.25c
High 4500	61.17a	4.51b	8.26ab	1.74b	10.06b	15.51bc	15.85bc	13.18b
Common cultural	54.49a	7.00a	11.02a	3.97a	14.99a	33.33a	18.34a	20.89a
LSD	NS	0.50	2.01	1.20	2.70	4.43	2.55	2.30

Organic fertilizer application rate (kg/ha)	Weight of seeds (g)	100 seeds weight (g)	Pod yield /plot (g/10m ²)	Seed yield /plot (g/10m ²)	Shelling percentage (%)	Rate of 1 st grade seed (%)	Rate of 2 nd grade seed (%)	Rate of 3 rd grade seed (%)
Control	5.24c	59.62b	3935.5c	1362.2d	42.87c	85.39ab	12.55ab	2.06a
Low 1500	5.60c	60.36b	3997.0c	1425.5d	42.98c	87.84ab	10.21b	1.94a
Middle 3000	6.71bc	61.46b	4178.4c	1821.4c	45.54c	87.16ab	10.97b	1.87a
High 4500	8.10b	61.72b	5200.7b	2160.7b	51.29b	89.02a	9.90b	1.08a
Common cultural	14.54a	69.76a	9218.5a	3743.2a	78.77a	83.40b	15.26a	1.34a
LSD	1.76	4.63	690.82	299.05	4.92	4.76	4.03	NS

Table 2. Effects of different application rates of chicken compost on agronomic characters of organic cultural black kernel peanut in harvest period (spring crop of 2010).

Organic fertilizer application rate (kg/ha)	Plant height (cm)	No. of branch (no.)	Mature pods/plant (no.)	Immature pods/plant (no.)	Total pods/plant (no.)	Mature pod fresh weight (g)	Total seeds/plant weight (g)	Mature pod dry weight (g)
Control	102.17a	3.32a	5.98a	5.48a	10.46b	16.68b	12.88c	7.87b
Low 1500	103.09a	3.20a	7.51a	4.16a	11.67ab	17.34ab	13.96bc	8.60ab
Middle 3000	106.66a	3.07a	7.70a	5.51a	13.21a	19.34ab	17.98ab	10.24ab
High 4500	107.00a	3.08a	6.83a	4.61a	11.437	17.79ab	15.85abc	8.49ab
Common cultural	84.62b	3.83a	7.53a	4.13a	11.67ab	22.20a	19.50a	12.28a
LSD	6.02	NS	NS	NS	2.59	5.10	4.63	4.22

Organic fertilizer application rate (kg/ha)	Weight of seeds (g)	100 seeds weight (g)	Pod yield /plot (g/10m ²)	Seed yield /plot (g/10m ²)	Shelling percentage (%)	Rate of 1 st grade seed (%)	Rate of 2 nd grade seed (%)	Rate of 3 rd grade seed (%)
Control	4.07b	51.29b	4380.8b	1065.1c	29.86bc	56.82b	27.72a	15.46a
Low 1500	5.00ab	52.67b	4490.1b	1234.3bc	37.19a	57.19b	29.56a	13.20a
Middle 3000	6.48a	54.74a	5156.5ab	1659.2a	36.20ab	60.82ab	27.08ab	12.10ab
High 4500	5.04ab	51.27b	4675.2b	1316.9b	28.51c	60.52ab	22.33b	17.15a
Common cultural	7.24a	58.22a	5852.2a	1830.7a	37.96a	65.26a	28.55a	6.86b
LSD	2.30	4.66	861.22	243.75	6.94	6.47	4.80	5.70

Table 3. Effects of different application rates of dairy compost on agronomic characters of organic cultural peanut TN14 in harvest period (spring crop of 2010).

Organic fertilizer application rate (kg/ha)	Plant height (cm)	No. of branch (no.)	Mature pods/plant (no.)	Immature pods/plant (no.)	Total pods/plant (no.)	Mature pod fresh weight (g)	Total seeds/plant weight (g)	Mature pod dry weight (g)
Control	63.74a	4.02b	6.98b	2.40b	9.28b	15.09b	12.20b	8.83c
Low 1500	65.78a	4.01b	7.69b	2.24b	9.93b	16.03b	13.05b	9.38bc
Middle 3000	67.37a	4.12b	8.79ab	1.65b	10.44b	17.57b	14.47b	11.77bc
High 4500	65.36a	3.94b	8.91ab	2.35b	11.25b	18.44b	14.24b	12.35b
Common cultural	54.49b	7.00a	11.02a	3.97a	14.99a	33.33a	18.34a	20.89a
LSD	3.95	0.59	2.25	1.11	3.11	5.74	2.97	3.40

Organic fertilizer application rate (kg/ha)	Weight of seeds (g)	100 seeds weight (g)	Pod yield /plot (g/10m ²)	Seed yield /plot (g/10m ²)	Shelling percentage (%)	Rate of 1 st grade seed (%)	Rate of 2 nd grade seed (%)	Rate of 3 rd grade seed (%)
Control	6.00b	58.19c	4088.0b	1600.6	42.87c	85.39ab	12.55ab	2.06a
Low 1500	6.45b	60.20b	4272.4b	1753.9bc	42.98c	87.84ab	10.21b	1.94a
Middle 3000	7.35b	62.41b	4683.7b	1959.9bc	45.54c	87.16ab	10.97b	1.87a
High 4500	7.65b	61.79b	4914.9b	2038.7b	51.29b	89.02a	9.90b	1.08a
Common cultural	14.54a	69.76a	9218.5a	3743.2a	78.77a	83.40b	15.26a	1.34a
LSD	2.12	2.58	1579.8	400.28	4.92	4.76	4.03	NS

Table 4. Effects of different application rates of dairy compost on agronomic characters of organic cultural black kernel peanut in harvest period (spring crop of 2010).

Organic fertilizer application rate (kg/ha)	Plant height (cm)	No. of branch (no.)	Mature pods/plant (no.)	Immature pods/plant (no.)	Total pods/plant (no.)	Mature pod fresh weight (g)	Total seeds/plant weight (g)	Mature pod dry weight (g)
Control	104.04a	3.25ab	6.67a	5.27a	11.93a	18.04a	15.98a	8.17a
Low 1500	107.89a	3.30ab	7.47a	5.34a	12.81a	19.16a	17.87a	9.77a
Middle 3000	107.60a	3.10b	7.96a	5.24a	13.19a	20.16a	19.14a	10.57a
High 4500	105.68a	3.13b	7.48a	4.84a	12.32a	19.10a	17.55a	10.13a
Common cultural	84.62b	3.83a	7.5a	4.13a	11.67a	22.20a	19.50a	12.28a
LSD	8.86	0.68	NS	NS	NS	NS	NS	NS

Organic fertilizer application rate (kg/ha)	Weight of seeds (g)	100 seeds weight (g)	Pod yield /plot (g/10m ²)	Seed yield /plot (g/10m ²)	Shelling percentage (%)	Rate of 1 st grade seed (%)	Rate of 2 nd grade seed (%)	Rate of 3 rd grade seed (%)
Control	5.49b	58.15c	4141.8b	1531.1a	32.12a	61.47a	30.51a	8.02b
Low 1500	6.26ab	63.91a	5107.5ab	1601.4a	35.53a	64.51a	22.93ab	12.56abc
Middle 3000	6.98ab	66.41a	5374.0ab	1827.7a	36.18a	63.49a	22.25b	14.26a
High 4500	6.03ab	60.68b	5093.4ab	1552.4a	34.12a	63.27a	23.06ab	13.67ab
Common cultural	7.24a	58.22c	5852.2a	1830.7a	37.96a	65.26a	28.55ab	6.86c
LSD	1.68	4.9223	1613.2	NS	NS	NS	7.95	5.82

Table 5. Effects of different application rates of chicken compost on agronomic characters of organic cultural peanut TN14 in harvest period (fall crop of 2010).

Organic fertilizer application rate (kg/ha)	Plant height (cm)	No. of branch (no.)	Mature pods/plant (no.)	Immature pods/plant (no.)	Total pods/plant (no.)	Mature pod fresh weight (g)	Total seeds/plant weight (g)	Mature pod dry weight (g)
Control	39.28b	8.21ab	11.42a	9.99ab	21.41bc	21.71b	12.90a	15.24b
Low 1500	42.63ab	8.730a	12.57a	10.91ab	23.48ab	22.89ab	13.75a	18.81ab
Middle 3000	39.91b	8.15ab	13.19a	11.78a	24.98a	24.14ab	14.99a	21.09a
High 4500	39.45b	8.21ab	12.82a	9.43b	22.25abc	23.38ab	13.71a	18.95ab
Common cultural	44.68a	7.22b	12.50a	7.06c	19.56c	29.07a	13.37a	19.72ab
LSD	3.85	1.21	NS	2.16	2.98	7.17	NS	4.69

Organic fertilizer application rate (kg/ha)	Weight of seeds (g)	100 seeds weight (g)	Pod yield /plot (g/10m ²)	Seed yield /plot (g/10m ²)	Shelling percentage (%)	Rate of 1 st grade seed (%)	Rate of 2 nd grade seed (%)	Rate of 3 rd grade seed (%)
Control	6.87b	55.43a	5787.8b	1832.7b	45.05a	62.41a	33.80a	3.80a
Low 1500	8.73ab	63.28a	6085.5ab	2927.5ab	46.85a	64.10a	32.96a	2.62a
Middle 3000	9.54a	63.61a	6438.5ab	2542.5a	45.98a	65.34a	30.72a	3.94a
High 4500	8.98ab	66.36a	6234.8ab	2393.4ab	48.59a	64.32a	32.81a	2.87a
Common cultural	8.74ab	66.18a	7750.1a	2931.0a	45.21a	72.78a	15.29b	2.94a
LSD	2.28	NS	1912.2	606.64	NS	NS	9.15	NS

Table 6. Effects of different application rates of chicken compost on agronomic characters of organic cultural black kernel peanut in harvest period (fall crop of 2010).

Organic fertilizer application rate (kg/ha)	Plant height (cm)	No. of branch (no.)	Mature pods/plant (no.)	Immature pods/plant (no.)	Total pods/plant (no.)	Mature pod fresh weight (g)	Total seeds/plant weight (g)	Mature pod dry weight (g)
Control	42.05a	3.49b	7.10b	5.66a	12.77b	25.38a	10.20a	17.79b
Low 1500	44.21a	4.12a	7.74b	5.05a	12.79b	26.46a	11.06a	17.14b
Middle 3000	43.77a	4.11a	7.65b	5.18a	12.83b	25.93a	13.51a	19.61ab
High 4500	43.16a	4.13a	7.95ab	5.51a	13.46ab	25.61a	11.04a	19.50ab
Common cultural	44.82a	3.80ab	10.17a	6.83a	17.01a	30.12a	13.25a	23.05a
LSD	NS	0.59	2.27	NS	3.6356	NS	NS	5.08

Organic fertilizer application rate (kg/ha)	Weight of seeds (g)	100 seeds weight (g)	Pod yield /plot (g/10m ²)	Seed yield /plot (g/10m ²)	Shelling percentage (%)	Rate of 1 st grade seed (%)	Rate of 2 nd grade seed (%)	Rate of 3 rd grade seed (%)
Control	4.59b	45.31ab	6767.5a	1223.1b	25.58b	40.39b	46.96a	12.64ab
Low 1500	4.58b	41.76b	7054.8a	1221.6b	26.84a	43.58b	44.67ab	11.75ab
Middle 3000	5.16b	46.29ab	6912.1a	1376.8b	26.37b	45.63b	44.99ab	9.37b
High 4500	4.89b	44.28ab	6826.8a	1304.8b	26.42b	41.19b	45.27ab	14.21a
Common cultural	8.47a	64.48a	8029.1a	2257.2a	35.53a	58.28a	35.29b	6.43c
LSD	1.22	20.31	NS	328.8	7.01	12.16	11.13	4.36

Table 7. Effects of different application rates of dairy compost on agronomic characters of organic cultural peanut TN14 in harvest period (fall crop of 2010).

Organic fertilizer application rate (kg/ha)	Plant height (cm)	No. of branch (no.)	Mature pods/plant (no.)	Immature pods/plant (no.)	Total pods/plant (no.)	Mature pod fresh weight (g)	Total seeds/plant weight (g)	Mature pod dry weight (g)
Control	41.44a	8.21ab	10.69a	7.35bc	18.05b	20.26b	13.08	15.91b
Low 1500	45.18a	8.46a	11.75a	11.47a	23.21a	23.14ab	14.09	16.54ab
Middle 3000	42.19a	8.55a	10.93a	9.28abc	20.20ab	25.20ab	14.71	17.65ab
High 4500	41.96a	8.21ab	11.28a					