六、玉米施肥时期试验

一、前言

玉米在生长期中，受各种环境因素影响不同。不同品种对所需营养不同，因此不同气候条件下的玉米产量和品质也不同。本试验的目的在于探讨玉米施肥的适宜时期，以及不同施用方法对玉米产量的影响。

二、试验材料及方法

(1) 供试品种：玉米。

(2) 试验设计：随机区组设计，小区面积6m²，重复4次，小区间相隔5m，行距0.3m，株距0.3m。

(3) 施肥量：N素60kg/ha，使用方法如下：

<table>
<thead>
<tr>
<th>施肥方式</th>
<th>0次</th>
<th>1次</th>
<th>2次</th>
<th>3次</th>
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<tbody>
<tr>
<td>施肥量</td>
<td>0</td>
<td>60</td>
<td>120</td>
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三、试验结果

表1 施肥效果

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<tr>
<th>施肥方式</th>
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<tr>
<td>0次</td>
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<tr>
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<td>87</td>
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<td>102</td>
<td>+40%</td>
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<tr>
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附录：

- 玉米施肥的适宜时期
- 不同施肥方法对玉米产量的影响

四、结论

玉米施肥的适宜时期应根据当地的气候条件和土壤肥力等因素综合考虑。本试验结果表明，施用N素60kg/ha，分次施肥可显著提高玉米产量。
三、試驗結果

(1) 子實重量：kg/ha

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五、結論

1. 增加試驗結果，處理間種方式＝種類差異，而第9處理則子實數量最少。
2. 植株數量對數量著重要影響，第1處理其數量較低，而第9處理則數量較高。
3. 水分含量對數量著重要影響，及根系機能與數量間關係密切，水勢（秦氏）及藥效（任作）對試驗數量之提高有著重要之影響。
4. 水分，藥效對數量之提高著重要影響，而第9處理其數量較多，而第1處理則數量較少，且第9處理其數量著重要提高，而第1處理則數量著重要提高。

参考文獻

2. Purdue University Agr. Exp. Station. Soil and Plant Tissue Tests Bull. 656, 1958
3. N.R. Su Semiquantitative Tissue Tests Proposed for Foliar Diagnosis of Pineapple. stats from 1960
4. Fitcher E. B. Plant Injuries in crops 1963
### 三、試驗結果

|  | 水 | 蘇 | 硝 | 鹽 | 東 | 山 | 仁 | 樣
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### 四、討論

1. 依試驗結果顯示，處理與無處理相比，效果甚顯著，而第 8 處理效果尤佳。
2. 按照葉片重量增加，有一定差距，而第 9 處理效果尤佳。
3. 茶葉的重量增加，而第 8 處理效果尤佳，因此處理效果以第 8 處理最佳，駁斥第 10 處理效果不如其它。

### 五、結論

1. 依試驗結果顯示，處理與無處理相比，效果甚顯著。因此處理效果以第 8 處理最佳，駁斥第 10 處理效果不如其它。
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### 參考文獻

2. Purdue University Agr. Exp. Station Soil and Plant Tissue Tests Bull. 635 1968
4. Firma R. Deer Hunger Signs in crops 1960
ENGLISH SUMMARY
(by Soil and Fertiliser Section Senior specialist S.C. Liao)

The new variety Taiwan Hybrid Corn No.5 was selected by this station in 1958. For the extension work of this new variety the field experiments of fertilizer on Corn had been carried out from 1959 to 1970. The results of these experiments divide to 2 groups. One is Elements requirement research, another is the Method of application include space time etc. Acknowledgement should be paid for S Soil and Fertilizer specialist Dr. S.C Chang, Dr. T.S. Fu, Dr. N.R. Su (J. C. R. R.) on Technical advice and financial assistance.

The Results include:
A. Elements Requirement Research
   I. Study on Phosphorus and Potassium Fertilizer Recommendation through soil test for corn
   II. Experiments on N-P-K corn fertilizer requirement
      (a) Autumn and Spring part
      (b) Winter interplant part
   III. Response of corn to Magnesium
   IV. Response of corn to Zinc

B. Method of Application
   V. Effect of nitrogen fertilization and plant population on the protein content of corn
   VI. Experiments on timing of corn fertilizer application

1. We had 39 site trials on this study
2. The Effect of P, K fertilizer severely influenced by climate in Taiwan, especially on low temperature and short daylight, in those case they would be show good effect on these fertilizer
3. In these trial we found the effect of Phosphorus higher than that of Potassium. The Loss Content of Effective P2O5, K2O in soil, is the more effect of P-K fertilizer be increased.
4. According to 3 year result of trials we found

   effective P2O5 in soil (kg/ha)  corn yield increase (%) by fertilization
   <22                            28-62
   22-58                         13.7-32
   58-115                       12.5-17.2
   >115                         5.1-11

   effective K2O in soil (kg/ha)  corn yield increase (%) by fertilization
   0-62                          21-27
   62-125                       9.2-14.3
   125-250                    6.7-12.6
   >250                         2-1.5

II. Experiments on N-P-K corn fertilizer requirement
   (a) Autumn and Spring part (1969-1971)
1. We carried out 23 sites on this trial all over this Province
2. Nitrogen is more necessary in all these locations
3. The effect of phosphorus and potassium are different between these location.
4. In the view of higher yield fertility, the effect of fertilizer application is only 1.3-1.7 times as compared with no fertilizer. But the lower yield fertility, the yield is more than 2-4 times compared with no fertilizer
5. The optimum ratio of Fertilizer on the Hybrid corn are concluded as 13:9:30
6. In the correlation between height (5 weeks after seeding are measured) and yield, the lower yield fertility is more higher than the other one.
7. In several high yield group, its threshold contents of NO3-N on tissue test (4 weeks after seeding) are 150 PPM in autumn crop.
8. Severe hunger sign on phosphorus and Potash are found in several field.
9. Potassium hardly to prevents attack of disease.

   (b) Winterinterplant part (1968)
1. The effect of Phosphorus Fertilizer is most significant other than that of N, and K. It have some effect at any rate whether soil test value is high or not and effect of N and K is rather low.
2. Its growth would be impeded, and yield of grain be decreased when soil test value is low or extreme low, at the treatment for no phosphorus and potassium application.
3. At the economical consideration optimum ratio of N-P-K when application are 90:50:100 in Yun-lin prefecture and 90:50:50 in Chin-yi prefecture respect -ively on soil form.

III. Response of corn to Magnesium (1969-1977)
Since soils condition are not the same, it find different effect between 9 locations
1. At Sheng-hwa, Potassium Content of soil is extremely high, on Mg,K2 (Mg, K2O=40 K2O=50kg/ha) treatment its grain yield increase by 9 % than Mg,K2 treatment
2. At Nan-si, Magnesium and Potash content is all medium on soil analytical data, the effect of Potash evaluate to 1% significance level and that of Magnesium is not, but the yield of Mg,K2 (K2O=100kg/ha) increase by 13%, Mg,K2 treatment increase by 21% Mg,K2 and Mg,K2 treatment increase
ENGLISH SUMMARY

(by Soil and Fertilizer Section Senior specialist S.C. Liao)

The new variety Taiwan Hybrid Corn No.5 was selected by this station in 1958. For the extension work of this new variety the field experiments of fertilizer on Corn had been carried out from 1959 to 1970. The results of these experiments divide to 2 groups, one is Elements requirement research, another is the Method of application include space time etc. Acknowledgement should be paid for S Soil and Fertilizer specialist Dr. S.C Chang, Dr. I.S. Pan, Dr. N.R.Su (J. C. R. R.) on Technical advice and financial assistance.

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(b) Winter interplant part

III Response of corn to Magnesium

IV Response of corn to Zinc

B. Method of Application

V Effect of nitrogen fertilization and plant population on the protein content of corn

VI Experiments on timing of corn fertilizer application

I Study on Phosphorus and Potassium Fertilizer Recommendation through soil test for corn (1957-1970)

1. We had 39 site trials on this study

2. The Effect of P, K fertilizer severely influenced by climate in Taiwan, especially on low temperature and short daylight, in cases they would be show good effect on these fertilizer

3. In these trial we found the effect of Phosphorus higher than that of Potassium. The Lesss Centilt of Effective P2O5, K2O in soil, is the more effect of P-K fertilizer be increased.

4. According to 3 year result of trials we found

- effective P2O5 in soil (kg/ha) corn yield increase (%) by fertilization
  - <23 28-52
  - 23-58 13.7-32
  - 58-115 12.5-77.2
  - >115 5.1-11

- effective K2O in soil (kg/ha) corn yield increase (%) by fertilization
  - 0-22 21-27
  - 22-125 9.2-14.3
  - 125-250 6.7-12.6
  - >250 2-1.6

VII Experiments on N-P-K corn fertilizer requirement (a) Autumn and Spring part (1959-1962)

1. We carried out 28 sites on this trial all over this Province

2. Nitrogen is more necessary in all these locations

3. The effect of phosphorus and potassium are different between these location.

4. In the view of higher field fertility, the effect of fertilizer application is only 1.3-1.7 times as compared with no fertilizer. But the lower field fertility, the yield is more than 2-4 times compared with no fertilizer

5. The optimum ratio of Fertilizer on the Hybrid corn are concluded 130:93:0-40

6. In the correlation between harvest (5 weeks after seeding are measured) and yield, the lower field fertility is more higher than the higher one

7. In several field high yield group, its threshold contents of NO3-N on tissue test (4 weeks after seeding) are 150 PPM in autumn crop.

8. Severe hunger signs on phosphorus and Potash are found in several field.

9. Potassium hardly to prevents attack of disease.

(b) Winter interplant part (1968)

1. The effect of Phosphorus Fertilizer is more significance other than that of N, and K. It have some effect at any rate whether soil test value is high or not and effect of N and K is rather low.

2. Its growth would be impeded, and yield of grain be decreased when soil test value is low or extreme low, at the treatment for no phosphorus and potassium application

3. At the economical consideration optimum ratio of N-P-K application are 90:50:100 in Yen-lin prefecture and 90:50:50 in Chin-yl prefecture respectively on silt form.

III Response of corn to Magnesium (1965-1967)

Since soils condition are not the same, it find different effect between 5 locations

1. At Shang-kiu, Potassium Content of soil is extremely high, on Mg,K (Mg=40 K2O=50 kg/ha) treatment its grain yield increase by 9% than Mg,K treatment

2. At Nan-shu, Magnesium and Potash contents is all medium on soil analytical data, the effect of Potash evaluate to 1% significance level and that of Magnesium is not, but the yield of Mg,K (K2O=100 kg/ha) increase by 13%, Mg,K treatment increase by 21% Mg,K4 and Mg,K5 treatment increase
by 5% and 12% respectively.
3. At Pei-ho, soil K test belong to low, Mg is medium, at Mg, K and Mg, K treatment increase by 8% and 10% respectively. Mg, K treatment increase by 1% Mg, and Mg single application treatment increase 13 and 19%.
4. At Liu-er, the aim of this trial is for F.H value influence on Magnesium application, the result show few influence on this element.
5. At Hu-wei, Magnesium single application in half and whole quantity increase by 6 and 14% respectively, but Mg, K and Mg, K treatments are all increase by 13% so it can't increase yield for more Mg addition.
6. At Chia-yi, the site sits on dense hal, and damaged by drought in growth period so there is no any result to discuss.

IV. Response of Corn to Zinc (1967)

a. Pot experiments Prove:
1. Zinc is a necessary element for corn growth.
2. Zinc treatment make corn plant a low analysis of phosphorus and Potash.
3. Effectiveness of Phosphorus and Zinc relate to content of P, K, and Zn in soil, Their effect rely on the balance of the four.

b. Field Experiment prove:
1. Zinc is effective for corn to increase the yield, it increase grain yield by 15% with addition of 5.6-28kg/ha Zinc.
2. When phosphorus analysis show medium in soil by use of 8.6kg/ha Zinc cause yield increase by 7.4-19%
3. When phosphorus analysis in soil is low, by no addition of phosphorus, Zinc use cause contrary effect.

V. Effect of nitrogen fertilization and plant population on the protein content of corn (1968-1969)
The standard cultivation and fertilizing are 125kg/ha N 30cm x 30cm in spacing, and 2 times dressing on corn in this area. nowadays.

4 Experiments proved:

a. about Grain yield
1. 3 experiments show that the less space is the more production acquired.
2. At Y-tou, in dense spacing, the more nitrogen applied the more yield increased, but in wider spacing (30-40cm) its optimum N application restrict to 80kg/ha.

At Yung-khan, in former year 120 kgN reach to peak of yield, but latter year its dressing should be divide to 3 times, otherwise 60kg N is sufficient.

At Matou its figure similar to Yung-khan.
3. The more dressing time increase, the more yield increased, but latter year two experiments show that it should be in dense spacing.

b. about Protein yield
1. At Y-tou, on standard fertilization (150kgN) it reached the highest Pro
by 5% and 12% respectively.

3. At Pai-ho, soil K test belong to low, Mg is medium, at Mg, K and Mg, K treatment increase by 68% and 18% respectively. Mg, K treatment increase by 68% Mg, and Mg, single application treatment increase 13% and 19%.

4. At Liu-ting, the aim of this trial is for FH value influence on Magnesium application, the result show few influence on this element.

5. At Hu-wei, Magnesium single application in half and whole quantity increase by 6 and 14% respectively, but Mg, K and Mg, K treatments are all increase by 13% so it can't increase yield for more Mg addition.

6. At Chia-yi, the site situation on dense ho11, and damaged by drought in growth period so there is no any result to discuss.

**IV. Response of Corn to Zinc (1987)**

a. Pot experiments prove:

1. Zinc is a necessary element for corn growth.

2. Zinc treatment makes corn plant a low analysis of phosphorus and Potash.

3. Effectiveness of Phosphorus and Zinc relate to content of P, C, and Zn in soil. Their effect rely on the balance of the four.

b. Field Experiment prove:

1. Zinc is effective for corn to increase the yield; it increase grain yield by 15% with addition of 5.6—25kg/ha Zinc.

2. When phosphorus analysis show medium in soil by use of 6.8kg/ha Zinc cause yield increase by 7.4—20%

3. When phosphorus analysis in soil is low, by no addition of phosphorus, Zinc use cause contrary effect.

**V. Effect of nitrogen fertilization and plant population on the protein content of corn (1988—1989)**

The standard cultivation and fertilizing are 125kg/ha N 60cm ×10cm in spacing, and 2 times dressing on corn in this area. nowadays.

4 Experiments proved:

a. about Grain yield

1. 3 experiments show that the less space is the more production acquired.

2. At Yi-tou, in dense spacing, the more nitrogen applied the more yield increased, but in wider spacing (90—40cm) its optimum N application restrict to 80kg/ha.

At Yung-khan, in former year 120 kgN reach to peak of yield, but latter year its dressing should be divide to 3 times. otherwise 80kg N is sufficient.

At Matou its figure similar to Yung-khan.

3. The more dressing time increased, the more yield increased, but latter year two experiments show that it should be in dense spacing.

b. about Protein yield

1. At Yi-tou, on standard fertilization (100kgN) it reached the highest Pro