Kasetsart J. (Nat. Sci.) 38 : 21 - 30 (2004)

Storage Potential of Three Different Types of In-shell Peanut Seeds under Ambient and Cold Room Conditions

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ABSTRACT

Peanut seed storability differs depending on storage environment and peanut genotype. This study was conducted to determine the effects of storage conditions on peanut seed quality, and to compare storage potential of three peanut cultivars. In-shell seeds of three peanut cultivars *viz.* Kasetsart 50, Local Fresh Boiled peanut (LFB) and Tainan 9 were stored under ambient (23.5 to 28.1°C, 58.5 to 79.0% RH) and cold room (12°C, 76% RH) conditions for 6 months from January to July 2003 at the National Corn and Sorghum Research Center. Split-split plot design with 5 replications was used. Storage condition was treated as main plot factor, cultivars as sub-plot factor, and storage duration as sub-sub plot factor. Germination, vigor and field emergence were determined at 0, 3 and 6 months of storage.

Under cold room condition, seed quality differences among cultivars were minimal. Seeds of the three cultivars maintained high quality up to 6 months. Under ambient condition, seed quality differences were obvious. Tainan 9 seed maintained high germination, vigor and field emergence up to 6 months, while germination, vigor and field emergence of LFB seeds were greatly reduced and seed vigor of Kasetsart 50 was decreased.

Seed qualities of Tainan 9, and to a lesser extent, of Kasetsart 50, were high and stable under both ambient and cold room conditions after 6 months of storage, however, those of LFB seeds under ambient condition were greatly reduced after 6 months suggesting cold storage is necessary for LFB.
Key words: storage potential, peanut seed, seed quality, seed vigor

INTRODUCTION

Peanut possesses a short storage life. Rapid loss of germination and vigor during storage under ambient condition is a major constraint in peanut production especially under tropical condition. Storability can be improved by controlling storage environment. A number of researchers have proved that peanut storage life is relatively longer under cold storage (Satonsawapak, 1986; Duangpatra, 1984; Duangpatra and Kuphotipan, 1986; Duangpatra *et al.*, 1986; Duangpatra, 1988). However, cold storage is far beyond the reach of farmers especially of developing countries. Peanut storage life also differs among peanut cultivars. Genotypic differences have been reported in terms of seed longevity (Rao *et al.*, 2002), field emergence (Ketring, 1992); germinability (after six months storage) (Nkang and Umoh, 1996), seed deterioration (between varieties Tainan 9 and SK 38) (Duangpatra *et al.*, 1986), and germination rate (among four peanut cultivars: Tainan 9, SK

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Received date : 13/02/04 Accepted date : 31/03/04

39, PI 337394F and PI 337409) (Duangpatra and Kuphotipan, 1986). The present study was conducted to determine the effects of storage conditions on peanut seed quality (germination, vigor and field emergence), and to compare storage potential of in-shell seeds of three peanut cultivars.

MATERIALS AND METHODS

In-shell seeds of three peanut cultivars *viz.* Kasetsart 50 (large seeded cultivar), Local Fresh Boiled peanut (LFB)(small seeded cultivar) and Tainan 9 (medium seeded cultivar) were sun-dried after harvest to about 5% moisture content, and stored under cold room (12°C - 76% RH), and under ambient condition (23.5 to 28.1°C- 58.5 to 79.0% RH) for the period of 0, 3 and 6 months from January 2003 through July 2003 at the National Corn and Sorghum Research Center, Pakchong district, Nakhon Ratchasima province. Split-split plot designs with 5 replications was used in this experiment in which storage conditions was treated as main plot factor, peanut cultivars as subplot factor, and storage periods as sub-sub plot factor. Seed quality (moisture content, germination, germination index, accelerated aging and electrical conductivity) determination was done at the Seed Technology Laboratory, Department of Agronomy, Faculty of Agriculture, Kasetsart University, Bangkok, Thailand. Field study was carried out at the National Corn and Sorghum Research Center, Pakchong district, Nakhon Ratchasima province. Mean temperature (°C) and RH (%) of the National Corn and Sorghum Research Center during the storage period were shown in Table 1.

Seed moisture content

Seed moisture content was measured by hot-air oven method. Pre-weighed fresh seeds were dried in oven for 24 hours, and the dry weight was recorded. Then, seed moisture content was calculated using the following formula:

$$\%\text{moisture content (w.b.)} = \frac{\text{Fresh weight of seed} - \text{Dry weight of seed}}{\text{Fresh weight of seed}} \times 100$$

Table 1 Monthly mean temperature (°C), relative humidity (%), rainfall (mm) and number of rainy days from January to August 2003.

Month	Temperature (°C) (±SD) [1/]	RH (%) (± SD)	Rainfall (mm) (± SD)	No. of rainy days
January	23.5 ± 1.4	58.5 ± 6.7	T[2/] ± 0	0
February	26.0 ± 1.8	67.5 ± 10.8	39.3 ± 3.0	9
March	26.4 ± 1.3	72.5 ± 9.5	144.6 ± 15.0	11
April	27.8 ± 0.7	72.5 ± 6.9	120.5 ± 12.2	8
May	28.1 ± 1.1	72.5 ± 7.8	134.6 ± 10.5	9
June	27.2 ± 0.8	73.9 ± 6.4	186.7 ± 10.5	16
July	26.6 ± 0.7	79.0 ± 5.2	149.8 ± 11.3	15
August	27.0 ± 0.8	75.6 ± 5.1	65.60 ± 4.8	14

1/ Standard deviation
2/ Trace amount

Source: 431301Pak ChongAgromet Station Elevation: 356 m
Lat: 14.42.00 Long: 101.25.00

Germination (G) and germination index (GI)

Germination was performed on five 50-seed replicates each, which were treated with carboxin (5,6-dihydro-2methyl-1,4-oxathi-ine-3-carbosanilide) 75 % WP, in sand at 25°C. The percentage of normal seedlings was counted at 10 days after seeding as described in International Rules for Seed Testing Annexes (ISTA, 1999). The number of normal seedlings was also counted daily for germination index (GI) from the day that the first seed germinated until the germination test finished. Germination index was calculated by:

$$\text{Germination index} = \sum\left(\frac{\text{Ni}}{\text{Di}}\right)$$

Where Ni = Number of normal seedlings counted at i^{th} date

Di = Number of days required to the i^{th} germination

Accelerated aging for 4 days (4 AA) and for 8 days (8 AA)

Five replicates of 50 seeds each for each treatment were subjected to accelerated aging for 96 hours (4 AA) and 192 hours (8 AA) by exposing to 42°C and 100% RH (AOSA, 1983). The seeds were then allowed to dry for 3 days under ambient condition. Then, it followed germination test procedures, and percentage of normal seedlings was counted.

Electrical conductivity (EC)

EC was determined at 20°C with five replicates of 25 seeds each (without damaged seed coats) in 75 ml deionized water at 24 hours using a Conductivity Hand-Held Meter LF 330/340, and the values were expressed in µS/cm/g (AOSA, 1983).

Field emergence percentage

Field emergence was tested at the National Corn and Sorghum Research Center, Pakchong district, Nakhon Ratchasima province. The seeds were sown in well-prepared seedbed with 50 × 20 cm spacing. Emergence percentages were counted at 7, 14 and 21 days after seeding (DAS). Field emergence at 21 DAS was noted as total field emergence. Seedlings those emerged from the soil surface without having deformed, damaged, or missing terminal bud and primary leaves, but having normal shape and normal size of primary leaves were counted as normal seedlings.

RESULTS AND DISCUSSION

Seed moisture content

Initial moisture contents were not significantly different among seeds of three cultivars (Table 2). They ranged from 4.4 to 4.9%. Swamy and Rao (1971) reported that seed moisture content which equilibrated with 80% of RH (critical moisture content-CMC) is extremely vulnerable to rapid deterioration of seeds. Justice and Bass (1979) complied equilibrium moisture content of seeds of several crops at various relative humidities and approximately 12 to 25°C. They showed for peanut that seed moisture content of 4.2, 5.1 and 5.9% were equilibrated with 30, 40 and 50 % RH, respectively. Equilibrium levels of initial seed moisture contents of three peanut cultivars were apparently lower than critical moisture content of 80% RH. Therefore, initial seed moisture contents in this experiment were assumed to be low enough not to affect seed quality, and thus safe for storage.

After 6 months of storage, seed of LFB cultivar stored under ambient condition had lower moisture content than seeds of Kasetsart 50 and Tainan 9. Comparing between ambient storage and cold room, it was found that moisture contents of ambient-stored seeds were higher than those of cold-room stored seeds (Table 2). However, peanut seed moisture contents ranging from 4.2 to 5.2 % at 6 months of storage were still safe for continuing storage.

Table 2 Moisture content, germination and germination index of Kasetsart 50, LFB and Tainan 9 peanut seeds stored under ambient (23.5 to 28.1°C, 58.5 to 79.0% RH) and cold room condition (12°C, 76% RH) for 6 months.

Cultivars	Moisture content (%)		Germination (%)		Germination index	
	Ambient	Cold room	Ambient	Cold room	Ambient	Cold room
			0 month			
Kasetsart 50	A 4.8 a	A 4.8 a	B 81.5 a	B 81.5 a	A 6.4 a	A 6.4 a
LFB	A 4.4 a	A 4.4 a	A 97.2 a	A 97.2 a	A 7.9 a	A 7.9 a
Tainan 9	A 4.9 a	A 4.9 a	A 99.2 a	A 99.2 a	A 7.5 a	A 7.5 a
			3 months			
Kasetsart 50	B 5.1 a	B 5.11 a	A 98.4 a	B 85.2 b	A 8.38 a	B 6.04 b
LFB	B 5.2 a	A 5.30 a	B 91.0 b	A 98.8 a	A 8.85 a	A 9.19 a
Tainan 9	A 5.3 a	A 5.37 a	A 100.0 a	A 98.8 a	A 8.86 a	A 9.07 a
			6 months			
Kasetsart 50	A 5.2 a	A 4.5 b	B 81.6 b	B 94.4 a	B 6.49 b	B 8.63 a
LFB	B 4.4 a	A 4.2 a	C 49.2 b	A 98.0 a	C 4.54 b	A 10.31 a
Tainan 9	A 5.1 a	A 4.5 b	A 97.2 a	A 98.4 a	A 8.13 b	B 9.05 a

1/ Within a column in each storage period, means preceded by the same capital letter are not significantly different at $P < 0.05$ by DMRT.

2/ Within a row in each character, means followed by the same small letter are not significantly different at $P < 0.05$ by DMRT.

Effects of storage conditions on germination and vigor

The effects of storage conditions were found especially at 6 months of storage (Table 2 and Table 3). Storage conditions influenced G, GI, 4 AA and EC of Kasetsart 50 and LFB, while GI, 4 AA, 8 AA and EC were affected in Tainan 9.

Storage conditions influenced G of Kasetsart 50 and LFB at both 3 and 6 months of storages. G of Kasetsart 50 seeds was higher under ambient than under cold-room condition at 3 months of storage, but at 6 months cold-room condition gave higher G than did ambient condition. Germination of LFB seed was higher under cold room than under ambient condition at both 3 and 6 months of storages. Effect of storage condition on G of Tainan 9 was not found.

In seeds of three peanut cultivars, GI, 4 AA and 8 AA were higher under cold room than under ambient condition at 6 moths of storage, but at 3 months GI of Kasetsart 50 was higher under ambient than under cold room condition. In Tainan 9, 8 AA was higher under cold room than under ambient condition.

Therefore, results in this experiment indicated that storage conditions influenced germination and vigor of Kasetsart 50 and LFB. The effect of storage conditions was especially obvious at 6 months of storage. The storage condition did not affect germination of Tainan 9 peanut seed, but that affected its seed vigor as determined by GI, 4 AA, 8 AA and EC (Table 2 and Table 3).

Copeland and McDonald (2001) reported that the deterioration of seeds is observable in their lowered performance during germination. Delayed seedling emergence is among the first noticeable symptoms, followed by a slower rate of seedling growth and development and decreased germination. Therefore, low GI of seeds of three

Table 3 Germination (%) after accelerated aging for 4 days (4 AA), germination (%) after accelerated aging for 8 days (8 AA), and electrical conductivity (EC) of Kasetsart 50, LFB and Tainan 9 peanut seeds stored under ambient (23.5 to 28.1°C - 58.5 to 79.0% RH) and cold room condition (12°C - 76% RH) for 6 months.

Cultivar	4 AA (%)		8 AA (%)		EC (µS/cm/g)	
	Ambient	Cold room	Ambient	Cold room	Ambient	Cold room
			0 month			
Kasetsart 50	A 94.8 a	A 94.8 a	A 86.0 a	A 86.0 a	B 13.70 a	B 13.70 a
LFB	A 93.6 a	A 93.6 a	B 60.4 a	B 60.4 a	B 14.85 a	B 14.85 a
Tainan 9	A 99.2 a	A 99.2 a	A 93.6 a	A 93.6 a	A 7.44 a	A 7.44 a
			3 months			
Kasetsart 50	B 83.0 a	B 86.4 a	A 17.2 a	B 10.4 a	B 14.80 a	B 13.14 a
LFB	B 84.4 a	B 83.6 a	A 42.4 a	A 52.4 a	C 22.09 a	C 19.48 a
Tainan 9	A 97.2 a	A 99.0 a	A 52.0 a	A 68.4 a	A 10.15 b	A 7.91 a
			6 months			
Kasetsart 50	B 68.0 b	B 86.4 a	A 13.2 a	AB 48.0 a	A 21.25 b	B 13.09 a
LFB	C 39.2 b	B 84.0 a	A 26.8 a	B 16.4 a	B 46.67 b	C 17.86 a
Tainan 9	A 90.8 b	A 98.8 a	A 25.6 b	A 79.6 a	A 16.55 b	A 7.87 a

1/ Within a column in each storage period, means preceded by the same capital letter are not significantly different at $P < 0.05$ by DMRT.

2/ Within a row in each character, means followed by the same small letter are not significantly different at $P < 0.05$ by DMRT.

peanut cultivars at 6 months under ambient-storage indicated that seed deterioration occurred faster under ambient condition than under cold room condition.

At 6 months of storage, 4 AA of seeds of three peanut cultivars were higher under cold room condition than under ambient condition, and so was 8 AA of Tainan 9 seeds. These results proved that the storage potential of peanut seeds were higher under cold room than under ambient condition as those reported by Duangpatra (1984), Satonsawapak (1986), Duangpatra and Kuphotipan (1986), Duangpatra *et al.* (1986) and Duangpatra (1988).

It was also found that EC of seeds of three peanut cultivars were significantly higher under ambient than under cold room condition at 6 months of storage (Table 3 and Table 5). The EC indirectly evaluates the concentration of electrolytes released by seeds during imbibition (Dias *et al.*, 1996). The degree of deterioration is associated with the concentration of seed exudates that may be found in the steep solution. These exudates are a reflection of the amount of membrane degradation that has occurred (Copeland and McDonald, 2001). The high EC of peanut seeds under ambient-storage suggested that peanut seed deterioration was faster under ambient condition.

In this experiment, three peanut cultivars could maintain their seed quality at high level throughout 6 months of storage period under cold room condition. It appeared that seed quality would not be losing under cold room condition. Seeds cannot retain their viability indefinitely, however, they must eventually deteriorate and die. In this experiment, the storage period would be too short to observe the loss of seed viability under cold room condition. It would need some longer time to determine seed deterioration under cold storage.

Cultivars differences depending on storage condition

Before storage, G, 8 AA and EC differed among seeds of three peanut cultivars (Table 2 and Table 3). Kasetsart 50 seed was significantly lower in G than the other two cultivars. LFB seed was significantly lower in 8 AA, and Tainan 9 seed was significantly lower in EC. However, there were no significant differences among cultivars of peanut seeds in GI and 4 AA. It was assumed that initial seed vigor was the lowest in LFB according to low germination of 8 AA, and the highest in Tainan 9 as indicated by low conductivity.

At 3 months, all cultivars had a high percentage of G, but G was significantly different among cultivars depending on the storage condition (Table 2). Under ambient condition, G of LFB seed was significantly lower than those of the others, while that of Kasetsart 50 seed was lower under cold room condition. Significant differences in 4 AA and EC occurred among cultivars under both storage conditions. Tainan 9 was significantly higher in 4 AA than the others.

The highest conductivity was observed in seeds of LFB, and the lowest in seeds of Tainan 9 under both storage conditions. There was no significant difference among cultivars in GI and 8 AA under ambient condition, while under cold room condition Kasetsart 50 was significantly lower in GI and 8 AA than the others. According to 4 AA and EC, Tainan 9 had the highest seed vigor.

At 6 months, differences in germination and vigor among cultivars of peanut seeds became obvious. Under ambient condition, G, GI and 4 AA were the highest in Tainan 9, intermediate in Kasetsart 50 and the lowest in LFB. Under cold room, Kasetsart 50 was lower in G than LFB and Tainan 9. LFB had the highest GI, while Tainan 9 had the highest 4 AA. The highest 8 AA was found in Tainan 9, intermediate in Kasetsart 50 and the lowest in LFB.

Delouche and Baskin (1973) proved that germination responses after accelerated aging and periods of storage were closely related. It was noticed in this experiment that, at 0 month, 8 AA of Kasetsart 50, LFB and Tainan 9 peanut seeds were 86.0, 60.4 and 93.6%, while G were 81.5, 97.2 and 99.2% respectively. After 6 months storage under ambient condition, G of the three cultivars of peanut seeds were found to be 81.6, 49.2 and 97.2%, respectively. It seemed that, in peanut, germination after accelerated aging for 8 days and periods of storage were related.

Effects of storage periods on germination and vigor

Total germination after periods of storage indicated that Kasetsart 50 and Tainan 9 peanut seeds were relatively stable under both storage conditions, while LFB seed was unstable under ambient condition. Tainan 9 seed retained high G, and vigor until 6 months under both storage conditions. Germination of Kasetsart 50 peanut seed at 6 months was not different from its initial germination, but G of LFB decreased significantly (relative to its initial germination) under ambient condition.

Table 4 and Table 5 indicated the tendency for seed vigor reduction in storage relative to storage time. All three peanut cultivars of peanut seeds maintained high vigor under cold room condition. Under ambient condition, seed vigors were significantly reduced at 6 months of storage. The prominent reduction in 4 AA was found in LFB followed by Kasetsart 50. The 4 AA of LFB decreased to 39%, while those of Kasetsart 50 and Tainan 9 declined to 68% and 91%, respectively. It was noted that as storage time increased, EC of all cultivars also increased. However, the maximum increment was found in LFB seed (46.7 µS/cm/g), intermediate in Kasetsart 50 seed (21.3 µS/cm/g) and minimum in Tainan 9 seed (16.6 µS/cm/g). GI of LFB seed was also significantly lower than its initial index, while Kasetsart 50 and Tainan 9 retained their initial indices.

Effects of storage conditions and cultivar differences in field emergence

The effects of storage conditions on field emergence was found in Kasetsart 50 and LFB at 6 months of storage (Table 6). Field emergence of both cultivars seeds were lowered under ambient than under cold room condition. It was related to seed vigor, because their seed vigor had already lowered at this time as previously discussed. However, emergence of LFB (76%) was higher than expected, since it showed lower percentage of G (49%) and 4 AA (39%).

Total emergence differences among cultivars of peanut seeds were found at 3 and 6 months under ambient condition (Table 6). At 3 months, total emergence of LFB seed was lower than those of Kasetsart 50 and Tainan 9 seeds. At 6 months, total emergence of Tainan 9 was the highest. The emergence pattern or trend among cultivars was the same as G pattern. Before storage, LFB seed germinated and emerged faster than Kasetsart 50 and Tainan 9. It is not surprising because small peanut seed was faster in germination (Kittitanasuan, 1990; Duangpatra *et al.*, 1990) and field emergence than large peanut seed (Rujirawat, 1995). The seed size of LFB is smaller than Kasetsart 50 and Tainan 9, and thus it takes relatively shorter time to absorb water and to germinate or to emerge. However, as its seed vigor was reduced under ambient condition, G and field emergence of LFB seed became slower with increasing storage time.

It was observed that total emergence of Tainan 9 peanut seed was stable up to 6 months of storage under both storage conditions (Table 7). At 6 months, total emergence of Kasetsart 50 was not different from its initial emergence, while that of LFB seed was significantly reduced under ambient condition.

Table 4 Differences in seed moisture content (MC), germination (G) and germination index (GI) within each peanut cultivar seeds stored under ambient and cold room condition for 6 months.

Storage duration (month)	MC (%)		G (%)		GI	
	Ambient	Cold room	Ambient	Cold room	Ambient	Cold room
			Kasetsart 50			
0	C 4.8	AB 4.8	B 81.5	A 81.5	B 6.41	B 6.41
3	B 5.1	A 5.1	A 98.4	A 85.2	A 8.38	B 6.04
6	A 5.2	B 4.5	B 81.6	A 94.4	B 6.49	A 8.63
			LFB			
0	B 4.4	B 4.4	A 97.2	A 97.2	A 7.91	C 7.91
3	A 5.2	A 5.3	A 91.0	A 98.8	A 8.85	B 9.19
6	B 4.4	B 4.2	B 49.2	A 98.0	B 4.54	A10.31
			Tainan 9			
0	B 4.9	B 4.9	A 99.2	A 99.2	B 7.52	B 7.52
3	A 5.3	A 5.4	A 100.0	A 98.8	A 8.86	A 9.07
6	A 5.1	C 4.5	A 97.2	A 98.4	B 8.13	A 9.05

1/ Within a column in each cultivar, means preceded by the same capital letter are not significantly different at $P < 0.05$ by DMRT.

Table 5 Differences in seed germination (%) after accelerated aging for 4 days (4 AA), germination (%) after accelerated aging for 8 days (8 AA), and electrical conductivity (EC) within each peanut cultivar depending on storage duration when stored under ambient and cold room condition for 6 months.

Storage duration (month)	4 AA (%)		8 AA (%)		EC (mS/cm/g)	
	Ambient	Cold room	Ambient	Cold room	Ambient	Cold room
			Kasetsart 50			
0	A 94.8	A 94.8	A 86.0	A 86.0	A 13.70	A 13.70
3	A 83.0	A 86.4	B 17.2	B 10.4	A 14.80	A 13.14
6	B 68.0	A 86.4	B 13.2	AB 48.0	B 21.25	A 13.09
			LFB			
0	A 93.6	A 93.6	A 60.4	A 60.4	A 14.85	A 14.85
3	A 84.4	A 83.6	AB 42.4	A 52.4	B 22.09	A 19.48
6	B 39.2	A 84.0	B 26.8	B 16.4	C 46.67	A 17.86
			Tainan 9			
0	A 99.2	A 99.2	A 93.6	A 93.6	A 7.44	A 7.44
3	A 97.2	A 99.0	B 52.0	B 68.4	B 10.15	A 7.91
6	B 90.8	A 98.8	B 25.0	AB 79.6	C 16.55	A 7.87

1/ Within a column in each cultivar, means preceded by the same capital letter are not significantly different at P < 0.05 by DMRT.

Table 6 Field emergence (%) at 7, 14 and 21 days after planting of Kasetsart 50, LFB and Tainan 9 peanut seeds stored under ambient and cold room condition for 6 months.

Cultivar	7 Days		14 Days		21 Days	
	Ambient	Cold	Ambient	Cold	Ambient	Cold
			0 month			
Kasetsart 50	B 2.4 a	B 2.4 a	B 70.0 a	B 70.0 a	A 84.4 a	A 84.4 a
LFB	A 30.0 a	A 30.0 a	A 90.4 a	A 90.4 a	A 90.8 a	A 90.8 a
Tainan 9	AB 17.6 a	AB 17.6 a	A 92.0 a	A 92.0 a	A 92.4 a	A 92.4 a
			3 months			
Kasetsart 50	A 99.2 a	A 98.0 a	A 99.6 a	A 99.6 a	A 99.6 a	A 99.6 a
LFB	B 92.4 a	A 97.6 a	B 93.2 a	A 97.6 a	B 93.2 a	A 98.0 a
Tainan 9	A 100.0 a	A 94.0 a	A 100.0 a	A 94.8 a	A 100.0 a	A 96.4 a
			6 months			
Kasetsart 50	A 34.0 a	B 48.4 a	B 68.4 b	A 94.8 a	B 81.0 b	A 96.0 a
LFB	A 47.6 b	A 88.0 a	B 73.2 b	A 96.8 a	B 76.0 b	A 97.2 a
Tainan 9	A 51.2 b	A 83.2 a	A 86.8 a	A 94.8 a	A 96.0 a	A 96.8 a

1/ Within a column in each storage period, means preceded by the same capital letter are not significantly different at P < 0.05 by DMRT.

2/ Within a row in each character, means followed by the same small letter are not significantly different at P < 0.05 by DMRT.

Table 7 Differences in field emergence percentage within seeds of each peanut cultivar stored under ambient and cold room condition for 6 months.

Duration	7 Days		14 Days		21 Days	
(month)	Ambient	Cold	Ambient	Cold	Ambient	Cold
			Kasetsart 50			
0	C 2.4	C 2.4	B 70.0	B 70.0	B 84.4	B 84.4
3	A 99.2	A 98.0	A 99.6	A 99.6	A 99.6	A 99.6
6	B 34.0	B 48.4	B 68.4	A 94.8	B 81.0	A 96.0
			LFB			
0	B 30.0	B 30.0	A 90.4	A 90.4	A 90.8	A 90.8
3	A 92.4	A 97.6	A 93.2	A 97.6	A 93.2	A 98.0
6	B 47.6	A 88.0	B 73.2	A 96.8	B 76.0	A 97.2
			Tainan 9			
0	C 17.6	C 17.6	AB 92.0	A 92.0	A 92.4	A 92.4
3	A 100.0	A 94.0	A 100.0	A 94.8	A 100.0	A 96.4
6	B 51.2	B 83.2	B 86.8	A 94.8	A 96.0	A 96.8

[1/] Within a column in each cultivar, means preceded by the same capital letter are not significantly different at $P < 0.05$ by DMRT.

CONCLUSION

Storage environment had a significant influence on seed quality, and peanut genotypes were significantly different in maintaining germination, vigor and field emergence. All the three cultivars of peanut seeds could maintain high germination, vigor and field emergence up to 6 months under cold room condition. However, genotypic differences became obvious under ambient condition. Under ambient condition, germination, vigor and field emergence of LFB seeds were greatly reduced, while those of Tainan 9 were still high. Therefore, cold storage is necessary in order to maintain high qualilty of LFB peanut seed. Germination, vigor and field emergence were higher and more stable in Tainan 9 peanut seeds, followed by Kasetsart 50 and LFB.

ACKNOWLEDGEMENTS

Department of Technical and Economic Cooperation (DTEC), Thailand is gratefully acknowledged for the financial support of this research. The special thanks go to the staff, especially to Mr. Surapol Chaochong of the National Corn and Sorghum Research Center for field assistance.

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