# 種子保護劑處理與落花生菌核病防除之效果

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年來本省因食用上需要，落花生栽培面積，已逐漸增加。四十年實際栽培面積，爲 84,889公頃，產量達61,158公噸（5），惟較之實際需要量，相距尙遠。爲謀今後食用油料之自給自足，則獎勵增產，及病害防除工作，當兼籌並進。

落花生菌核病 (*Sclerotium rolfsii* Sacc)，廣佈於臺東，宜蘭，竹南，斗六，虎尾，嘉義，臺南，臺東，玉里等地。據年來各地考察，及初步調查結果，每年因此病而枯死之病株，約爲 9—15％，中南各地，被害尤烈。病害發生盛期，多在七月至九月之間。

過去本省因落花生栽培面積，較目前少，故對於此病之爲害，諸多忽視，更乏有效防除方法。本試驗目的在於探究適用於防除菌核病之藥劑及用量，與種子發芽之影響。

種子保護劑處理豆科植物，對瘁倒病菌之防除價值，諸多學者已有論述，(1) (2) (4) Vlitos 及 Preston 氏 (6) 謂種子保護劑對於多種豆科植物根瘤之形成，並無影響。Gerdamann 氏 (3) 謂處理之苜蓿及紫雲英種子，在乾燥或潮濕之土中，仍不影響其藥效。

材料及方法：

本試驗供用之菌核病菌，係採自臺東，由豐里大公豆之病株上所分離培養者。供接種用之病原菌，乃培養於小麥種子培養基，在32°C之定溫箱中，經6—7日後供用。落花生之品種爲番地十七號。供用之種子保護劑爲 New Improved Ceresan* (5 per cent ethyl mercury phosphate), Agrosan GN*(Organomercurial salts equivalent to 1%of mercury),Spergon** (96 per cent tetrachloro-para-benzoquinone), Phygon**(50 per cent 2,3-Dichloro-1,4-Naphthoquinone), Phygon XL**(50 per cent 2, 3-Dichloro-1, 4-Naphthoquiuone and magnesium sulfate as a safening), Arasan SF** (75 per cent tetra-methyl-thiuram disulfide) Fernide* (TMTD) in a hight concentration)

註：*藥劑之樣品由卜內門公司贈送，**由美國 Du Pont 公司寄贈

Sample of seed protectants were contributed by Imperial Chemical Industrise (China) Ltd., Taipei, Taiwan, China, marked with (*); and contributed by E. I. Du Pont DE Nemours & Company through Asgrow Export Corporation, Milford, Connecticut, U. S. A., marked with (**), respectively.

Arasan SF 與 Fernide 其所含之有效成分，同爲 TMTD，後者之含量，原樣品無詳細註明，姑列入供試。

本試驗分盆栽及田間兩部份，同時進行，盆栽試驗，用無菌之砂土，盛於方形之鉛鐵盤，其體積爲31×31×7cm.，每種藥劑，分爲三種不同用量，共21處理，另設無處理者一，以資對照。每處理用盤二只，每盤種花生30顆，距離一定，在溫室內舉行，試驗期中，室內晚間溫度，爲 26°-28°C 日間爲 32°-34°C。

田間觀察試驗，擇前期作落花生栽培地，而有菌核病發生者，每種藥劑各設一區，隨機排列，區中置三組不同用量之處理，及一組無處理之對照，每組四行，行長 5 公尺，行距30公分，每行種花生25顆，株距20公分，每區組間各空一行之距離。

種子處理方法，除 Fernide 用糊種法 (Slurry) 外，其餘均按粉衣法 (Dusting) 行之，藥劑用量係以種子重量計算。每藥劑處理，用種子 200克，置之於底徑12公分之濶口玻璃瓶中，倒入一定量之藥劑，然後緊塞瓶口，徐徐搖動4—5分鐘，務使藥劑塗佈均勻。糊種法則將一定量之藥劑，置之於 400 cc. 之燒杯中，注入少量清水，攪拌均勻，和成稀糊狀，隨將種子倒入杯中，緩緩搖動，使種子上下團轉，至勻和爲度，種子處理後，貯於紙袋中待用。

田間及盆栽播種時，用鑷子隨意取出已處理之種子，置於土中，同時取附有菌絲之小麥種子培養基一顆，併置於花生邊旁，蓋上薄土，逐日觀察，並調查種子發芽數目。

試驗結果：

藥劑處理對種發芽之影響

在溫室環境下，凡經處理之種子，其發芽率恒較無處理者爲高。在田間情形，大致與室內結果吻合。

表(一) 藥劑處理對種子發芽之影響

Table 1.-Investigations on the percentage of seedling emergence after seed treatment under field and greenhouse condition.

| 處理 Treatment applied | | 發芽百分率 Seedling emergence | |
|---|---|---|---|
| 藥劑種類 Chemicals | 藥量用量 Dose | 田間調查 Field | 室內調查 Greenhouse |
| | Pct. | Pct. | Pct.* |
| Spergon | 0.0 | 39 | 60.00 |
| | 0.2 | 79 | 89.95 |
| | 0.4 | 82 | 84.95 |
| | 0.8 | 90 | 93.30 |
| Agrosan GN | 0.0 | 52 | 60.00 |
| | 0.2 | 67 | 88.30 |
| | 0.4 | 67 | 73.30 |
| | 0.8 | 83 | 93.30 |
| Arasan SF | 0.0 | 42 | 60.00 |
| | 0.1 | 39 | 68.30 |
| | 0.2 | 55 | 76.65 |
| | 0.4 | 59 | 84.95 |
| Phygon XL | 0.0 | 43 | 60.00 |
| | 0.2 | 35 | 71.65 |
| | 0.4 | 33 | 68.30 |
| | 0.8 | 35 | 80.00 |
| Fernide | 0.0 | 42 | 60.00 |
| | 0.15 | 51 | 59.95 |
| | 0.3 | 60 | 66.60 |
| | 0.6 | 40 | 70.00 |
| Phygon | 0.0 | 40 | 60.00 |
| | 0.1 | 35 | 46.60 |
| | 0.2 | 42 | 61.65 |
| | 0.4 | 36 | 73.30 |
| New Improved Ceresan | 0.0 | 38 | 60.00 |
| | 0.2 | 67 | 83.00 |
| | 0.4 | 13 | 0.45 |
| | 0.8 | 5 | 0.00 |

* 兩重複之平均數

* Averages for 2 replicates of 30 seeds per treatment

據表（一）所示，就藥劑之種類而論，在溫室環境下，盆栽試驗結果，則以 Spergon及 Agrosan GN 兩處理之效果最著，其他各處理間之發芽情形，亦較無理者處爲優，不過差其異之程度，不若上述兩者懸殊之甚耳。在田間情形，仍以 Spergon 及 Agrosan GN兩處理之效果顯著，尤以前者之發芽情形，在任一用量標準，均較無處理者超出一倍以上。

綜觀室內及田間之結果，大致均甚吻合， New Improved Ceresan 在任何環境下，凡其用量超過 0.2 %時，因藥害關係，使發芽率減低，或不能發芽。藥害程度，隨藥量增高而益甚。 Fernide, Phygon 及 Phygon XL 之效果，就本試驗用量範圍內，似無特殊優點，該處理間，凡藥量增高時，其發芽率亦有增高之趨勢，足見各處理間之藥劑用量，仍未達其適當標準。茲將盆栽試驗結果，加以分析，藉以檢討各種藥劑間之差異。

表(二) 變方分析表

Table 2. Analysis of Variance

| 變異原因 Variation | 自由度 D. f. | 平方和 Sum of Square | 均方 Mean Square | F 值 F-Value | 5%F | 1% |
|---|---|---|---|---|---|---|
| 重複 Replication | 1 | 189.8355 | | | | |
| 處理 Treatment | 20 | 3501.0300 | 175.05 | 3.227** | 2.120 | 2.940 |
| 機差 Error | 20 | 1084.7750 | 54.2388 | | | |
| 總計 Total | 41 | 4775.6265 | | | | |

P=1%時之差異顯著標準值爲4.4

Highly significant, at 0.01 level, value is 4.4

P=5%時之差異顯著標準值爲2.9

Significant, at 0.05 level, value is 2.9

表(三) 藥劑種類與種子發芽率之差異比較

Table 3. Effect of seed protectants on total emergence of peanut in compost, infested with *S. rolfsii*

| 藥劑種類 Chemicals | 發芽率(%) Percentage of seed germination | | | | | |
|---|---|---|---|---|---|---|
| Spergon | 90.2 | | | | | |
| Agrosan GN | 88.1 | 2.1 | | | | |
| Arasan SF | 77.5 | 12.7** | 10.6** | | | |
| Phygon XL | 73.7 | 16.5** | 14.4** | 3.8* | | |
| Fernide | 65.8 | 24.4** | 22.3** | 11.7** | 7.9** | |
| Phygon | 61.0 | 29.2** | 27.1** | 16.5** | 12.7** | 4.8** |

據表（三）可知，各藥劑處理均有增進種子發芽之顯著效果，其中以 Spergon 爲最優 Agrosan GN 次之， Arasan SF, Phygon XL, Fernide及 Phygon 等又次之。在實際上之應用，當以前列兩種藥劑最爲可取，茲擇最有效之藥劑三種，並入加 New Improved Ceresan 0.2% 一種，分析比較

各藥劑用量間之差異。

表(四) 藥劑用量與種子發芽之差異比較

Different dosages of treatment on the total emergence of seedlings under greenhouse condition

| 處理 Treatment | 發芽率(%) Percentage of seed Germination | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Agrosan GN 0.8% | 96.5 | | | | | | | |
| Spergon 0.8% | 93.7 | 2.8 | | | | | | |
| Spergon 0.2% | 91.1 | 5.4 | 2.6 | | | | | |
| Agrosan GN 0.2% | 88.9 | 7.6* | 4.8 | 2.2 | | | | |
| Arasan SF 0.4% | 86.0 | 10.5* | 7.7* | 5.1 | 2.9 | | | |
| Spergon 0.4% | 85.0 | 11.5* | 8.7* | 6.1 | 3.9 | 1.0 | | |
| New Improved Ceresan0.2% | 83.3 | 13.5** | 10.4* | 7.8* | 5.7 | 2.7 | 1.7 | |
| 接種無處理 Non treated (CK) | 60.0 | 35.5** | 33.7** | 31.1** | 28.9** | 26.0** | 25.0** | 23.3** |

P=1%時之差異顯著標準值爲 12.8

Highly significant, at 0.01 level is 12.8

P=5%時之差異顯著標準值爲 7.0

Significant, at 0.05 level is 7.0

表三及表四，1%時之差異顯著標準值以**示之；5%時之差異顯著標準值以*示之

In table 3. and 4. figures significant at 1% level are marked with a double asterisk, those significant at the 5% level with a single asterisk.

據表(四)所列之任一藥劑用量，較之無處理者，均有極顯著之差異。Agrosan GN 0.8%與Spergon 0.8%兩者並無顯著差別，Spergon 0.2%與0.4之處理，在室內環境下，顯有差異，但核與田間情形，頗有出入，蓋本初步試驗結果，尚未達完滿程度，此點仍待進一步之研究，New Improved Ceresan 0.2%之效果，雖不若前者兩種，惟與無處理者比較，仍有極顯著之效果。

## 結　論

在染有菌核病菌之土中，落花生種子因處理與無處理間之差異，極其顯著，本試驗所用之七種種子保護劑，除 New Improved Ceresan 因用量較多，而顯有藥害者外，大體言之，全有防病效果，其中以 Spergon 0.8% 及 Agrosan GN 0.8% 尤爲卓著，其他各處理效果之大小，乃程度上之差別，Arasan SF. Phygon XL, Fernide 及 Phygon 之效果，雖不如 Spergon 及 Agrosan GN，但若以田間及室內之結果，兩相對照，可知凡藥劑之用量增高時，其發芽率亦有漸次增高之趨勢。反之 New Improved Ceresan 處理之種子，其發芽率，則因藥量增多而漸次減低，其用量爲 0.2% 時，當已達其最高限度矣。

# INVESTIGATIONS ON SEED TREATMENT OF PEANUT FOR CONTROL OF SCLEROTIAL WILT

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## Summary

The peanut wilt caused by *Sclerotium rolfsii* Sacc was widely distributed over the peanut growing regions throughout this Island. Approximately 9-15% of the plant wilted in the field during July to September yearly. In order to improve the seedling emergance an effort was made, to find some dependable seed protectants which could be recommended for use with this crop. This paper presents the preliminary results on the effectiveness of severals seed protectants on the seedling emergance of peanut in compost, infested with *S. rolfsii*, in Taipei, Taiwan.

From the results of seed germination obtanied in greenhouse and field trials it was concluded that majority of fungicides used in this experiment were proved to be of some value and may be expected to improve the stands after treatment. Of the materials used, Spergon at 0.8 per cent and Agrosan GN at 0.8 per cent dosages by weight of seed showed the most promice while Arasan SF at 0.4 per cent the next.

The effect of Phygon. XL, Fernide and Phygon at all dosages were not so significant in the greenhouse trial as compared with the field trial but in the condition of the former the percentage of seed germination tends to increase toward the higher dosage.

New Improved Ceresan retarded seed germination when its dosage is over 0.2 per cent but the percentage of seed germination tends to increase as its dosage decreased. Then in conclusion New Improved Ceresan would have its fungicidal value for this crop if lower dosage was recommended.

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