

UNCLASSIFIED

|   |
|---|
|   |
|   |
|   |
| AD NUMBER   |
| AD838842  |
| NEW LIMITATION CHANGE   |
| TO<br>Approved for public release, distribution unlimited   |
| FROM<br>Distribution authorized to U.S. Gov't. agencies and their contractors; Foreign Government Information; JUN 1965. Other requests shall be referred to Department of the Army, Fort Detrick, Attn: Technical Release Branch/TID, Frederick, MD 21701. |
| AUTHORITY   |
| SMUFD D/A ltr, 14 Feb 1972  |

THIS PAGE IS UNCLASSIFIED

AD838842

TRANSLATION NO. 1302

~~SECRET~~  
DATE: 25 JUNE 1965

DDC AVAILABILITY NOTICE

Qualified requestors may obtain copies of this document from DDC.

This publication has been translated from the open literature and is available to the general public. Non-DDC agencies may purchase this publication from the Clearinghouse for Federal Scientific and Technical Information, U. S. Department of Commerce, Springfield, Va.

STATEMENT #2 UNCLASSIFIED

This document is subject to special export controls and each transmittal to foreign governments or foreign nationals may be made only with prior approval of Dept. of Army, Fort Detrick, ATTN: Technical Release Branch/TID. Frederick, Maryland 21701

9

OBSERVATIONS ON THE GROWTH AND REPRODUCTION OF  
SOME VARIETIES OF MAIN-CROP RICE  
AND "CHIEM" RICE

- North Vietnam -

[Following is a translation of an article by Vo Hung in the Vietnamese-language periodical Khoa Hoc Ky Thuat Nong Nghiep (Agricultural Sciences and Technology), Hanoi, Jan 1964, pp 20-21.]

RICE GROWING TECHNIQUES

An understanding of the growth and reproduction of rice varieties is essential for scheduling the seeding, planting and fertilizing operations, and for the selection of appropriate soil. At the experimental farm of the Central Secondary School of Agriculture (Hanoi), we have studied the growth and reproduction of 45 varieties of main-crop rice and 16 varieties of "chiem" rice in mixed clayey fields with normal water and climatic conditions in suburban Hanoi.

Weather Conditions

| ⊙ Tháng          | 11   | 12   | 1    | 2    | 3     | 4    | 5    | 6     | 7     | 8     | 9     | 10   | 11   |
|------------------|------|------|------|------|-------|------|------|-------|-------|-------|-------|------|------|
| ⊙ Nhiệt độ C     | 22,1 | 17,0 | 17,2 | 18,8 | 22,5  | 22,6 | 26,6 | 29,6  | 27,9  | 28,5  | 26,6  | 24,3 | 22,0 |
| ⊙ Ẩm độ %        | 84   | 79   | 79   | 80   | 89    | 81   | 79   | 77    | 85    | 85    | 86    | 82   | 70,0 |
| ⊙ Lượng mưa (mm) | 40,4 | 1    | 20,3 | 7,7  | 48,55 | 16,2 | 97,3 | 179,9 | 364,6 | 342,8 | 285,8 | 46,7 | 46,0 |

[Legend]: a) Month; b) Temp. (C.); c) Humidity (%); d) Rainfall (mm).

I. Growth and Reproduction of 45 Varieties  
of Main-Crop Rice (Seeded on 16 May;  
planted 27 June)

| ① Tên giống      | ② Bắt đầu đẻ nhánh | ③ Thời đẻ | ④ Phấn hóa đồng non | ⑤ Phấn hóa già | ⑥ Trổ | ⑦ Phơi màu | ⑧ Chắc xanh | ⑨ Chín | ⑩ Tổng thời gian sinh trưởng (ngày) |
|------------------|--------------------|-----------|---------------------|----------------|-------|------------|-------------|--------|-------------------------------------|
| Thắng lùn        | 6-7                | 4-8       | 5-8                 | 10-8           | 4-9   | 5-9        | 21-9        | 6-10   | 144                                 |
| Thanh bà         | -                  | 4-8       | 5-8                 | 11-8           | 7-9   | 9-9        | 26-9        | 10-10  | 148                                 |
| Nếp mơ           | -                  | 5-8       | 5-8                 | 10-8           | 7-9   | 9-9        | 26-9        | 10-10  | 148                                 |
| Tê mơ            | -                  | 2-8       | 5-8                 | 12-8           | 8-9   | 9-9        | 27-9        | 10-10  | 148                                 |
| Nam đặc lùn      | -                  | 2-8       | ?                   | ?              | 8-9   | 10-9       | 27-9        | 11-10  | 149                                 |
| Nam đặc (K.S.M.) | -                  | 8-8       | 12-8                | 18-8           | 10-9  | 13-9       | 27-9        | 13-10  | 151                                 |
| Chấu con voi     | -                  | 20-8      | 21-8                | 27-8           | 22-9  | 24-9       | ?           | 23-10  | 161                                 |
| Đoãn chùng       | -                  | 20-8      | 21-8                | 26-8           | 21-9  | 22-9       | 10-10       | 23-10  | 161                                 |
| Hìn              | -                  | ?         | 21-8                | 27-8           | 20-9  | 22-9       | 10-10       | 23-10  | 161                                 |
| Hữu nghị         | -                  | 24-8      | ?                   | 30-8           | 25-9  | 26-9       | 14-10       | 25-10  | 163                                 |
| Gié sấm          | -                  | 26-8      | ?                   | 30-8           | 24-9  | 26-9       | 12-10       | 25-10  | 163                                 |
| Dâu nguyên       | 7-7                | 21-8      | 21-8                | ?              | 24-9  | 26-9       | 12-10       | 25-10  | 163                                 |
| Dâu rừng         | -                  | 18-8      | 21-8                | 28-8           | 23-9  | 26-9       | 12-10       | 25-10  | 163                                 |
| Sớm cánh         | -                  | 20-8      | 25-8                | 3-9            | 24-9  | 27-9       | 12-10       | 26-10  | 164                                 |
| Nô nương         | -                  | 20-8      | 25-8                | 5-9            | 24-9  | 26-9       | 13-10       | 26-10  | 164                                 |
| K Cao-miền       | -                  | 25-8      | ?                   | ?              | 25-9  | 26-9       | 13-10       | 26-10  | 164                                 |
| Tám canh nóng    | -                  | 25-8      | ?                   | 5-9            | 25-9  | 26-9       | 12-10       | 26-10  | 164                                 |
| Nếp Hòa-bình     | -                  | 20-8      | 25-8                | 3-9            | 24-9  | 26-9       | ?           | 26-10  | 164                                 |
| Dâu đại trà      | 6-7                | 18-8      | 25-8                | 5-9            | 24-9  | 26-9       | 12-10       | 26-10  | 164                                 |
| Dâu tây          | -                  | 25-8      | 25-8                | 4-9            | 25-9  | 26-9       | 13-10       | 26-10  | 164                                 |
| Nghệ chế         | -                  | 25-8      | 25-8                | 4-9            | 25-9  | 27-9       | 13-10       | 26-10  | 164                                 |
| Khâu nương puộc  | 8-7                | 20-8      | 25-8                | 3-9            | 27-9  | 29-9       | 17-10       | 29-10  | 169                                 |
| Dâu hén          | 7-7                | 20-8      | ?                   | ?              | 27-9  | 29-9       | 17-10       | 29-10  | 169                                 |
| Kim sơn miến     | -                  | 28-8      | 1-9                 | ?              | 29-9  | 1-10       | 17-10       | 29-10  | 169                                 |
| Dự vàng          | -                  | 25-8      | 1-9                 | ?              | 28-9  | 1-10       | 17-10       | 29-10  | 169                                 |
| Chở ong          | -                  | 25-8      | 1-9                 | 4-9            | 28-9  | 1-10       | 16-10       | 30-10  | 170                                 |
| Tám thơm         | -                  | 28-8      | ?                   | 4-9            | 3-10  | 5-10       | 19-10       | 3-11   | 174                                 |
| Gié nước         | -                  | 28-8      | ?                   | 4-9            | 2-10  | 5-10       | 18-10       | 3-11   | 174                                 |
| Lúa Hải-lăng     | -                  | ?         | 1-9                 | 4-9            | 1-10  | 2-10       | 19-10       | 3-11   | 174                                 |
| Tê hiên          | 8-7                | 28-8      | ?                   | ?              | 4-10  | 6-10       | 20-10       | 5-11   | 176                                 |
| Dự lùn           | -                  | 28-8      | 1-9                 | 10-9           | 3-10  | 4-10       | 22-10       | 5-10   | 176                                 |
| Ồn               | -                  | ?         | 1-9                 | 9-9            | 2-10  | 4-10       | 22-10       | 5-11   | 176                                 |
| Hóp              | 7-7                | 30-8      | 5-9                 | 12-9           | 6-10  | 8-10       | 25-10       | 7-11   | 178                                 |
| Di hương         | -                  | 30-8      | 5-9                 | 13-9           | 7-10  | 8-10       | 24-10       | 7-11   | 178                                 |
| Tê đong          | -                  | 30-8      | 10-9                | 19-9           | 8-10  | 10-10      | 24-10       | 7-11   | 178                                 |
| Hiên             | -                  | 30-8      | 10-9                | 19-9           | 7-10  | 9-10       | 23-10       | 7-11   | 178                                 |
| K 106 A          | -                  | 30-8      | 10-9                | 18-9           | 6-10  | 8-10       | 24-10       | 7-11   | 178                                 |
| Tám xoan         | -                  | 30-8      | 10-9                | 18-9           | 8-10  | 10-10      | 28-10       | 10-11  | 181                                 |
| Tám cỏ ngỗng     | -                  | 1-9       | ?                   | ?              | 7-10  | 8-10       | ?           | 10-11  | 181                                 |
| Tám trâu         | -                  | ?         | ?                   | ?              | 9-10  | 11-10      | ?           | 10-11  | 181                                 |
| Mùa số 1         | -                  | 1-9       | 9-9                 | 17-9           | 7-10  | 9-10       | 28-10       | 10-11  | 181                                 |
| Di               | -                  | 1-9       | 9-9                 | 18-9           | 8-10  | 11-10      | 28-10       | 11-11  | 182                                 |
| 813              | -                  | ?         | ?                   | 21-9           | 12-10 | 14-10      | ?           | 15-11  | 186                                 |
| Sai-bui-bao      | -                  | 1-9       | 15-9                | 21-9           | 14-10 | 15-10      | ?           | 15-11  | 186                                 |
| Nếp quán         | -                  | 1-9       | 15-9                | ?              | 15-10 | 16-10      | ?           | 15-11  | 186                                 |

[Legend on next page]

[Legend]: a) Name; b) begin producing shoots; c) stop producing shoots; d) formation of ears; e) formation of spikelets; f) opening; g) formation of grains; h) full grains; i) ripe; j) Total time of growth (days).

## II. Growth and Reproduction of 16 Varieties of "Chiem" Rice. (Seeded on 20 November; planted 20 January)

|             |      |      |      |      |      |      |      |      |     |
|-------------|------|------|------|------|------|------|------|------|-----|
| Dài trung   | 20-2 | 25-3 | 28-3 | 7-4  | 30-4 | 2-5  | 20-5 | 28-5 | 189 |
| Chiem bắc   | 22-2 | 25-3 | 30-3 | 7-4  | 2-5  | 3-5  | 20-5 | 30-5 | 191 |
| Tám chiêm   | 22-2 | 25-3 | 30-3 | 7-4  | 2-5  | 4-5  | 20-5 | 31-5 | 192 |
| Chiem dợt   | 22-2 | 25-3 | 30-3 | 8-4  | 2-5  | 3-5  | 22-5 | 31-5 | 192 |
| Chiem chanh | 22-2 | 25-3 | 30-3 | 8-4  | 2-5  | 4-5  | 22-5 | 31-5 | 192 |
| Bầu hương   | 24-2 | ?    | 2-4  | 10-4 | 3-5  | 4-5  | 22-5 | 31-5 | 192 |
| Bầu 157     | 24-2 | 28-3 | 2-4  | 10-4 | 2-5  | 4-5  | 24-5 | 31-5 | 192 |
| Chiêm cút   | 25-2 | 28-3 | 2-4  | 10-4 | 2-5  | 5-5  | 24-5 | 1-6  | 193 |
| Chiêm xiêm  | 25-2 | 28-3 | 6-4  | 14-4 | 4-5  | 6-5  | 24-5 | 1-6  | 193 |
| Di đồng     | 25-2 | ?    | 5-4  | 14-4 | 2-5  | 3-5  | 24-5 | 1-6  | 193 |
| Chiêm tếp   | 24-2 | 28-3 | 5-4  | 14-4 | 4-5  | 6-5  | 24-5 | 3-6  | 195 |
| Sỏi đường   | 26-2 | 27-3 | 5-4  | 14-4 | 6-5  | 8-5  | 26-5 | 4-6  | 196 |
| Nếp chiêm   | 26-2 | 28-3 | 8-4  | 16-4 | 7-5  | 9-5  | 26-5 | 4-6  | 196 |
| Chùm quăng  | 26-2 | 28-3 | 8-4  | 16-4 | 9-5  | 11-5 | 26-5 | 6-6  | 198 |
| Chiêm số 1  | 24-2 | 27-3 | 8-4  | 16-4 | 8-5  | 9-5  | 27-5 | 6-6  | 198 |
| Chiêm 3 lá  | 25-2 | 27-3 | 8-4  | ?    | 7-5  | 9-5  | 27-5 | 6-6  | 198 |

## III. CONCLUSION

1. For the group of varieties seeded on 16 May, and planted on 27 June:

The duration of growth for varieties of early main-crop rice varies from 144 to 151 days.

The duration of growth for varieties of regular main-crop rice varies from 161 to 178 days.

2. For the group of varieties seeded on 20 November, and planted on 20 January: the duration of growth varies from 189 to 198 days.

## NEW SOURCES OF FERTILIZER

- North Vietnam -

[Following is a translation of an article by Nguyen Van Nhiep, Haiphong Experimental Farm, in the Vietnamese-language periodical Khoa Hoc Ky Thuat Nong Nghiep (Agricultural Sciences & Technology) Hanoi, January 1964, pages 22-23.]

"Dien Thanh" is a plant. This hearty plant can resist acidity, alkalinity, aridity and soaking, and it can be sown in any season. Its growth depends on soil and climatic conditions because it resists acidity better than it does alkalinity, moisture better than aridity, and heat better than cold.

The Haiphong Experimental Farm has fertilized its rice fields with "dien thanh." Following are the results obtained during the tenth-month season, in 1962.

1. "Dien thanh" cut and transferred to different fields as a fertilizer.

"Dien thanh" was sown in March and April along ditches, roads and empty fields for main-crop rice... In June and July, "dien thanh" was cut; then it was brought to the rice fields and mixed into the soil. The experiment showed that "dien thanh" can be used as a substitute for manure. Indeed, it was more efficient than manure. Rice plants fertilized with "dien thanh" were green, hearty and gave high yields.

| Fertilizer per hectare   | Yield (piculs per hectare) |
|--|----------------------------|
| Manure (7 tons)  | 30.5                       |
| Manure (3.5 tons) + dien thanh (3.5 tons)                        | 33.07                      |
| Manure (3.5 tons) + dien thanh (3.5 tons) + apatit 166 kilograms | 35.00                      |

2. "Dien thanh" grown among "chiem" rice plants and used as a fertilizer for main-crop rice.

"Dien thanh" was sown early in May in fields growing "chiem" rice -- when rice grains were almost mature. At the end of June, "dien thanh" was plowed under and the fields were prepared for planting the main-crop rice.

We found that rice plants fertilized with a mixture of "dien thanh" and manure were greener and taller than those fertilized with manure alone:

|                             |              |
|-----------------------------|--------------|
| Fields without "dien thanh" | 2,783 kg/ha. |
| Fields with "dien thanh"    | 3,184 kg/ha. |

3. "Dien thanh" cultivated together with rice. Seeding was done with a Model 2-9 Seeding Machine (a device used in Haiphong for perpendicular [sic] seeding). One row of rice plants (with 10 cm spacing between plants in the same row), alternated with one row of "dien thanh" (also with 10 cm. spacing between plants of same row), at a spacing of 20cm between rows. After one month and 12 days, when it was 30 cm tall, "dien thanh" was hoed and buried between rows of rice plants. The density of rice plants was 40 x 10 cm. This method led to a definite increase in rice yields. We tested three schemes:

|  |             |
|--|-------------|
| 1. Rice seeded according to the pattern                              | 20 x 20 cm. |
| 2. Rice seeded according to the pattern                              | 40 x 10 cm. |
| 3. Rice seeded according to the pattern alternated with "dien thanh" | 40 x 10 cm. |

The third scheme was the best. The rice plants were green and gave full grains.

The scheme 20 x 20 cm. gave a yield of 3,210 kg/ha.

The scheme 40 x 10 cm. gave a yield of 3,210 kg/ha.  
The scheme 40 x 10 cm. with "dien thanh" gave a  
yield of 3,610 kg/ha.

Thus a gain of 400 kg/ha. was obtained by the use of 30 kg of "dien thanh" seeds (30 piasters) plus two man-days for seeding (concurrent with rice seeding); the labor for hoeing and burying was equivalent to the labor that would be required to carry fertilizer to the fields.

#### 4. "Dien thanh" used for making green fertilizer.

Green fertilizer is composed of dirt and "dien thanh" as the main ingredients. It is inferior to manure, and is considered as a supplementary fertilizer. It is often used in remote fields which have previously received little or no application of manure.

### METHOD OF MANUFACTURE

An area is selected in the middle of the field to be fertilized. The soil should be good and moderately moist so that the "dien thanh" can grow vigorously without any special care. The area is plowed and harrowed in the same manner as that used in growing potatoes. On each 100 square meters spread 300 kg of manure (ten small shoulder-loads) and 45 kg of superphosphate; then, sow one kg of "dien thanh" seeds. Water if soil is too dry. When "dien thanh" is 60-80 cm high, plow and cover "dien thanh" with soil. Spread 30 kg of superphosphate and sow "dien thanh" seeds again. When "dien thanh" is sufficiently high, plow and cover over. Then, seed "dien thanh" once more if the time is available. The green fertilizer is needed from February to June. Ten days after the last seeding, the soil is used as a fertilizer. The final cost of this fertilizer is about 2.60 piasters per ton.

We have observed that green fertilizer acts fast but does not have a lasting effect. After each application, rice plants turn green and grow with vigor -- only to turn brown and wither shortly thereafter.

Seven tons of manure yielded 3,466 kg/ha.

Seven tons of green fertilizer yielded 3,220 kg/ha.

To fertilize rice, use "dien thanh" in any form including green fertilizer. Its final cost is low.

By observing the growth of rice plants fertilized with "dien thanh," and comparing the crop results, we estimated the effects of "dien thanh" in each form of application, as follows:

1. In green fertilizer, "dien thanh" is buried under dry, insulating soil. The warmth rapidly decomposes stems and leaves. Organic matter is digested. Nitrogen is, for the most part, absorbed in the soil. When spread in fields containing water, the fertilizing material in mineral form is dissolved in the water and absorbed by the plants. This explains the rapid effectiveness of green fertilizer (with manure the ability of rice to reproduce is 13.81, but with green fertilizer it is 14.66). However, the amount of fertilizing material is limited, therefore after a short period of vigorous growth, the plants turn yellow and wither.

2. When "dien thanh" is brought from the fields where it grows to different fields, its green leaves and stems are covered with soil. The leaves having a nitrogen content of 4.05 per cent decompose first. Afterwards, the stems with a lower nitrogen content decompose. Decomposition is slower in water than in dry soil. Hence, the fertility is longer lasting. We found that with this form of fertilizer rice plants do not turn brown, or, if they do turn brown, they do so in a very short time.

3. When buried in situ, "dien thanh" not only provides organic matter, but also a significant amount of nitrogen is derived from the bacteria living in the nodules. We noticed that in wet soil "dien thanh" plants do not have nodules in the lower roots; instead, most nodules appear in the higher roots less than three cm beneath the neck of the roots. The nodules are very large and occur in clusters of two or three. Some are found even at 4.5 cm above the neck of the roots. Furthermore, the root system is larger in wet soil than in dry soil. The ratio of roots to stem and leaves is 1:4 in dry soil and 1:3 in wet soil. For seven to ten tons/ha of stems and leaves, the roots yield at least two to three tons.

In brief, "dien thanh" as a fertilizer for rice plants is valuable both technically and economically.

To improve the quality of this fertilizer, the "dien thanh" should be buried deeper to avoid loss of nitrogen, and it should be applied many times in many small portions instead of one or two large applications as was the practice

in the past. In other words, the "dien thanh" fertilizer should be used in the same way as mineral nitrate fertilizers.

- END -