

THE RESPONSE OF SELECTED EXOTIC AND INDIGENOUS  
WHEAT VARIETIES TO CHANGES IN DAY  
LENGTH AND TEMPERATURE

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## INTRODUCTION

Varieties of wheat which are important in Oklahoma are constantly changing. None of the varieties recommended today in Oklahoma were recommended 20 years ago. The varieties recommended now are the best that are available; however, they are lacking in certain characters; for example, strength of straw, bread-making quality, disease and drought resistance. As a result of these shortcomings, the search goes on continuously for strains of wheat which are strong in these as well as other characters. Considerable breeding material is obtained as introductions from other areas of the United States and other parts of the world. In general, these introductions are not well adapted to Oklahoma and it is necessary to incorporate through crossing and selection the desired character or characters into wheats adapted to Oklahoma.

There is very little information in the literature of a group of wheat varieties collected from various parts of the world and grown in a number of widely distributed locations and latitudes. This study was originally planned as a wheat latitude - seeding date interaction study. In 1955 Dr. A. M. Schlehner while on a trip to Europe agreed to participate in such a study and grow a series of wheat varieties at Stillwater, Oklahoma in cooperation with the Netherlands Grain Center.

The terms used in this study are defined as follows:

1. Cold requirement or vernalization - The amount of cold needed by the "winter" wheat varieties to initiate heading. Cold requirement

varies among the varieties; some requiring much more than others. This character is not the same as cold tolerance or winterhardiness which is the ability to withstand cold.

2. Short day requirement or photoinduction - The number of short days (12 hours or less) needed to produce normal heading. Again there is a varietal response to this character. Winter wheats generally complete cold vernalization and photoinduction simultaneously in the winter.

3. Long day response - The ability of the wheat plant to grow vigorously under long days after the cold and short day requirement is satisfied. The spring wheats are grown under increasing day length and have little or no cold and short day requirements.

The objectives of this study were: (1) to study the response of the wheat varieties grown in a specific latitude; (2) to study the response to seeding date and the changes in cold and short days affected by the change in seeding date; (3) to study the relationship of maturity to the changes in cold and short days; (4) to observe the response to artificial vernalization, and (5) to determine the amount of light and heat energy from emergence to heading for each seeding date.

This study was conducted on the Agronomy Research Station, Stillwater, Oklahoma during the 1956 and 1957 crop years.

## REVIEW OF LITERATURE

Published literature on the various aspects of plant response to day length and cold is voluminous. The literature reported here is that which appears to have a bearing on this particular study.

### Photoperiod or Light Requirement

Garner and Allard (8) <sup>1/</sup>were the first to explain the response of plants to relative length of day and night in 1920. They showed that long days produced heading in some species of plants and short days produced heading in other species. They also demonstrated that artificial regulation of day length could speed up or slow down the sexual maturity of plants as desired. In 1940 they recognized two more light reaction groups; indeterminate-flowering under any light conditions and intermediate-flowering under a very narrow range of light (1). Allard and Garner also indicated that there was a wide variation in sensitivity to day length in both the long-day and short-day groups. The term "photoperiodic response" was proposed to describe these phenomena. Wanser (27) in 1922 proposed that winter wheat required two separate and distinct photoperiods, one for jointing of the wheat and a separate and distinct photoperiod to produce heading.

Forster and his associates (7) observed that Australian varieties when grown in England in general were extremely early, while the English

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<sup>1/</sup> Numbers in parentheses refer to Literature Cited, page 52.

varieties grown in Australia were extremely late. The English varieties also tillered profusely when grown in Australia. Their conclusion was that the English varieties were adapted to a longer day than were the Australian varieties. They also concluded that the longer day of England was responsible for the early heading of Australian varieties while the shorter day of Australia delayed the heading of the English varieties.

#### Vernalization or Cold Requirement

Klages (14) in 1926 reported that cold was not necessary to produce heading in winter wheat. McKinney, Sando and Swanson (18), however, showed that vernalization of up to 65 days accelerated heading in 11 varieties with which they were working. Peltier and Kiesselbach (20) showed that vernalized seed of Turkey winter wheat when seeded at the same time as Ceres spring wheat headed at about the same time; while non-vernalized Turkey wheat did not head from spring seeding. Early Blackhull, when vernalized and seeded in spring with Ceres wheat headed about a week earlier than the spring variety. Wort (28) studied the response to vernalization of 36 samples of spring wheats from different regions of the United States. The flowering of 27 varieties was hastened while the flowering of 9 varieties was retarded. He also noted an area response from the different lots of seed of the same variety. Samples which responded most were those produced in areas of relatively high temperatures during flowering and ripening of the parent plant.

The influence of the age of seed in response to vernalization was noted by Riddell and Gries (25). They were not able to show any direct correlation between age of the seed and earliness, although marked differences occurred between seed from different harvests. Gregory and

Purvis (9) in 1936 reported the vernalization of winter rye seed maturing in the head by subjecting it to temperatures near freezing for 24 days. They concluded that it was often possible for the seed to be partially or almost wholly vernalized while maturing in the head.

Schlehuber (26) in 1955 subjected 15 varieties of winter wheat to different cold treatments. These varieties normally range in maturity from very early to very late under Oklahoma conditions. They showed differential responses to cold treatments which were not always related to maturity. Of the normally early maturing varieties - Apache, Triumph and Wichita, only Wichita had a relatively short cold requirement. Cheyenne, a late winterhardy variety, had a relatively long cold requirement. Cimarron, a medium maturing variety, Improved Blue Jacket and Triticum-Agropyron elongatum X Pawnee C.I. 13020, late maturing varieties, had a very short cold requirement.

#### Light and Cold Requirement

Adams (2) conducted a seeding date test on Kharkof winter wheat and winter rye in Ottawa, Canada. He concluded that date of sowing and the amount of light and temperature influenced the heading in wheat and rye. He was able to produce heading any time from March to October. At Lincoln, Nebraska, Kiesselbach and Sprague (13) studied the response of Turkey winter wheat when sown on 4 dates; September 16, September 22, October 1 and February 15. In addition, they seeded Java spring wheat on February 15. The first three dates produced good yields and good tillering while the February 15 seeding produced very poor yields. Associated with the poor yields was a reduced tiller count and fewer mature seeds per head. Bayles and Martin (3) planted a number of varieties

of winter and spring wheat at 10-day intervals from October 14 to May 21 at Moro, Oregon. They concluded that the date at which a variety will head depends on the date of sowing, the seasonal environmental conditions, as well as the variety which is involved. The critical sowing date for desirable yield was found to be earlier than for heading. Quisenberry and Bayles (23) planted a number of winter wheat varieties on 3 seeding dates at 8 experiment stations. They found Nebraska 60 to be more winterhardy and later heading from fall seeding than Kharkof. Nebraska 60 produced normal heads from later spring seedings than did Blackhull and Quivira varieties. The variety Red Rock had nearly as much cold requirement as did Odessa, but much less winterhardiness.

McKinney and Sando (15), in a study reported in 1930, subjected Harvest Queen, a winter wheat, and Purple Straw, a winter-spring wheat, to different light and temperature treatments. Purple Straw headed earliest, 85 days after planting, when given long day treatments in the early stages of growth. Harvest Queen headed earliest, 92 days, when given short day treatments during the early stages of growth. Purple Straw, when given short days in the early stages, headed in 92 days. Harvest Queen, when given long days in the early stages, started to head at 97 days; however, profuse tillering and irregular heading was prevalent. They also observed that heading of winter wheat could be accelerated by subjecting the freshly germinated seeds to 31 to 33° F. The plants were grown to maturity under long day treatments. In a later experiment reported in 1933, McKinney and Sando (16) were again able to show that varietal responses to day length and cold treatment existed.

Hurd-Karrar (11) showed that short day treatments at 50-54° F. initiated the rosette stage in Turkey winter wheat while short day treat-

ments at 68-73° F. did not initiate the rosette stage. These data would indicate a relationship of light and temperature, although the author did not state this. In another experiment (12) she subjected Hard Federation spring wheat and Turkey winter wheat to two temperatures (54° F. and 70° F.) and three light treatments (short-8 hrs., normal-9.5 to 15 hours, and long-17 hours). The long day favored higher yields in Turkey and lower in Hard Federation. The short days produced the opposite effect. The higher temperature was more favorable to Hard Federation. She indicated that it was not necessary to have short-day treatments to produce normal plants of Turkey wheat, but that short day followed by long day treatments greatly increased the development of winter wheat.

Purvis (21) stated in 1934 that no known treatment can induce differentiation of flower initials in cereals before a certain minimal number of leaves has been formed. Under long days in spring rye varieties, this is approximately 7 leaves, and in winter rye germinated at 65° F. about 22 to 25 leaves. Short days delayed the production of flower primordia in both spring and winter varieties until after about 22 leaves were formed. This effect was not changed by the temperature of germination. Purvis and Gregory (22) later indicated that the number of leaves could be controlled by short-day treatments followed by long days as well as by cold treatments. Flowering was accelerated by short day treatments of up to 6 weeks and cold treatments of up to 14 weeks also hastened flowering. McKinney and Sando (17) concluded in 1935 that winter wheats were short day-low temperature and long day-high temperature plants. They found that temperatures and photoperiods favoring earliness in winter and spring wheats favored formation of a reduced number of internodes and leaves by each

tiller. Chinoy and Nanda (5) state that long days increased the development of the wheat varieties with which they worked. On the basis of their work they concluded that wheat does not need cold to head. Chinoy (4) later studied the effect of combinations of light and vernalized and non-vernalized plants. He then indicated that the vernalized plants in general headed sooner than the non-vernalized plants. Increasing the length of the light treatment did not compensate for the lack of vernalization. The combination of vernalization and long day treatments on the winter varieties very greatly hastened heading.

Gries, Stearns and Caldwell (10) subjected three spring wheat varieties to various day lengths and temperatures. They found that Chinese spring wheat was more efficient at utilizing light at the 8 hour day while the other varieties were more efficient at 16 hour days. The varieties were less efficient at 20 and 24 hour photoperiods which probably indicated a need for a dark period. They concluded that the light effect on spring wheat was quantitative rather than qualitative. Riddell and Gries (24), in a study of the effect of light and temperature treatments on 2 spring wheat varieties, showed that both varieties responded to the long photoperiod treatments. The varieties did exhibit different temperature optimums; however, White Federation 38 had a 60° F. optimum for early growth and an 80° F. optimum for later growth. Chinese responded at the 60° F. temperature as did the other variety, but did not respond to the higher temperature for further development.

Nuttonson (19) studied some wheat-climate relationships based on data from North America and some thermally analogous areas of North America in the Soviet Union and Finland. He concluded that the day-



degree summations for Kharkof winter wheat were similar regardless of the latitudinal position in the United States.

Feekes (6) concluded from his experiments in Holland that the relation of vernalization by cold and short day requirement is not simple. Some varieties having a cold requirement react strongly to short days while others do not. Two varieties in his experiment showed a strong response to short-day vernalization, one a moderate response, and two only a slight response. In another phase of this experiment, 5 different ecotypes of wheat were grown under 8, 10, 12 and 15-17 hours of light. Seeds having different artificial cold vernalization were included. In two varieties the reaction to low temperature was independent of the length of day. The Scandinavian wheat variety, Blanka, required a very long day for normal development; with only 8 hours of daylight, its growth was strongly inhibited. Dutch, German and French wheats reacted less and the Mediterranean wheat, Florence X Aurore, was almost indifferent to light treatment. The length of time the plants were subjected to light was more important than the intensity. When the light intensity was decreased to 1/50 of normal strength, the rate of development was not affected.

## MATERIALS AND METHODS

### Experimental Materials

This study was conducted as a part of the wheat breeding program at the Oklahoma Agricultural Experiment Station in cooperation with the Netherlands Grain Center, Wageningen, Holland. The following varieties were grown in this study:

<u>Variety</u>	<u>Origin</u>
1. Florence X Aurore	Tunis
2. Mara	Italy
3. Autonomia B	Italy
4. Peko	Germany
5. Heine 13161	Germany
6. Blanka	Sweden
7. Klein Aniversario	Argentina
8. Novi Sad	Yugoslavia
9. Bersee	France
10. Magdalena	France
11. Reichersburger Stamm 39	Austria
12. Austro-Bankut	Austria
13. Etoile de Choisy	France
14. Derenburger Silber	Germany
15. Banco	Sweden
16. Panter	Belgium

17. Yeoman	Great Britain
18. Probus	Switzerland
19. Eroica II	Sweden
20. Varma	Finland
21. Concho	Oklahoma
22. Comanche	Oklahoma
23. Ponca	Oklahoma
24. <u>Triticum</u> spp. - <u>Agropyron</u> <u>elongatum</u> X Pawnee	Oklahoma
25. Triumph	Oklahoma

The first 20 varieties are arranged in order of their approximate cold requirement. <sup>2/</sup> The varieties range from those having no cold requirement, those having some cold requirement, to varieties having considerable cold requirement. The cold requirement was not known for the Oklahoma varieties so they were placed at the bottom of the list.

The first 21 varieties were grown at the following locations and latitudes:

<u>Location</u>	<u>Latitude</u>
Finland	60°
Scotland	56°
England	56°
Holstein	56°
Holland <sup>3/</sup>	52°
Germany	52°
Germany	48°

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<sup>2/</sup> Correspondence, Netherlands Grain Center, Wageningen, Holland.

<sup>3/</sup> Four locations in Holland.

France	48°
Austria	48°
Oklahoma	34°

Data collected in this study have been submitted to the Netherland Grain Center.

No data from the other locations have been received; therefore, it has not been possible to study the influence which a number of latitudes and locations might have on these varieties.

#### Experimental Methods

On each seeding date 3 rows of each variety were sown. The rows were 1/2 meter (19.73 in.) long, spaced 20 cm. (7.85 in.) apart. Twenty-five seeds were spaced 2 cm. (0.8 in.) apart in the row. The plan for this study was set up by the Netherlands Grain Center. Plantings were made in 12 locations in Europe as well as the one here at Stillwater. It was intended at the start of the study that data from the other locations would also be available for use; however, no data have been received from the other locations.

The first seeding date in this study was made in the fall of 1955. Table 1 shows all the seeding and emergence dates. The nursery was grown on a Kirkland silt loam in the 1956 crop year and a Norge loam in the 1957 crop year. The study was planned with 11 seeding dates: approximately September 10, September 30, October 15, November 15, December 15, January 15, February 20, March 1, March 10, April 1 and May 1. The droughty condition in the fall of 1955 delayed the first 3 plantings until October 12, October 18 and October 27 respectively. In 1956 the first two plantings were not made because of drought and the October 15

planting was delayed until October 29. Seeds of some varieties were not received in time for the early plantings in 1955.

Table 1. -- Seeding and emergence dates of varieties in a seeding date study in 1956 and 1957 crop years.

1955-56		1956-57	
Seeded	Emerged	Seeded	Emerged
October 12	October 19	---	---
October 18	October 27	---	---
October 27	November 8	October 29	November 7
November 15	December 13	November 23	December 19
December 13*	January 15	December 17	January 18
January 17*	February 27	January 15**	February 17
February 21	March 3	February 20**	March 17
March 1	March 11	March 1**	March 20
March 10	March 27	March 10**	March 25
April 1	April 11	April 12	April 20
May 3	May 12	May 9	May 17

\* Vernalized and non-vernalized seedings - 1955-56

\*\* Vernalized and non-vernalized seedings - 1956-57

Seed vernalized for 28 days at approximately 36° F. was also planted in the November 15 and December 15 seedings in 1955. Since no response was observed from the vernalized seedings on these dates, January 15, February 20, March 1 and March 10 plantings were made with both vernalized and non-vernalized seeds in 1957.

Comanche, Ponca, Triticum spp. - Agropyron elongatum X Pawnee, C.I. 13020 (TAP 67) and Triumph were added to the study for the 1957 crop year.

Rainfall for July 1, 1955 to June 30, 1956 and July 1, 1956 to June 30, 1957 are shown in Table 2. The yearly average rainfall for

Stillwater, Oklahoma based on a 40-year record is 33.31 inches. There is considerable contrast in the total rainfall for each of the crop years in which this study was grown.

The mean monthly temperature for each of these crop years is shown in Table 3.

Morphological development was recorded using a scale designed by Feekes which is shown in Figure 1. He describes the development of a wheat plant from emergence until maturity divided into a scale of 23 stages as follows:

A. Germination

B. Tillering

1. One sprout (number of leaves may be counted).
2. Beginning of tillering.
3. Plant yet creeping or lying, leaves often forming a spiral.
4. Beginning of the erection of the pseudo stem.
5. Pseudo stem (formed by the sheaths of leaves) strongly erect.

C. Stem Development or Shooting

6. First node of the stem is formed.
7. Second node of the stem formed. This stage is called the beginning of shooting; it is obvious that a real stem is formed.
8. The last leaf is yet rolled up, the ear begins to swell.
9. Ligule of the last leaf just visible.
10. Sheath of the last leaf completely grown out, head strongly swollen.

D. Heading

- 10.1. First heads just visible.

Table 2. -- Rainfall data on the Agronomy Research Station  
Stillwater, Oklahoma.

Month	Year	
	1955-56	1956-57
July	1.35	1.03
August	2.15	1.27
September	1.99	.16
October	4.57	2.06
November	.18	1.77
December	T	1.68
January	.50	.84
February	1.13	1.71
March	.59	2.40
April	.38	5.10
May	3.81	14.91
June	1.27	9.46
Total	17.92	42.39

Table 3. -- Mean monthly temperatures and departures from  
normal for July, 1955 - July, 1957

Month	July, 1955 - June, 1956		July, 1956 - June, 1957	
	Mean Monthly Temperature	Departure from Normal	Mean Monthly Temperature	Departure from Normal
July	84.7	3.3	85.6	2.9
August	82.1	0.8	88.0	5.6
September	77.7	4.2	79.2	5.1
October	63.2	1.4	68.2	4.5
November	47.2	-2.0	48.5	-0.6
December	39.0	0.2	42.9	2.3
January	36.8	-1.3	33.8	-4.3
February	42.4	-0.2	45.4	2.8
March	53.4	3.3	49.1	-1.0
April	59.5	-1.3	57.6	-3.2
May	74.2	5.9	67.9	-0.4
June	79.6	1.7	75.2	-2.7

**GROWTH STAGES IN CEREALS**  
**ILLUSTRATION OF THE FEEKES SCALE**

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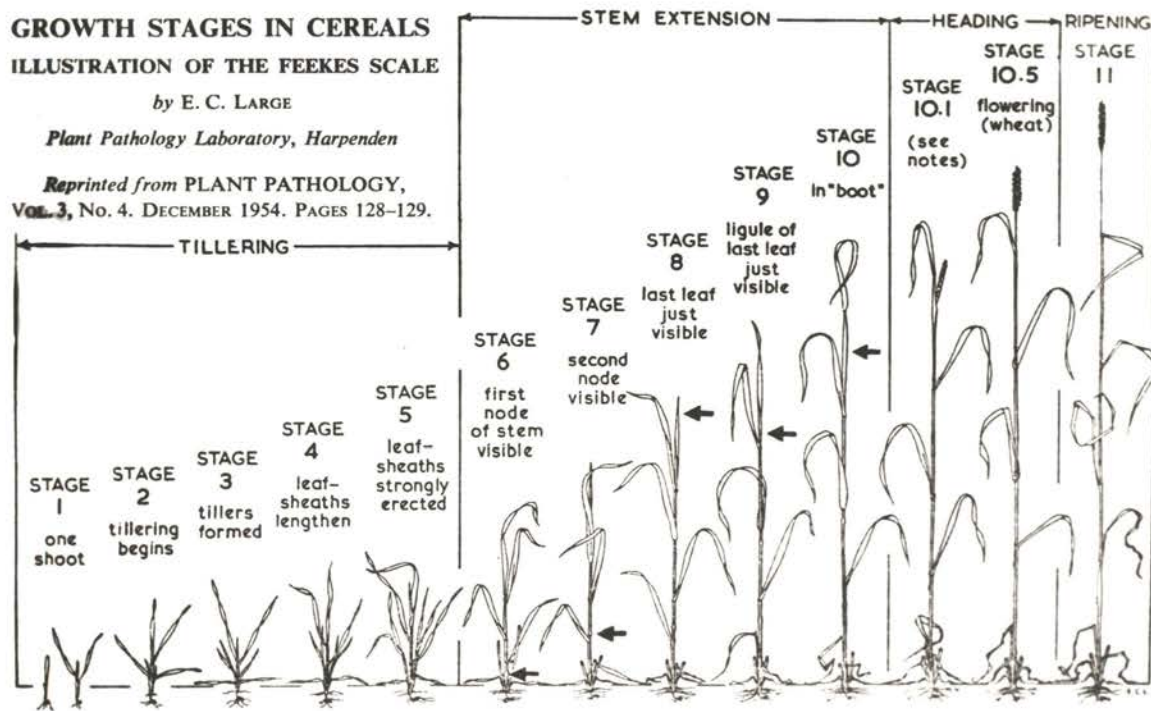


Figure 1. -- Feekes scale of morphological development of the wheat plant depicted diagrammatically.



10.2.  $1/4$  of the process of heading completed.

10.3.  $1/2$  of the heading completed.

10.4.  $3/4$  of the heading completed.

10.5. All heads out of sheath.

E. Flowering

10.5.1. Beginning of flowering.

10.5.2. Flowering complete to the top of the heads.

10.5.3. Flowering ended at the base of the heads.

u. Flowering ended, kernel "watery ripe".

F. Ripening

I. Milky ripe; kernel fluid milky.

II. Mealy ripe; kernel soft, but with dry contents.

III. Fully ripe; kernel hard and difficult to divide with the nail.

IV. Ripe for cutting; straw dead.

The number of leaves on the main shoot was counted in each stage from emergence to tillering. Height measurements were made when the varieties were mature in 1956. This was overlooked in 1957. Complete morphological data are included in the appendix (Appendix Tables 15 and 16).

The total number of daylight hours for each variety and seeding date was tabulated for the period of emergence to heading. The number of day-degrees, which is one degree per day on a given scale of mean temperature above the base temperature, for the same period has also been tabulated. This was done by using the mean monthly temperatures and  $40^{\circ}$  F. as the base temperature. This temperature was selected

because this is the approximate temperature at which wheat ceases to germinate and grow. Nuttonson (19) concluded that 40° F. was a good base to use in calculating day-degrees for wheat varieties. The photo-thermal units for the period from emergence to headed for each variety and seeding date have been calculated by multiplying the average day length by the number of day-degrees. The cold and short day responses of the wheat varieties from the last seeding date to head have been calculated.

## RESULTS AND DISCUSSION

### Heading From Various Seeding Dates

All the varieties did not head from every seeding date in which they were planted. The use of a number of seeding dates during the winter had the effect of a change in the environment. Each seeding date was subjected to a different cold and short day treatment. For example, the late October seeding was subjected to more cold and short days than the early March seeding. Table 4 presents the last seeding date from which heading occurred for the wheat varieties grown. Only those seeding dates in which a variety headed last are shown in this table. The first 20 varieties as indicated previously are arranged in order of their cold requirement by the Netherlands Grain Center.

The first varieties in general headed last from the April and May seeding dates. The last date to head became succeedingly earlier from the lower varieties. The last date to head in 1957 is not the same as in 1956; however, the first varieties again headed last from the April and May seeding dates. The last seeding date to head again in general became progressively earlier for the lower varieties in the table.

### Heading Dates

Heading and ripening dates for each variety for the two crop years are shown in Figure 2 as well as in the appendix tables. The 1956 data for each variety are shown in the top of the graph and immediately below

Table 4. -- Last seeding date from which heading occurred for the wheat varieties grown in 1956 and 1957 crop years.

Variety	1956							1957					
	12-13	1-17	2-21	3-1	3-10	4-1	5-3	1-15	2-20	3-1	3-10	4-12	5-9
Florence X Aurore							x						x
Mara							x					x	
Autonomia B						x					x		
Peko							x					x	
Heine 13161							x					x	
Blanka						x						x	
Klein Aniversario							x					x	
Novi Sad				x					x				
Bersee					x							x	
Magdalena						x						x	
Reichersburger Stamm 39		x							x				
Austro Bankut		x							x				
Etoile de Choisy				x							x		
Derenburger Silber		x							x				
Banco		x						x					
Panter		x						x					
Yeoman			x							x			
Probus		x							x				
Eroica II		x						x					
Varma	x								x				
Concho			x							x			
TAP 67											x		
Comanche										x			
Ponca										x			
Triumph									x				

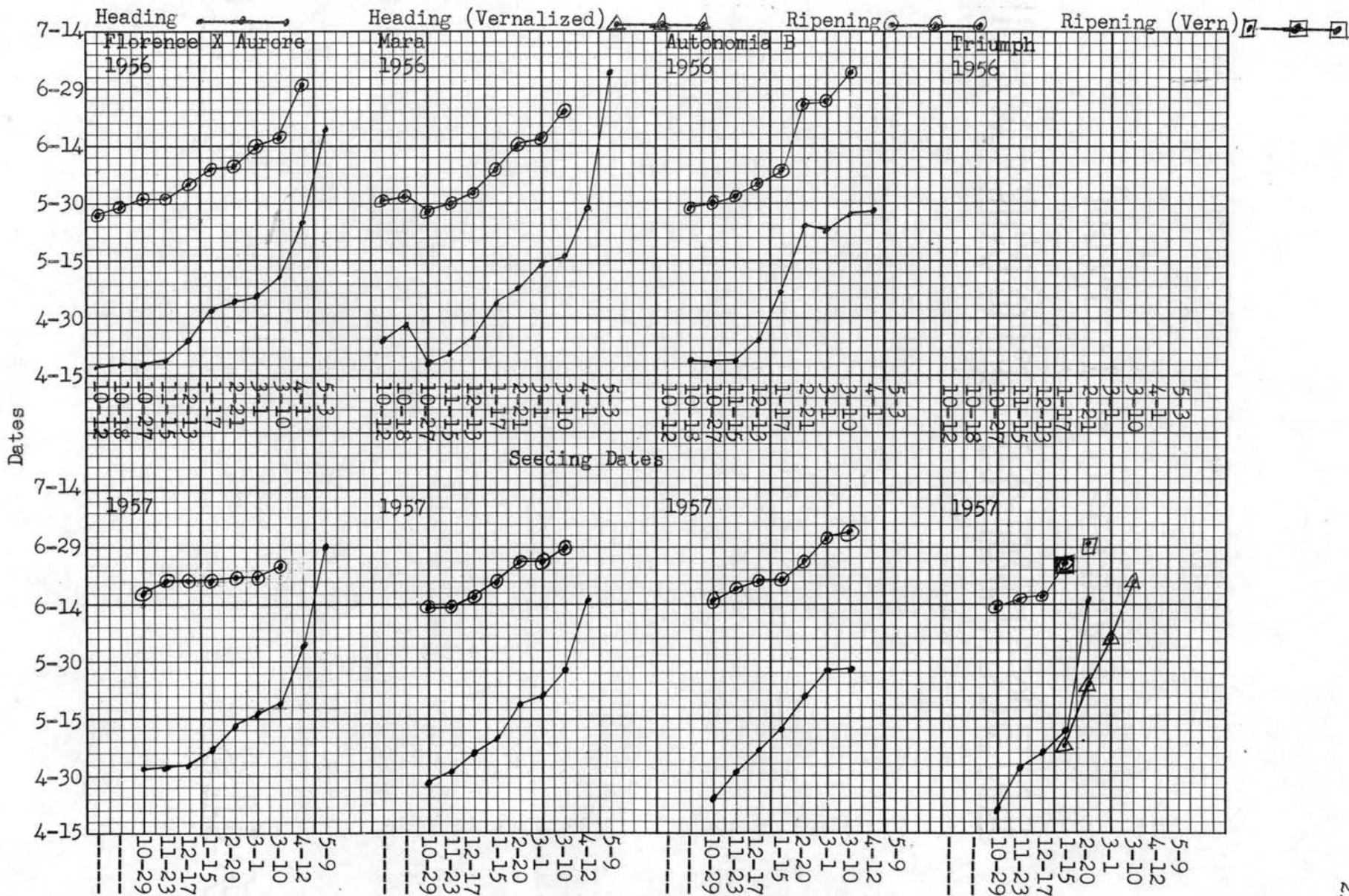


Figure 2. Heading and ripening dates for 25 varieties of wheat grown in 1956 and 1957.

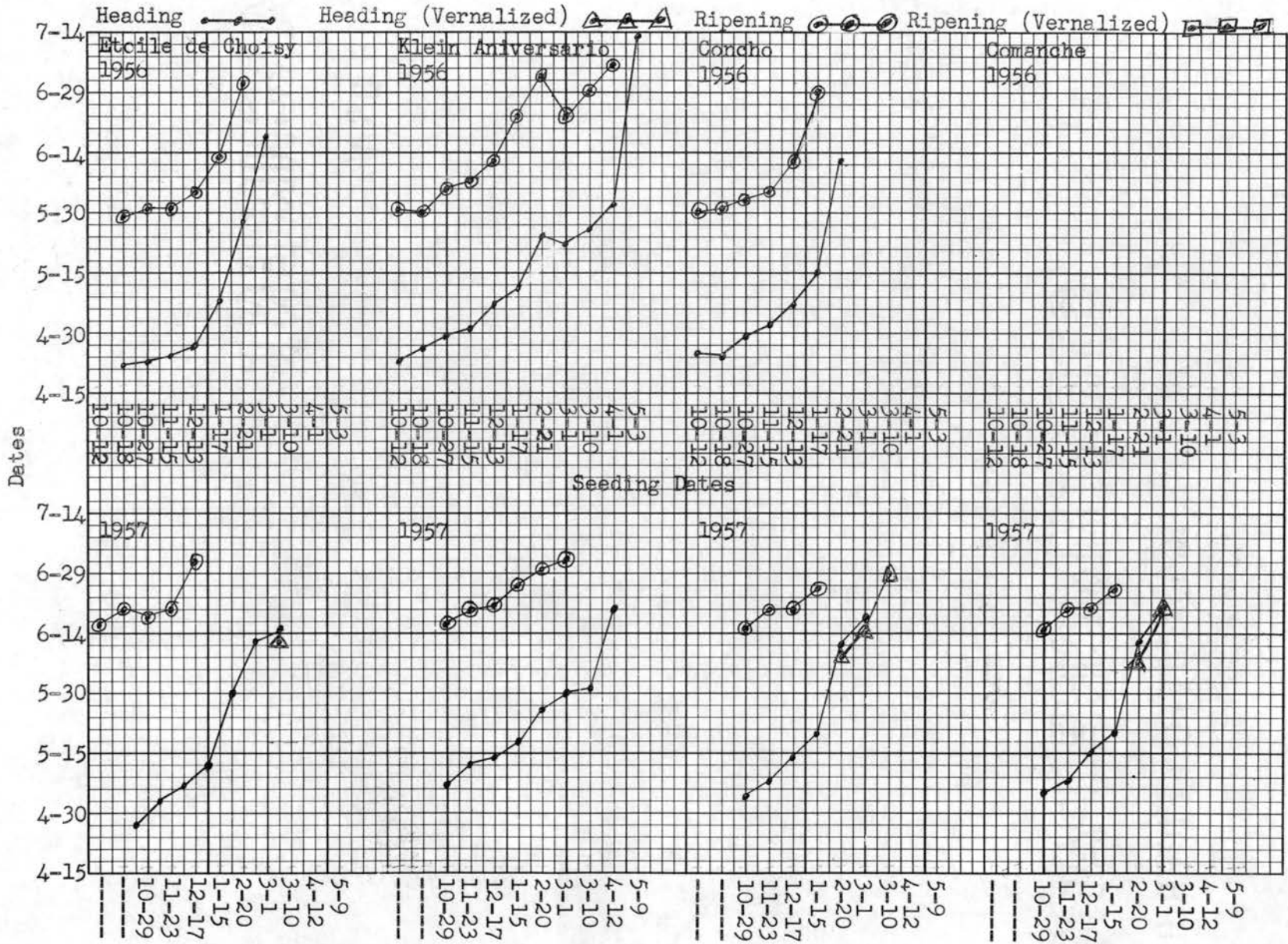


Figure 2. (Continued)

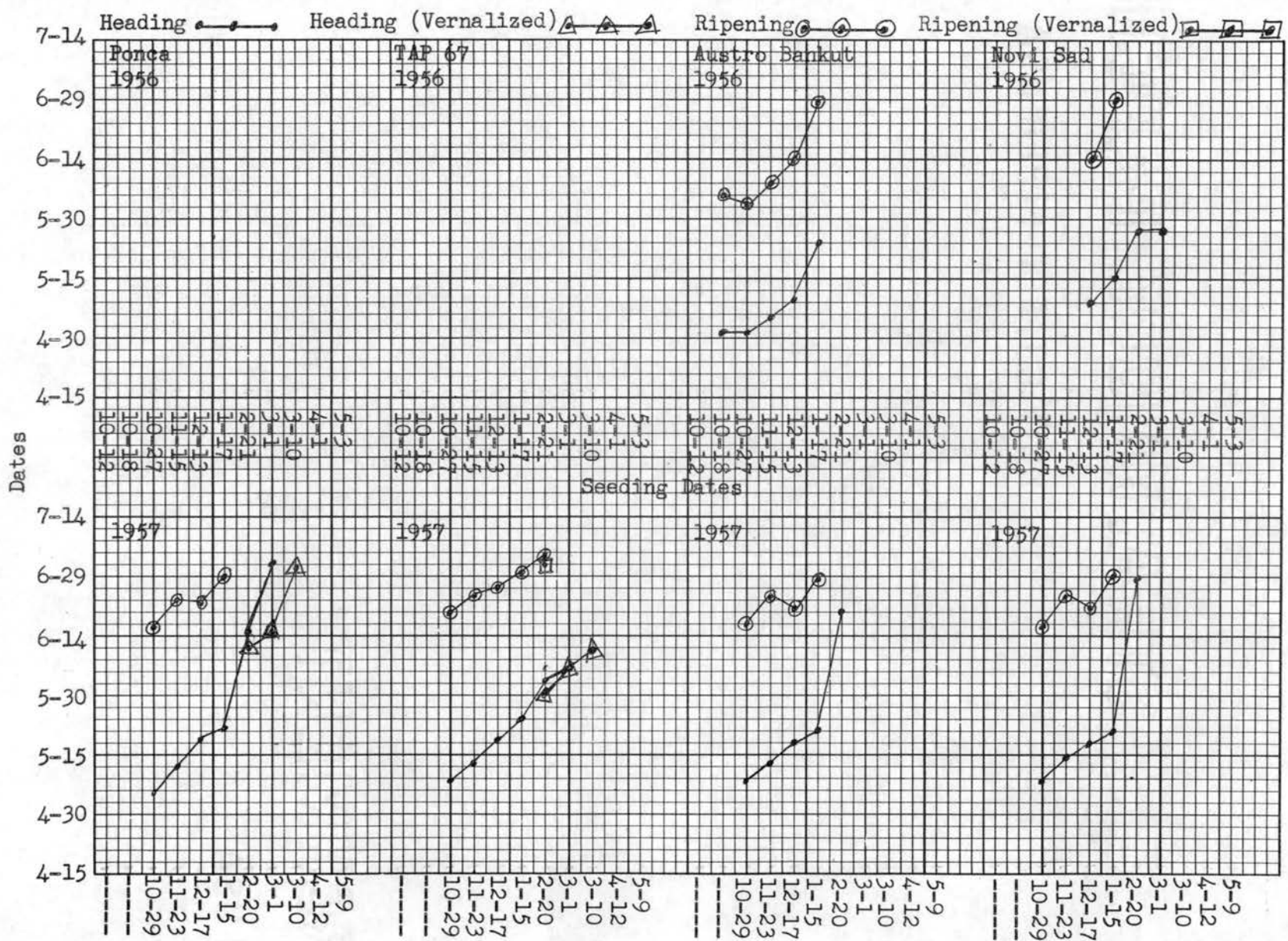


Figure 2. (Continued)



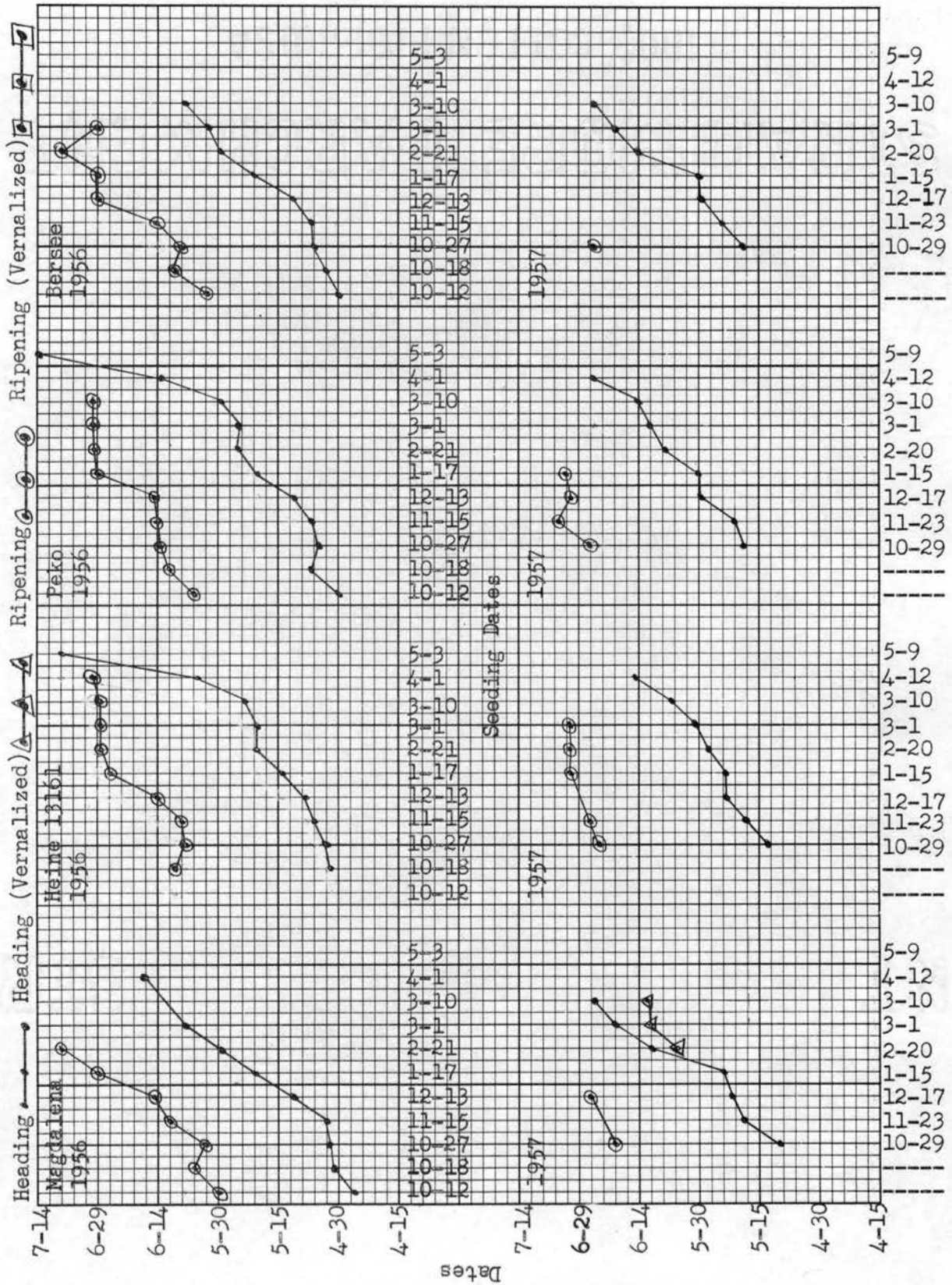


Figure 2. (Continued)



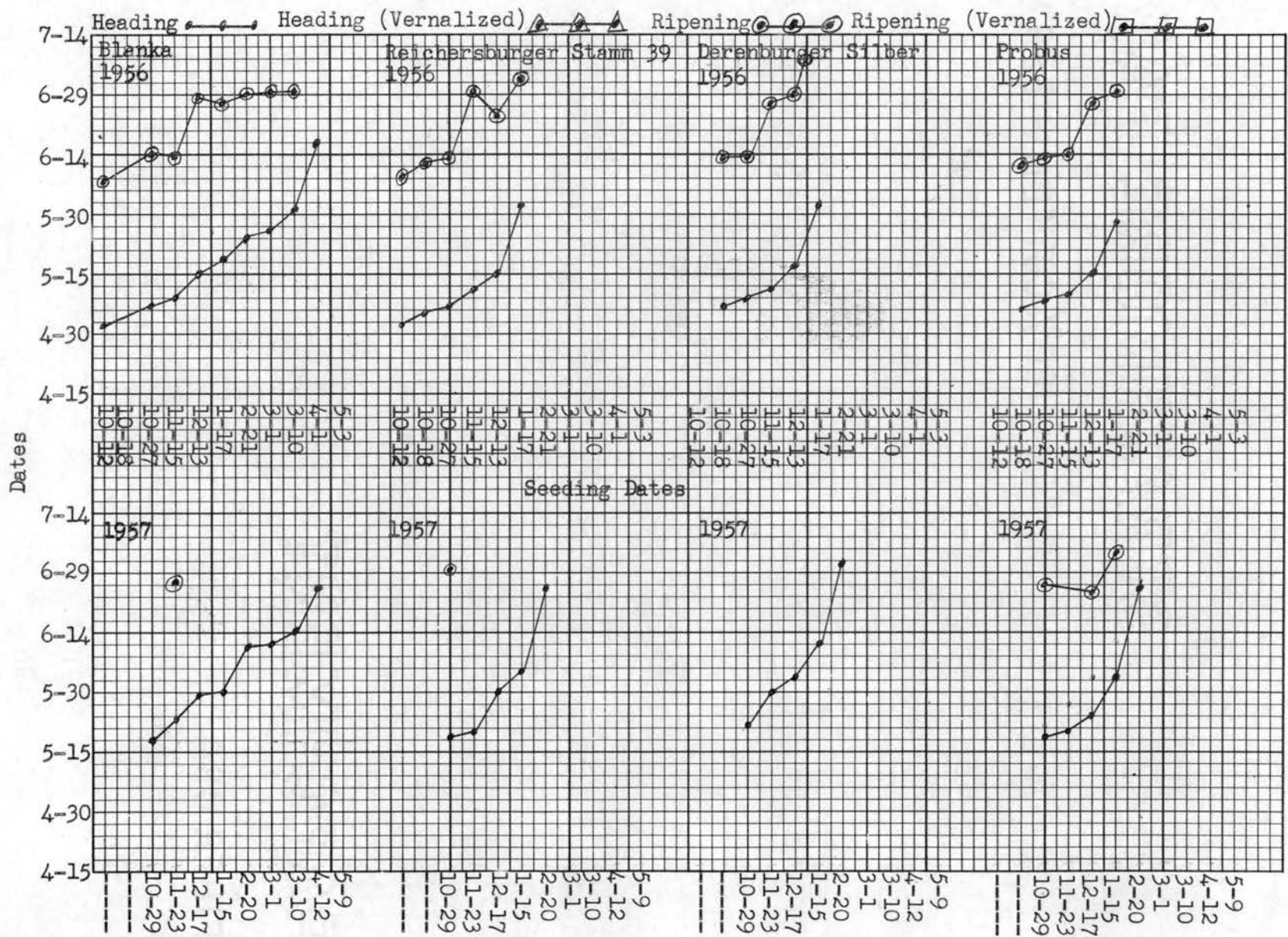


Figure 2. (Continued)

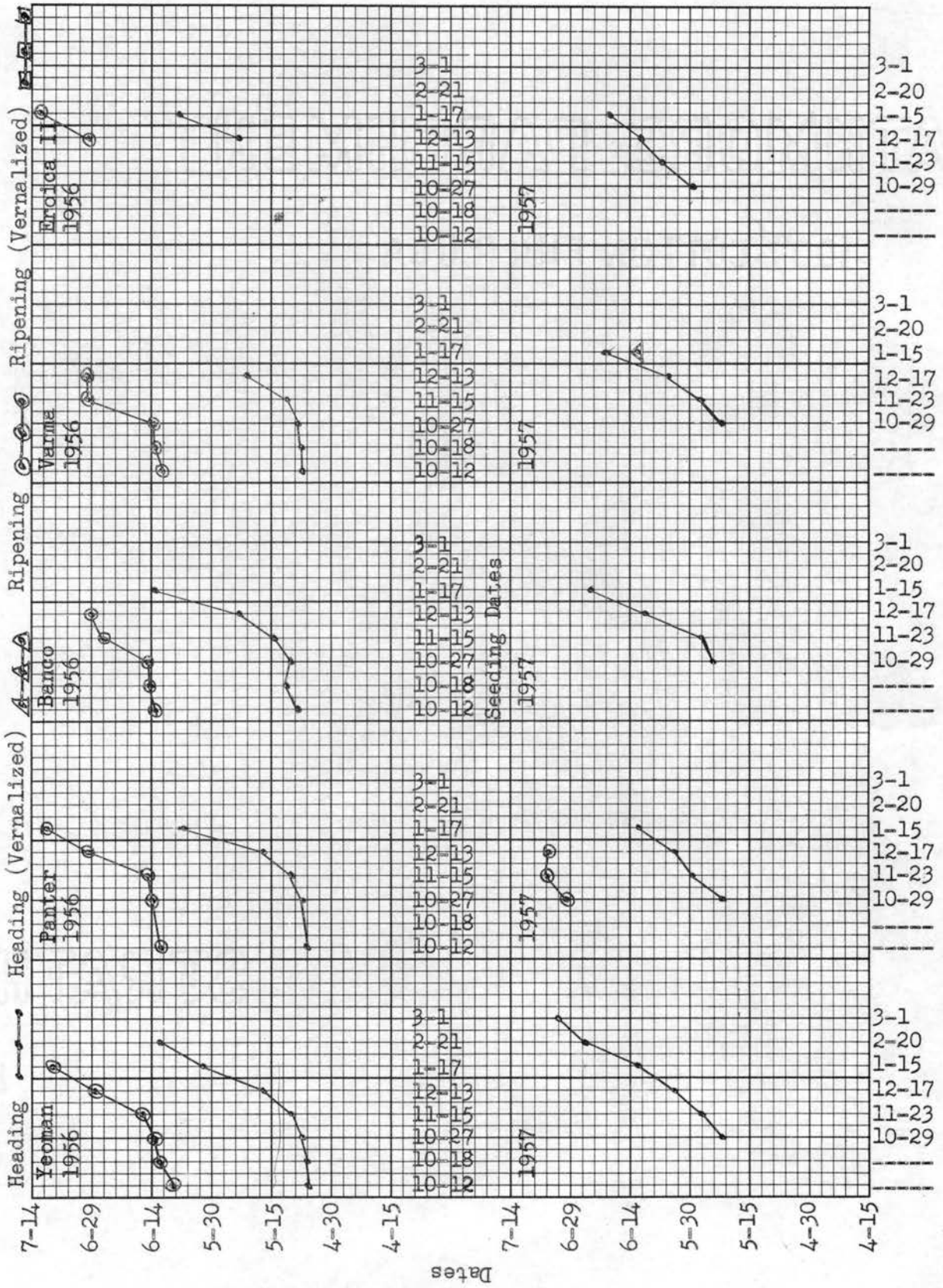


Figure 2. (Concluded)

are the 1957 data. Shown as the ordinate is the day and month from April 15 to July 14, the period of time in which heading and ripening occurred. The abscissa shows the seeding dates for each year, 11 in 1956 and 9 in 1957. Heading dates are shown by dots and ripening dates by circled dots.

The varieties headed earlier in 1956 than in 1957. Heading in 1956 occurred in a short period of time for the first 3 or 4 dates, October 12, October 18, October 27 and November 15. Heading when it occurred from the December 13, January 17, February 21 and March 1 seedings was later than the first 3 or 4 dates and was spread over a longer period of time. Heading from the April 1 and May 3 seedings was much later and much wider spread than from any of the other seeding dates. The general pattern existed in both years in that the length of time became greater between headings as the seeding dates became later.

The relationship for the respective varieties between the two curves representating the 1956 and 1957 heading dates is quite good. The slope of the curves of a variety for the two years in general is very much alike, indicating a similar response. It is recognized that this is not perfect agreement of the heading response for the two years.

\* Since each seeding date was not replicated, an average heading date was obtained for each respective variety using the heading dates of the October 12, October 18, October 27, November 15 and December 13 seedings in 1956 (Table 5). The average heading date for 1957 for each variety was obtained by using the heading dates for the October 29, November 23, December 17 and January 15 seedings. These seedings were used because all of the varieties which were grown headed from these dates. The average heading date is not representative of the expected heading from normal

Table 5. -- Average heading dates for the wheat varieties grown in 1956 and 1957 crop years.

Variety	1956		1957	
	Average	Rank	Average	Rank
Florence X Aurore	4-19	1	5-4	2
Mara	4-23	3	5-4	2
Autonomia B	4-20*	2	5-4	2
Peko	5-6	11	5-25	15
Heine 13161	5-5*	9	5-19	13
Blanka	5-7*	12	5-25	15
Klein Aniversario	4-29	5	5-13	8
Bersee	5-5	9	5-26	18
Novi Sad	**		5-16	10
Magdalena	5-3	7	5-19	13
Reichersburger Stamm 39	5-8	13	5-26	18
Austro-Bankut	5-4*	8	5-16	10
Etoile de Choisy	4-24*	4	5-5	5
Derenburger Silber	5-10*	17	6-1	20
Banco	5-14	19	6-6	24
Panter	5-9*	14	6-1	20
Yeoman	5-9	14	6-1	20
Probus	5-9*	14	5-25	15
Eroica II	**		6-9	25
Varma	5-11	18	6-3	23
Concho	5-1	6	5-12	6
TAP 67	***		5-16	10
Comanche	***		5-12	6
Ponca	***		5-15	9
Triumph	***		5-3	1

\* Only 4 heading dates included to obtain this average.

\*\* Seed not received in time to seed early dates.

\*\*\* Not grown in 1956.

seedings, but does present a comparable basis for a study of the varieties. The average heading dates are not comparable for the two years since the seeding dates are not the same.

Figures 3 and 4 show the average heading date as related to the last seeding date to head for the wheat varieties grown in 1956 and 1957. The varieties are arranged from the latest to the earliest seeding dates in which last heading occurred. Within each of these groups the varieties are arranged from the earliest to the latest average heading dates. The average heading dates do not represent heading from the seeding dates shown in the table.

If the last seeding date from which a variety will head were taken as a measure of cold requirement, is it possible to show any relationship between cold requirement and the maturity of a wheat variety? Florence X Aurore headed earliest and also headed from the last seeding date to head. Banco headed latest and also headed from the second earliest seeding date from which last heading occurred. There are other varieties which headed late and also headed last from late seeding dates. Since the reverse is also true, no clear cut relationship is apparent from these data. Early and late average heading dates occur without any strong relationship for the last date to head. On the basis of these data no correlation was found between cold requirement and maturity date for the wheat varieties studied.

#### Heading from Vernalized Compared with Heading From Non-Vernalized Seedings

Only 8 varieties out of 25 showed any response in heading from vernalization (Figure 5). A response was also shown in some other varieties in earlier stages of development. The response of these 8 varieties

\* = Last seeding date to head.    --+-- = Last date to head.    -----I = Average heading date.

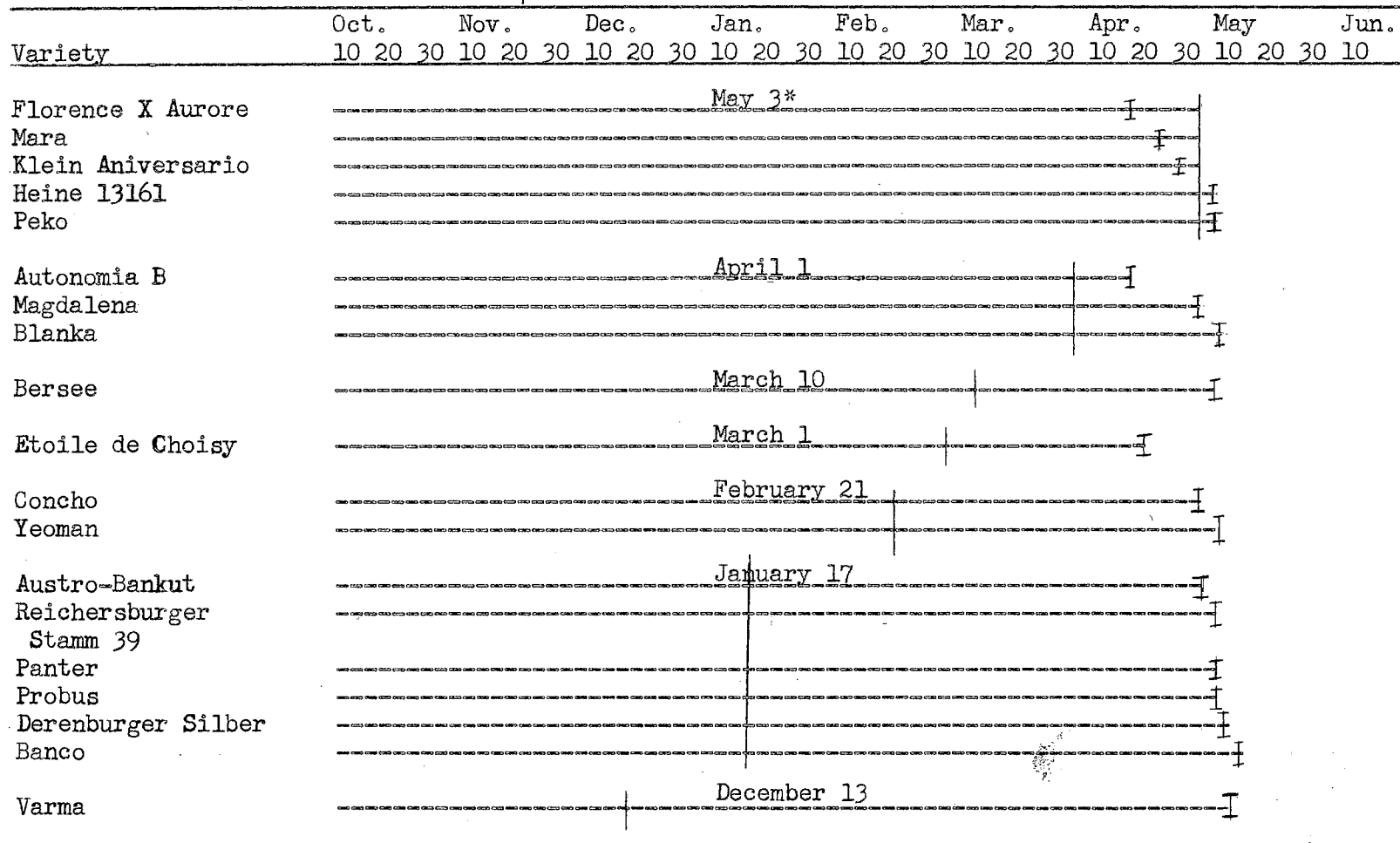


Figure 3. -- Average heading date as related to last seeding date to head for 19 wheat varieties in 1956.

\* = Last seeding date to head.    ---|--- = Last date to head.    -----I = Average heading date.

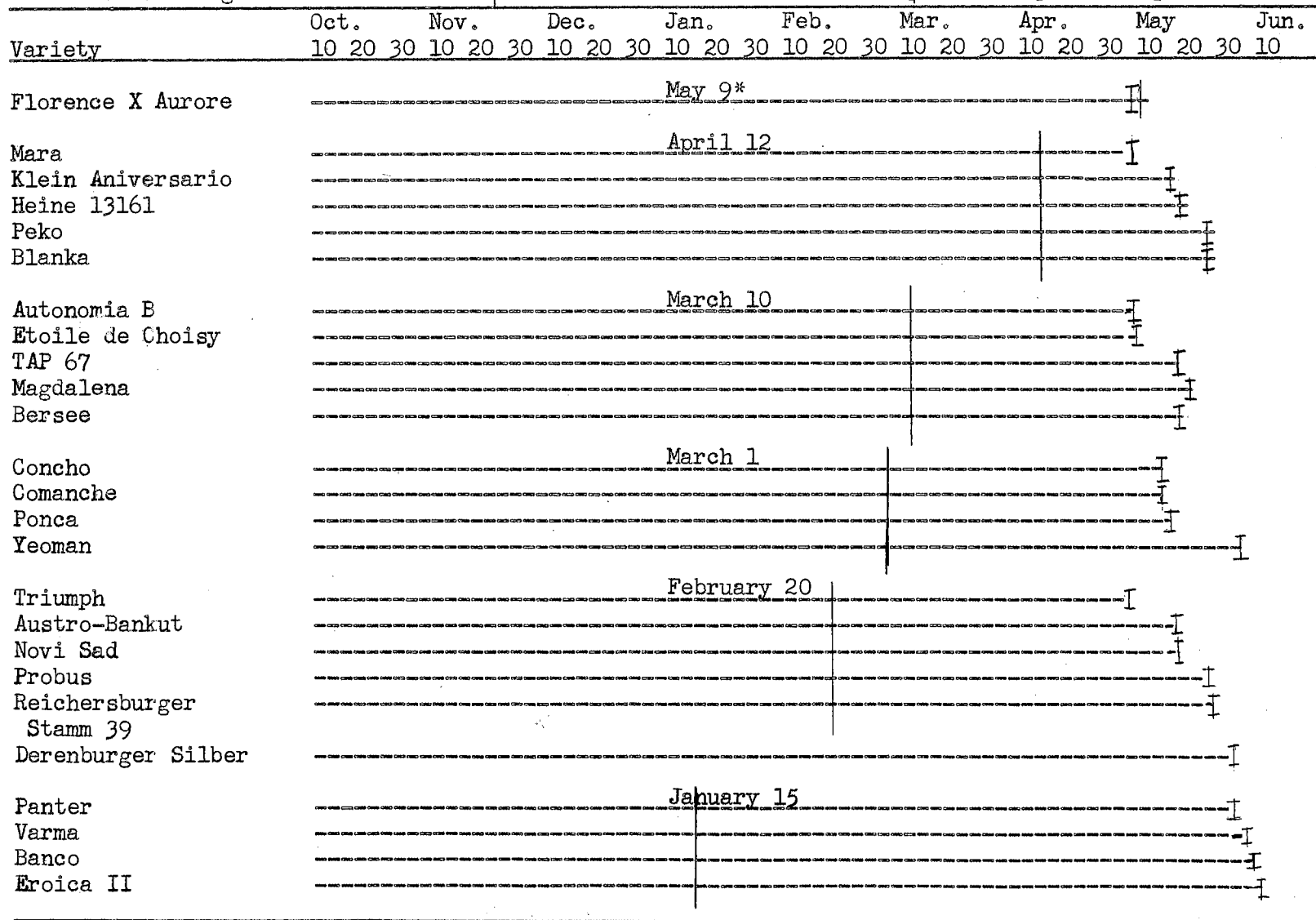


Figure 4. -- Average heading date as related to last seeding date to head for 25 wheat varieties in 1957.



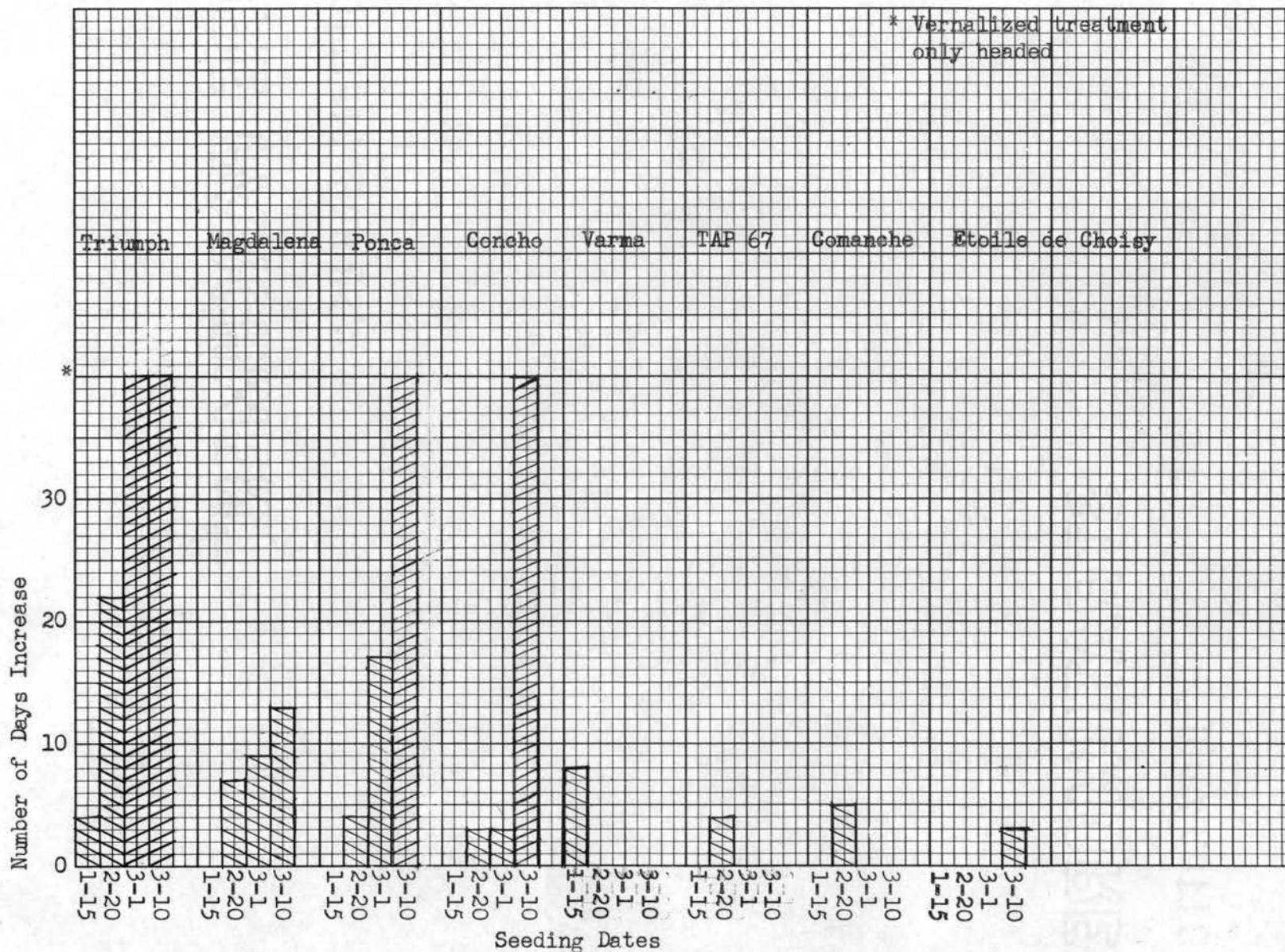


Figure 5. Days increase in heading of vernalized over non-vernalized seedings for 8 wheat varieties in 1957.



is shown by graph in terms of the days increase in heading of the vernalized over the non-vernalized seedings. In some varieties only the seeding which was vernalized headed.

Triumph was the only variety to show a response from all seeding dates. The greatest increase in heading due to vernalization was 22 days for Triumph from the February 20 seeding. The smallest increase from vernalization was 3 days shown by Concho from February 20 and March 1 seedings and by Etoile de Choisy from March 10 seeding. Triumph, Ponca and Concho exhibited heading from some vernalized seedings while the non-vernalized seedings did not head.

Gomanche showed a 5 day increase from vernalization from the February 20 seeding. It also headed from both the vernalized and non-vernalized seedings of March 1 but showed no increase due to vernalization. TAP 67 showed an increase of 4 days in heading from the vernalized seeding on February 20. It also headed from March 1 and March 10 seedings but no earlier heading was observed from the vernalized seedings on these dates.

The vernalized treatment sometimes produced an effect associated with the apparent hastening of the plant development. In the March 1 and March 10 seedings the plants from vernalized seed often appeared more turgid and healthy. This was most evident when both seedings of a variety were in Stage 5 (the pseudo stem strongly erect).

#### Heading as Related to Cold and Short Days

The number of hours with temperatures below 40° F. and the number of days having 12 hours or less was tabulated for each variety for the last seeding date to head (Table 6). The last seeding date to head was used since the cold and short day measurements for this date should be

Table 6. -- Response of wheat varieties at last seeding date to head to cold and short days in 1956 and 1957 crop years.

Variety	Cold Hours Response*		Short Day Response**		
	1956	1957	Indifferent 0-6 Days	Moderate 16-24 Days	High 49 $\frac{1}{2}$ Days
Florence X Aurore	0	0	x		
Mara	0	50	x		
Peko	0	50	x		
Heine 13161	0	50	x		
Klein Aniversario	0	50	x		
Blanka	59	50	x		
Magdalena	59	189	x		
Autonomia B	59	189	x		
Bersee	219	189	x		
Etoile de Choisy	235	189	x		
TAP 67	---	189	x		
Novi Sad	235	403		x	
Yeoman	315	287		x	
Concho	315	287		x	
Comanche	---	287		x	
Ponca	---	287		x	
Reichersburger Stamm 39	780	403		x ('57)	x ('56)
Austro-Bankut	780	403		x do.	x do.
Probus	780	403		x do.	x do.
Derenburger Silber	780	403		x do.	x do.
Triumph	---	403		x	
Banco	780	885			x
Panter	780	885			x
Eroica II	780	885			x
Varma	1256	403		x do.	x do.

\* Hours of 40° F. or below for last seeding date to head.

\*\* Number of days having 12 hours or less of daylight for the last seeding date to head.

a fairly good approximation of the minimum amounts under which heading could occur.

The varieties are divided into the following groups in relation to their proposed cold requirement. The origin is also noted and will be discussed later:

1. Little or no cold requirement

Florence X Aurore	Tunis
Mara	Italy
Peko	Germany
Heine 13161	Germany
Klein Aniversario	Argentina
Blanka	Sweden
Magdalena	France
Autonomia B	Italy

2. Moderately low cold requirement

Bersee	France
Etoile de Choisy	France
TAP 67	Oklahoma

3. Moderately high

Yeoman	Great Britain
Concho	Oklahoma
Comanche	Oklahoma
Ponca	Oklahoma

4. High cold requirement

Reichersburger Stamm 39	Austria
Austro-Bankut	Austria
Probus	Switzerland
Derenburger Silber	Germany
Triumph	Oklahoma

5. Extremely high cold requirement

Banco	Sweden
Panter	Belgium
Eroica II	Sweden

6. Unable to classify

Varma	Finland
Novi Sad	Yugoslavia

There appear to be divisions in the number of hours of cold where separations are made. The data do not agree for both years. Whenever there is an increase in the number of hours for a variety in one year there usually is an increase in the other year.

The cold requirement does not appear to be closely associated with the place of origin or adaptation of the varieties studied. Of the 5 Oklahoma varieties, TAP 67 has a moderately low cold requirement; Concho, Comanche and Ponca have moderately high cold requirements and Triumph has a high cold requirement, higher than the other 4 varieties. This relationship also appears to be true for the varieties from other localities. For example, of the 3 Swedish varieties, Blanka has little or no cold requirement, while Banco and Eroica II have an extremely high cold requirement.

The varieties within any one group originated from a number of latitudes and countries. For example, the varieties within the group having little or no cold originate from Tunis, Italy, Germany, Argentina, Sweden and France.

Varma and Novi Sad can not be classified under the scheme presented. These varieties headed one year in a date having a much lower number of hours of cold than in the other year. Why did they not head in both years from somewhere near the same number of hours of cold? No explanation seems apparent. The variation in the climate of the two years may have had an influence on these two varieties which was not readily apparent.

The reaction to the number of short days is broken into three groups. The March 10 and the April and May seedings were subjected to the 0-6 short days, the February 21 and March 1, 1956 and the February 20 and

March 1, 1957 seedings were grouped since the number of short days (16 and 24 days) was quite close together and January 17, 1956 and January 15, 1957 seedings were grouped under the 49 or more days.

Eleven varieties are classified as indifferent in their short day requirement, 6 varieties are classified as having a moderate short day requirement, and 3 are classified as having a high short day requirement. Five varieties do not lend themselves to a distinct classification, but fall under the moderate requirement in 1957 and the high requirement in 1956.

It should be pointed out that it is impossible to determine how much the response to short day is affected by the response to cold and vice-versa. If the vernalization of the seed of these varieties were effective, then the barrier of cold requirement should have been removed. In the case of Concho, Ponca and Triumph, their cold requirement was satisfied enough by vernalization that heading was produced from all three of the varieties from the March 10 seeding. This would indicate that they could be classified as being indifferent to short day.

#### Photothermal Units and Day-Degrees

Photothermal units and day-degrees have been calculated for the varieties in this study for the period from emergence to headed (Figure 6). In a study of this nature, photothermal units and day degrees are a good measure of the time from emergence to heading rather than the actual number of days. For example, the plant can not make as much advancement in a day's time in January as in a day in April.

The varieties are arranged on the graphs in order of increased photothermal units and day-degrees. The November 15, 1955-1956 and

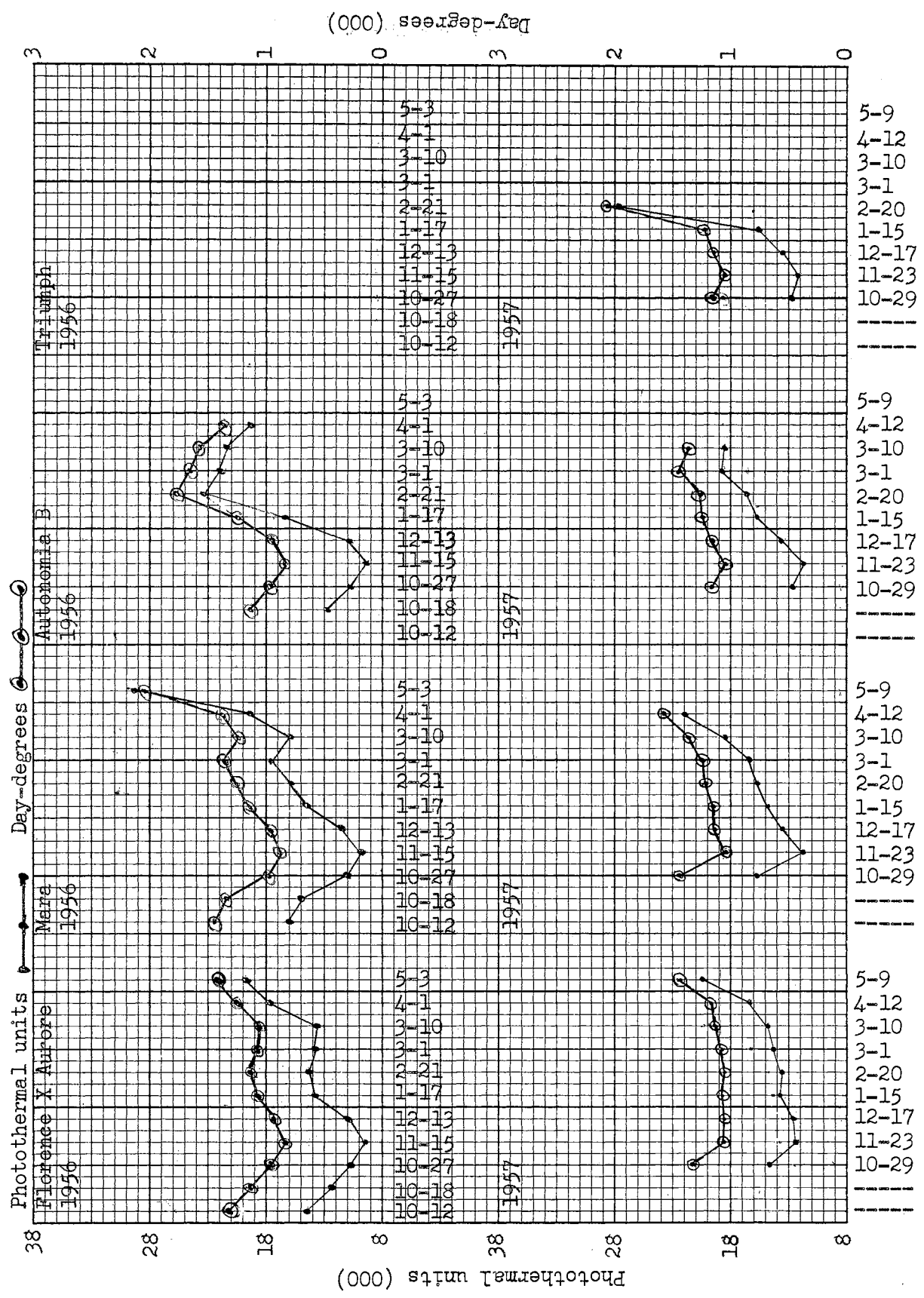


Figure 6. Photothermal units and day-degrees from emergence to headed for 25 wheat varieties grown in 1956 and 1957.

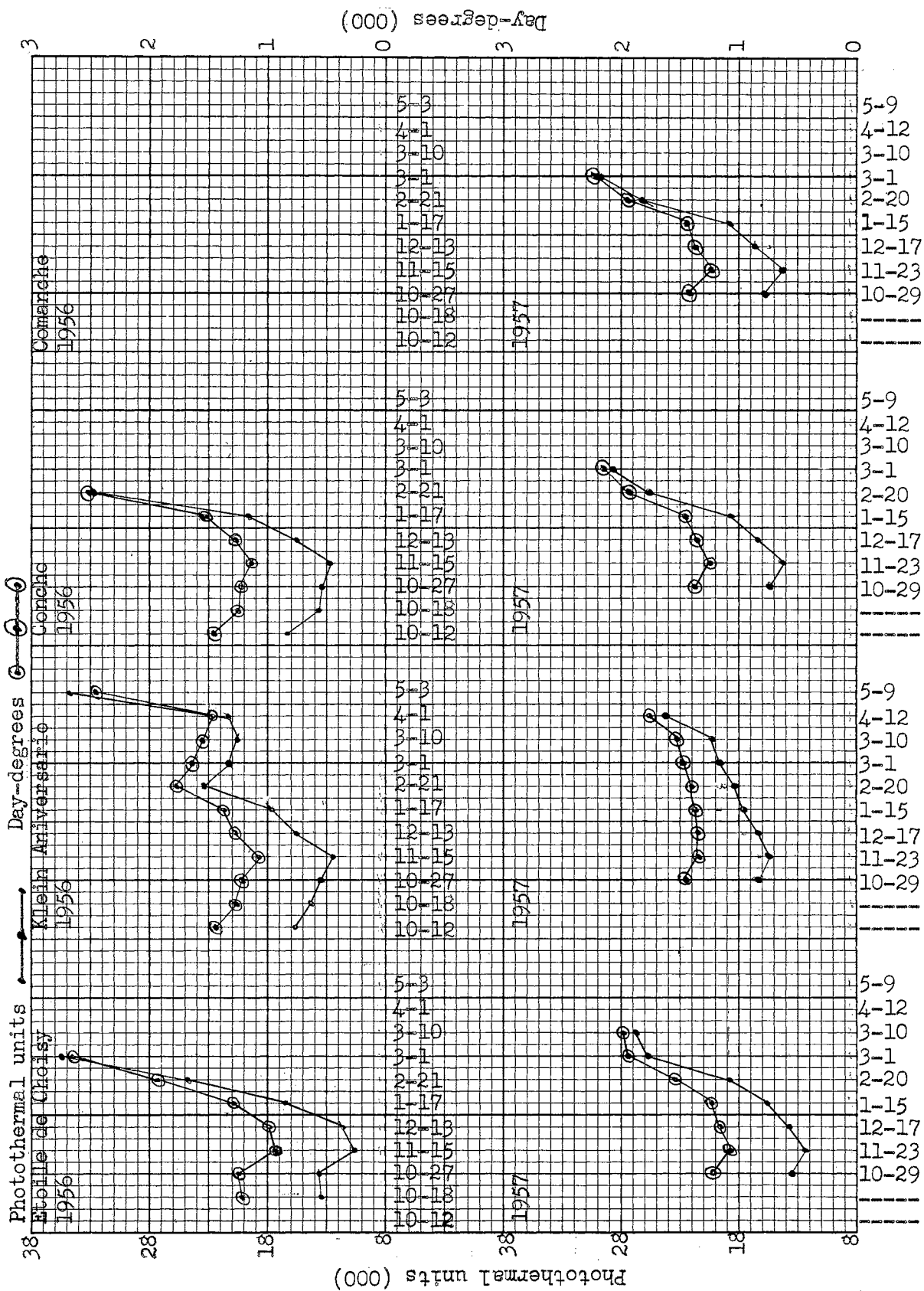


Figure 6. (Continued)

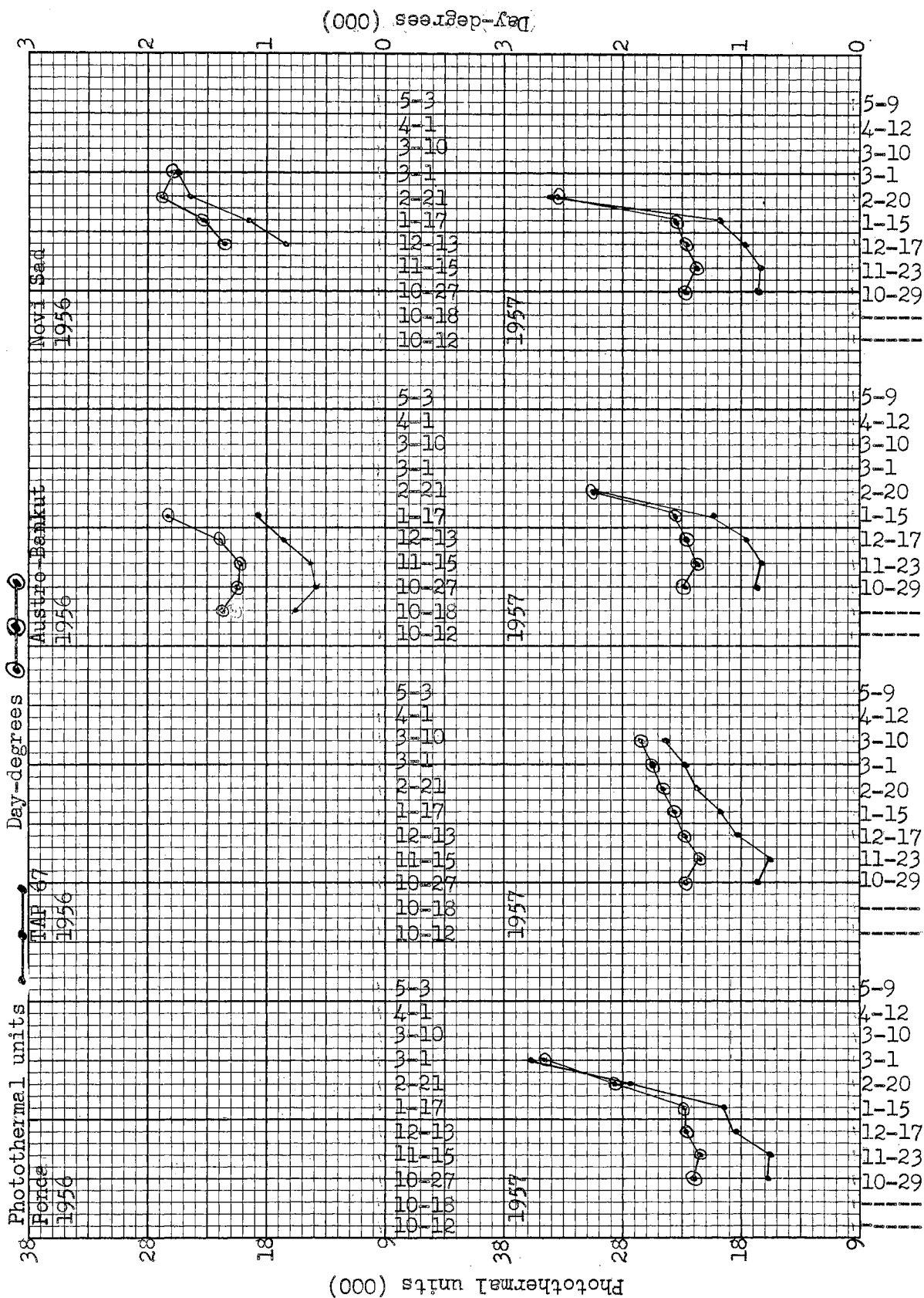


Figure 6. (Continued)



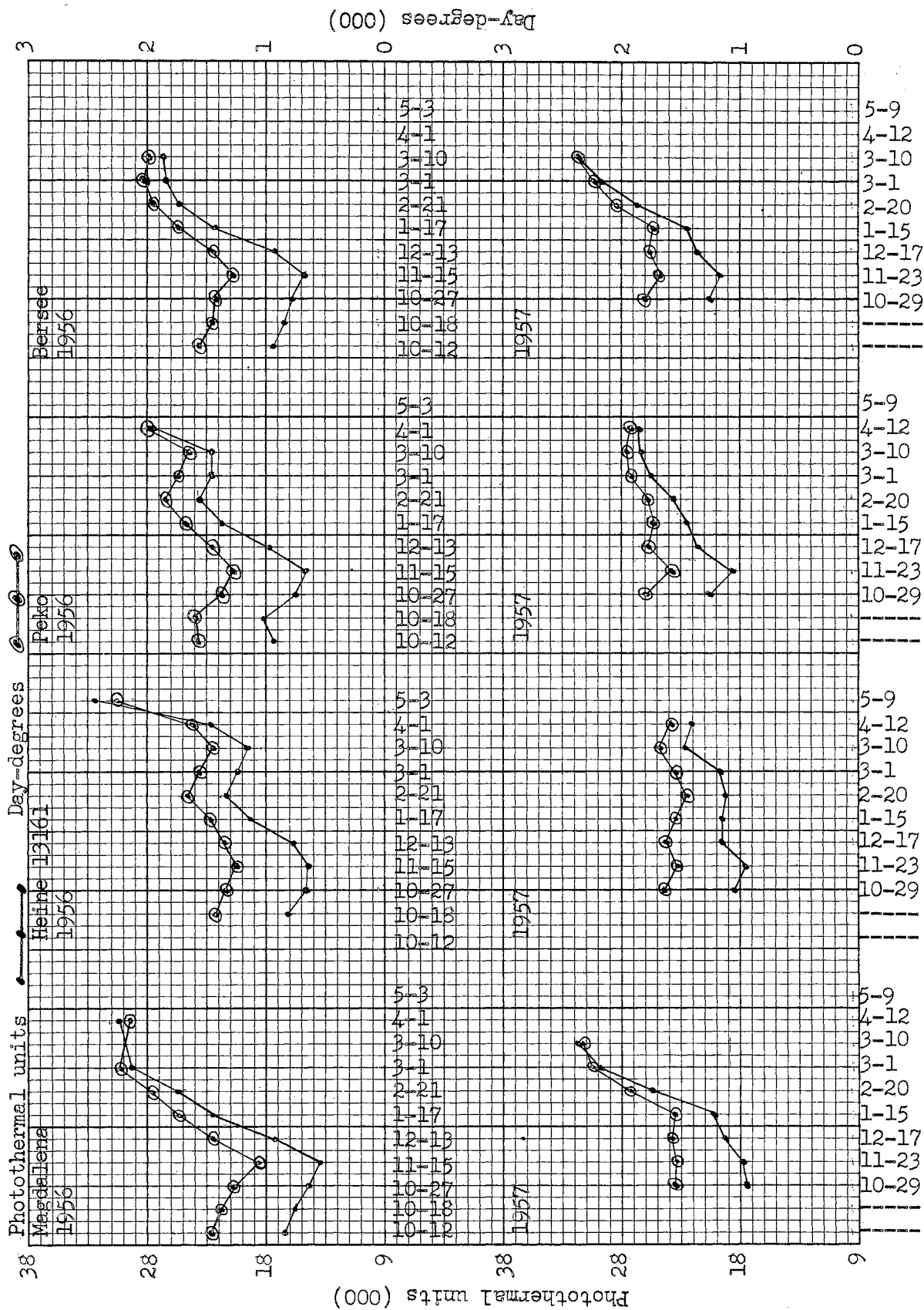


Figure 6. (Continued)

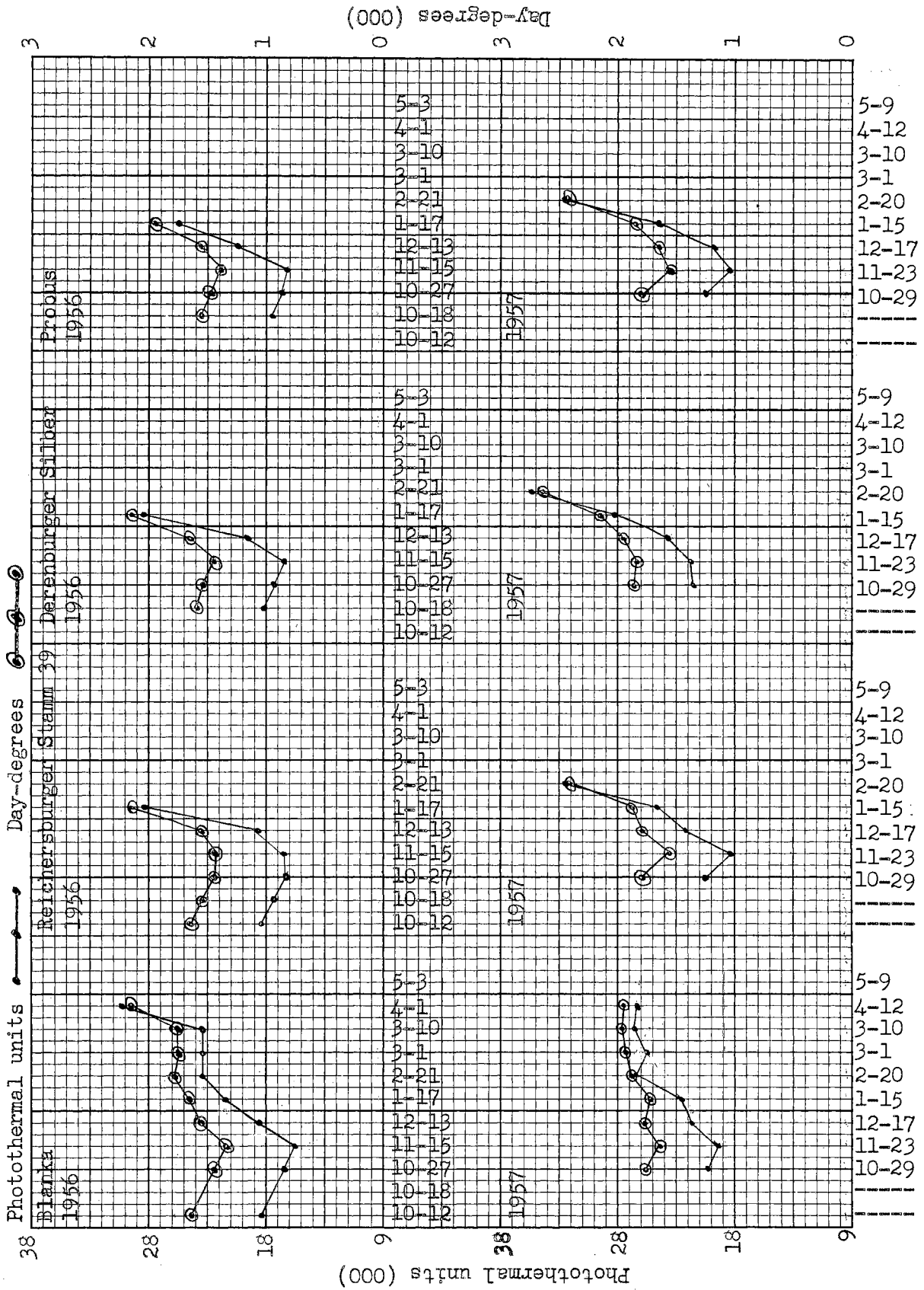


Figure 6. (Continued)

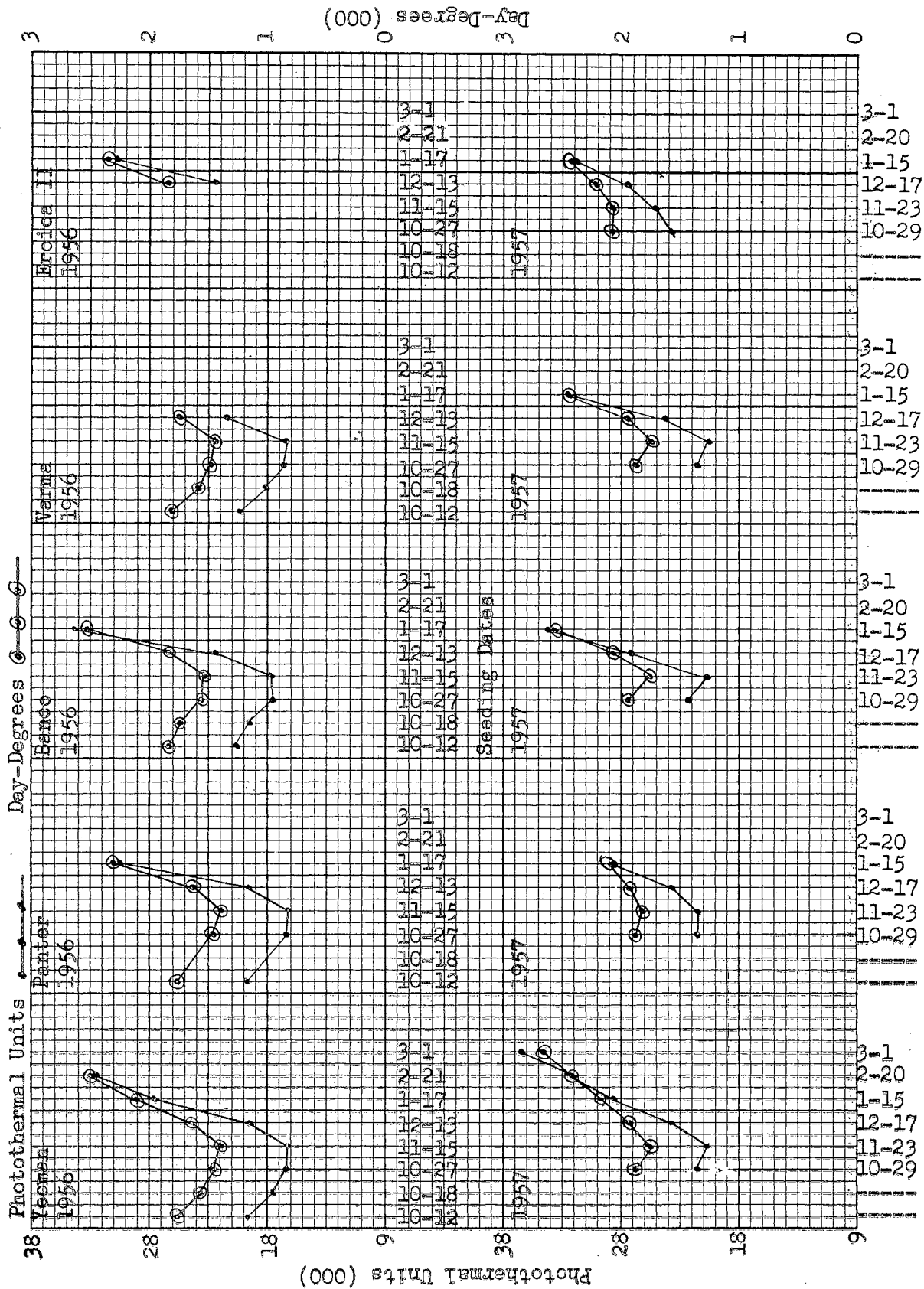


Figure 6. (Concluded)

November 23, 1956-1957 seedings in general had the lowest photothermal unit and day-degree values. These seeding dates would appear to be the most "efficient" in terms of plant utilization of light and heat energy. The higher values for the earlier seedings indicate that the early fall heat and light do not benefit heading; however, tillering as well as the cold and short day requirement benefit from the earlier seeding.

The photothermal units and day-degrees are in general lower in the 1956 crop year than in the 1957 crop year. No explanation is readily apparent. The cloudy, cold conditions and higher rainfall of 1956-1957 may have delayed the varietal development. Feekes (6) indicated that 1/50 of normal light is sufficient for plant response. The cloudy condition may have delayed the total quantity of growth whereas Feekes was concerned with satisfying the light requirement of the plants.

The photothermal units and day-degrees are different among the varieties. The varieties can be grouped fairly well by increased photothermal unit values:

- (1) Florence X Aurore  
Mara  
Autonomia B  
Triumph  
Etoile de Choisy
- (2) Klein Aniversario  
Concho  
Comanche
- (3) Ponca  
TAP 67  
Austro-Bankut  
Novi Sad  
Magdalena  
Heine 13161

(4) Peko  
 Bersee  
 Blanka  
 Reichersburger Stamm 39  
 Probus

(5) Derenburger Silber  
 Yeoman  
 Panter  
 Banco  
 Varma

(6) Eroica II

The photothermal unit and day-degree values are fairly similar within each group. These values are the lowest for group 1 and increase with each group.

Some of the later seeding dates for some varieties show a large increase in photothermal units. This may be the result of not having the cold and/or short day requirement fully satisfied.

There are differences among the varieties in each group. Some varieties show a decrease in photothermal units and day-degrees for the last seeding dates to head when compared with earlier seeding dates. Others show only a moderate increase and others show a tremendous increase.

#### Ripening

The ripening of the varieties in this study in 1956 was good and fairly typical of that expected (Appendix table 3). This was not true, however, in 1957 (Appendix table 4). The nursery was attacked by a powdery mildew type organism which severely damaged the following varieties: Derenburger Silber, Banco, Bersee, Magdalena, Reichersburger Stamm 39, Heine 13161, Blanka, Yeoman, Eroica II and Varma. The failure of these varieties to head from some seeding dates becomes evident when comparing the number of seeding dates which headed in 1956 against the

number which headed in 1957. A hail storm the night of May 20, 1957 also caused blasting and some abnormal ripening.

In 1956 all the varieties ripened from December 13 seeding. Indicated below is the last seeding date from which the specified varieties matured grain:

<u>Seeding Date</u>	<u>Varieties</u>
December 13	Banco, Varma
January 17	Reichersburger Stamm 39, Austro-Bankut, Panter, Derenburger Silber, Yeoman, Probus, Eroica II, Concho
February 21	Novi Sad, Magdalena, Etoile de Choisy
March 1	Bersee
March 10	Mara, Autonomia B, Peko, Blanka
April 1	Florence X Aurore, Heine 13161, Klein Aniversario

Since it is felt that the ripening data from the 1957 season was not reliable, it will not be related to the last seeding date to ripen.

Although ripening occurred from a number of seedings for all the varieties in 1956 and a part of the varieties in 1957, observations without making actual counts would indicate that the number of tillers maturing heads decreased with the later seeding dates. The total yield and the plumpness of the grain also appeared to suffer in the later seedings.

The length of time from heading to ripening falls into the following three classes:

- (1) Approximately the same for all dates:

Peko  
Novi Sad  
Austro-Bankut  
Banco

(2) Decreased with later seeding dates:

Heine 13161	Yeoman
Blanka	Probus
Bersee	Varma
Magdalena	Concho
Reichersburger Stamm 39	TAP 67
Panter	Comanche
Triumph	

(3) Approximately the same for all dates in 1956 but decreased in 1957:

Florence X Aurore  
Mara  
Autonomia B  
Etoile de Choisy

Eroica II was not classified because it ripened in only two dates in 1956 and none in 1957.

There was not a large decrease in the length of time from heading to ripening for the seeding dates of any variety. This is in contrast to a large decrease in the number of days from emergence to ripening for the later seeding dates.

The ripening dates were quite well distributed over a relatively short period of time. In 1956 ripening occurred over a period of 47 days, from May 27 to July 12. In 1957 ripening occurred over a 22 day period, from June 13 to July 4. This difference in length of time for ripening in the two years is difficult to explain since the spring of 1956 was hot and dry while the spring of 1957 was relatively cool and wet.

#### Spring Grazing as Related to Yield Reduction

The question is often asked, "How late is it possible to graze and not reduce yields?" Some of the data in this study can be related to this problem.

Four stages of development are shown for 3 varieties grown in 1956

and 1957 and 4 other varieties grown only in 1957 (see Figure 7). Florence X Aurore and Klein Aniversario are spring varieties, while the others are Oklahoma varieties. The stages of development are plotted at the bottom of the graph against the day and month.

Stage 5, the pseudo stem strongly erected, is approximately the stage at which grazing should be stopped. The head has emerged enough to be eaten by the animal when the first node is formed. If varieties such as Florence X Aurore and Klein Aniversario were grown in Oklahoma, it would be necessary to stop grazing them about the first of March according to the 1956 data. Had the October 12 and October 18 seedings been made in 1957, this date may have been even earlier for this year. Concho could have been grazed safely until March 10 and perhaps even as late as March 15 without reduction in the number of heads in 1956. On the basis of comparison of the late October seedings in both years, it would appear that this date might have been earlier from October 12 and October 18 seedings in 1957. On the basis of the data in 1957 for all of the Oklahoma varieties, it would be possible to graze until March 10 and not reduce the yield per acre. It is regrettable that the October 12 and October 18 seedings are not available in 1957. Data from these seedings may have indicated a somewhat earlier date than did the October 29 seeding.

Heading occurred earlier in 1956 than in 1957 for these three varieties which are shown, yet the stages which are shown were reached on an earlier date in 1957 than in 1956. This again would appear to be the result of the climate for the two years, in that the dry, hot conditions of 1956 hastened heading and vice-versa in 1957.



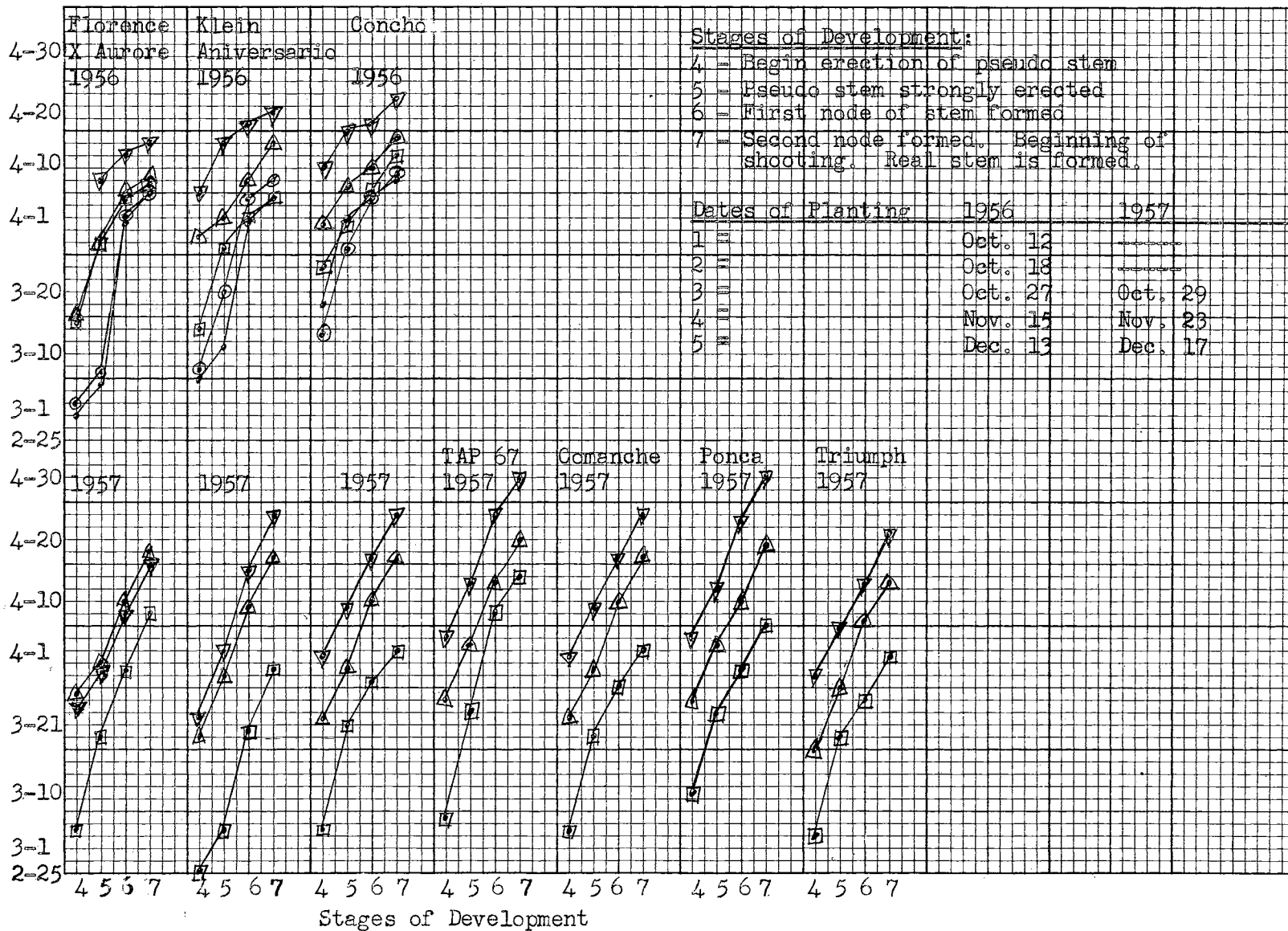


Figure 7. Stages of development for 7 wheat varieties as related to spring grazing of wheat.

## SUMMARY

A date of seeding study was conducted using 21 varieties for all or a part of 11 seeding dates in 1956 and 25 varieties for 9 seeding dates in 1957. Both vernalized and non-vernalized seed were included in the planting of the November 15 and December 15 seedings in 1956 with no response. In 1957 vernalized seedings were made on January 15, February 20, March 1 and March 10.

Observations were made according to a scale of morphological development designed by Feekes. The object of the study was to observe the development of these varieties in their response to the climate at Stillwater, Oklahoma. The cold and short day requirements, the relation of maturity to cold requirement and short days, the varietal response to vernalization, and the light and heat energy needed to head were also studied.

The varieties did not head from all seeding dates. No relationship could be shown between the cold requirement and maturity for the varieties studied. Eight varieties showed a response in heading to vernalization. Triumph was the only variety to show a response in heading in all vernalized seedings. Triumph, Ponca and Concho headed from some vernalized seedings in which no heading occurred from the non-vernalized seeding.

The number of hours of cold was shown for all varieties for the last seeding date from which heading occurred. On this basis, the cold requirement was proposed for all except two varieties. The cold require-

ment is not closely associated with the place of origin of the varieties. The proposed number of short days are also shown for the last seeding date to head. On the basis of these data the short day requirement is proposed for all except five of the varieties studied.

The photothermal units and day-degrees were tabulated for the period from emergence to heading. These were found to be lower in 1956 than 1957. The varieties were classified according to their photothermal unit requirements.

Ripening was good in 1956, but poor in 1957. Some varieties were attacked by a powdery mildew organism. Hail also caused some injury to some varieties.

On the basis of the limited data in this study, grazing of wheat can continue until March 1 to March 10 without affecting the yield or grazing off the stems containing the immature heads.

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Appendix Table 1. -- Heading dates for 21 varieties of wheat from 11 seeding dates in 1955 & 1956.

Variety	Seeding Dates - 1955 & 1956										
	Oct. 12	Oct. 18	Oct. 27	Nov. 15	Dec. 13	Jan. 17	Feb. 21	Mar. 1	Mar. 10	Apr. 1	May 3
Florence X	4-17	4-18	4-18	4-19	4-24	5-2	5-4	5-6	5-11	5-25	6-18
Aurore											
Mara	4-24	4-28	4-18	4-21	4-25	5-4	5-8	5-14	5-16	5-29	7-3
Autonomia B	*	4-19	4-18	4-19	4-24	5-7	5-24	5-23	5-27	5-28	----**
Peko	4-30	5-7	5-5	5-7	5-11	5-20	5-25	5-25	5-29	6-13	7-14
Heine 13161	*	5-2	5-3	5-6	5-8	5-14	5-20	5-20	5-23	6-4	7-8
Blanka	5-2	***	5-7	5-9	5-15	5-19	5-24	5-26	6-1	6-17	---
Klein	4-23	4-26	4-29	5-1	5-7	5-11	5-24	5-22	5-26	6-1	7-13
Aniversario											
Novi Sad	*	*	*	*	5-9	5-15	5-27	5-27	---	---	---
Bersee	4-30	5-3	5-6	5-7	5-11	5-21	5-29	6-2	6-7	---	---
Magdalena	4-26	5-1	5-2	5-3	5-11	5-21	5-29	6-7	---	6-17	---
Reichersburger	5-2	5-5	5-7	5-11	5-15	6-2	---	---	---	---	---
Stamm 39											
Austro-Bankut	*	5-1	5-1	5-5	5-10	5-24	---	---	---	---	---
Etoile de Choisy	*	4-22	4-23	4-24	4-27	5-8	5-28	6-18	---	---	---
Derenburger	*	5-7	5-9	5-11	5-17	6-2	---	---	---	---	---
Silber											
Banco	5-8	5-11	5-10	5-14	5-23	6-13	---	---	---	---	---
Panter	5-6	***	5-7	5-10	5-17	6-6	---	---	---	---	---
Yeoman	5-6	5-6	5-7	5-10	5-17	6-1	6-12	---	---	---	---
Probus	*	5-6	5-8	5-10	5-15	5-28	---	---	---	---	---
Eroica II	*	*	*	*	5-23	6-7	---	---	---	---	---
Varma	5-7	5-7	5-8	5-11	5-21	---	---	---	---	---	---
Concho	4-25	4-24	4-29	5-2	5-7	5-15	6-12	---	---	---	---

\* Seed received too late for this date.

\*\* Dashes refer to no heading from this seeding date.

\*\*\* Omitted through an error in planting.

Appendix Table 2. -- Heading dates for 25 varieties of wheat from 9 seeding dates in 1956 & 1957.

Variety	Seeding Dates - 1956 & 1957								
	Oct. 29	Nov. 23	Dec. 17	Jan. 15	Feb. 20	Mar. 1	Mar. 10	Apr. 12	May 9
Florence X Aurore	5-2	5-2	5-3	5-7	5-13	5-16	5-19	6-3	6-29
Mara	4-28	5-1	5-6	5-10	5-19	5-21	5-28	6-15	----*
Autonomia B	4-24	5-1	5-7	5-12	5-21	5-28	5-28	----	----
Peko	5-19	5-21	5-29	5-30	6-7	6-11	6-14	6-25	----
Heine 13161	5-13	5-18	5-23	5-23	5-28	5-31	6-6	6-15	----
Blanka	5-18	5-23	5-29	5-30	6-10	6-11	6-14	6-25	----
Klein	5-7	5-12	5-14	5-18	5-26	5-30	6-1	6-20	----
Aniversario									
Novi Sad	5-8	5-14	5-18	5-24	6-28	----	----	----	----
Bersee	5-19	5-24	5-29	5-30	6-14	6-20	6-25	----	----
Magdalena	5-10	5-19	5-22	5-24	6-11	6-20	6-25	----	----
Reichersburger	5-19	5-20	5-30	6-4	6-25	----	----	----	----
Stamm 39									
Austro-Bankut	5-8	5-14	5-18	5-24	6-20	----	----	----	----
Etoile de Choisy	4-27	5-3	5-7	5-12	5-30	6-12	6-15	----	----
Derenburger	5-22	5-30	6-3	6-11	7-1	----	----	----	----
Silber									
Banco	5-24	5-27	6-10	6-24	----	----	----	----	----
Panter	5-22	5-29	6-3	6-12	----	----	----	----	----
Yeoman	5-22	5-27	6-3	6-12	6-25	7-2	----	----	----
Probus	5-19	5-20	5-24	6-3	6-25	----	----	----	----
Eroica II	5-29	6-6	6-11	6-19	----	----	----	----	----
Varma	5-22	5-27	6-4	6-20	6-12	----	----	----	----
Concho	5-4	5-8	5-14	5-20	6-11	6-18	----	----	----
TAP 67	5-8	5-13	5-19	5-24	6-3	6-6	6-10	----	----
Comanche	5-5	5-8	5-15	5-20	6-12	6-20	----	----	----
Ponca	5-5	5-12	5-19	5-22	6-15	7-2	----	----	----
Triumph	4-24	5-2	5-6	5-12	6-15	----	----	----	----

\* Dashes refer to no heading from this seeding date.



Appendix Table 3. Ripening dates for 21 varieties of wheat from 11 seeding dates in 1955 & 1956.

Variety	Seeding Dates - 1955 & 1956										
	Oct. 12	Oct. 18	Oct. 27	Nov. 23	Dec. 17	Jan. 15	Feb. 20	Mar. 1	Mar. 10	Apr. 12	May 9
Florence X	5-27	5-29	5-31	5-31	6-4	6-8	6-9	6-14	6-16	6-30	---**
Aurore											
Mara	5-31	6-1	5-28	5-30	6-2	6-8	6-14	6-16	6-23	---	---
Autonomia B	*	5-29	5-30	6-1	6-4	6-8	6-25	6-26	7-3	---	---
Peko	6-5	6-11	6-13	6-14	6-15	6-29	6-30	6-30	6-30	---	---
Heine 13161	*	6-10	6-7	6-8	6-14	6-26	6-28	6-28	6-28	6-30	---
Blanka	6-7	***	6-14	6-13	6-28	6-27	6-29	6-30	6-30	---	---
Klein	5-31	5-30	6-5	6-7	6-12	6-23	7-3	6-23	6-29	7-6	---
Aniversario											
Novi Sad	*	*	*	*	6-14	6-28	---	---	---	---	---
Bersee	6-2	6-10	6-8	6-14	6-29	6-29	7-8	6-30	---	---	---
Magdalena	5-30	6-5	6-2	6-11	6-15	6-29	7-8	---	---	---	---
Reichersburger	6-9	6-12	6-13	6-30	6-24	7-3	---	---	---	---	---
Stamm 39											
Austro-Bankut	*	6-5	6-3	6-8	6-14	6-28	---	---	---	---	---
Etoile de Choisy	*	5-29	5-31	5-31	6-4	6-13	7-1	---	---	---	---
Derenburger	*	6-13	6-13	6-27	6-29	7-9	---	---	---	---	---
Silber											
Banco	6-13	6-14	6-15	6-26	6-29	---	---	---	---	---	---
Panter	6-12	***	6-14	6-15	6-30	7-10	---	---	---	---	---
Yeoman	6-9	6-12	6-13	6-16	6-28	7-9	---	---	---	---	---
Probus	*	6-11	6-13	6-14	6-27	6-30	---	---	---	---	---
Eroica II	*	*	*	*	6-30	7-12	---	---	---	---	---
Varma	6-11	6-13	6-13	6-30	6-30	---	---	---	---	---	---
Concho	5-30	5-31	6-2	6-4	6-12	6-29	---	---	---	---	---

\* Seed received too late for this date.

\*\* Dashes refer to no ripening from this seeding date.

\*\*\* Omitted through an error in planting.

Appendix Table 4. — Ripening dates for 25 varieties of wheat from 9 seeding dates in 1956 & 1957.

Variety	Seeding Dates - 1956 & 1957								
	Oct. 29	Nov. 23	Dec. 17	Jan. 15	Feb. 20	Mar. 1	Mar. 10	Apr. 12	May 9
Florence X Aurore	6-17	6-20	6-20	6-20	6-21	6-21	6-24	-----*	-----
Mara	6-13	6-13	6-16	6-20	6-25	6-25	6-29	-----	-----
Autonomia B	6-15	6-18	6-20	6-20	6-25	7-1	7-3	-----	-----
Peko	6-26	7-4	7-1	7-2	-----	-----	-----	-----	-----
Heine 13161	6-24	6-26	-----	7-1	7-1	7-1	-----	-----	-----
Blanka	-----	6-27	-----	-----	-----	-----	-----	-----	-----
Klein	6-16	6-20	6-21	6-26	6-30	7-2	-----	-----	-----
Aniversario	-----	-----	-----	-----	-----	-----	-----	-----	-----
Novi Sad	6-16	6-24	6-21	6-29	-----	-----	-----	-----	-----
Bersee	6-25	-----	-----	-----	-----	-----	-----	-----	-----
Magdalena	6-20	-----	6-26	-----	-----	-----	-----	-----	-----
Reichersburger	6-30	-----	-----	-----	-----	-----	-----	-----	-----
Stamm 39	-----	-----	-----	-----	-----	-----	-----	-----	-----
Austro-Bankut	6-17	6-24	6-21	6-28	-----	-----	-----	-----	-----
Etoile de Choisy	6-16	6-20	6-18	6-20	7-2	-----	-----	-----	-----
Derenburger	-----	-----	-----	-----	-----	-----	-----	-----	-----
Silber	-----	-----	-----	-----	-----	-----	-----	-----	-----
Banco	-----	-----	-----	-----	-----	-----	-----	-----	-----
Panter	6-30	7-5	7-4	-----	-----	-----	-----	-----	-----
Yeoman	-----	-----	-----	-----	-----	-----	-----	-----	-----
Probus	6-26	-----	6-24	7-4	-----	-----	-----	-----	-----
Eroica II	-----	-----	-----	-----	-----	-----	-----	-----	-----
Varma	-----	-----	-----	-----	-----	-----	-----	-----	-----
Concho	6-15	6-20	6-20	6-25	-----	-----	-----	-----	-----
TAP 67	6-20	6-24	6-26	6-30	7-4	-----	-----	-----	-----
Comanche	6-15	6-20	6-20	6-25	-----	-----	-----	-----	-----
Ponca	6-16	6-23	6-22	6-29	-----	-----	-----	-----	-----
Triumph	6-13	6-15	6-16	6-25	-----	-----	-----	-----	-----

\* Dashes refer to no ripening from this seeding date.

Appendix Table 5. --- Days from emergence to headed for 21 varieties of wheat from 11 seeding dates in 1955 & 1956.

Variety	Seeding Dates - 1955 & 1956										
	Oct. 12	Oct. 18	Oct. 27	Nov. 15	Dec. 13	Jan. 17	Feb. 21	Mar. 1	Mar. 10	Apr. 1	May 3
Florence X	181	174	162	128	100	65	62	56	45	44	37
Aurore											
Mara	188	184	162	130	101	67	66	64	50	48	52
Autonomia B	*	175	162	128	100	70	82	73	61	47	---**
Peko	194	193	179	146	117	83	83	75	63	63	---
Heine 13161	*	188	177	145	114	77	78	70	57	54	57
Blanka	196	***	181	148	121	82	82	76	66	67	---
Klein	187	182	173	140	113	74	82	72	60	51	62
Aniversario											
Novi Sad	*	*	*	*	115	78	85	77	---	---	---
Bersee	194	189	180	146	117	84	87	83	72	---	---
Magdalena	190	187	176	142	117	84	87	88	---	67	---
Reichersburger	196	191	181	150	121	96	---	---	---	---	---
Stamm 39											
Austro-Bankut	*	187	175	144	116	87	---	---	---	---	---
Etoile de Choisy	*	178	167	133	103	71	86	99	---	---	---
Derenburger	*	193	183	150	123	96	---	---	---	---	---
Silber											
Banco	202	197	184	153	129	107	---	---	---	---	---
Panter	200	***	181	149	123	100	---	---	---	---	---
Yeoman	200	192	181	149	123	95	101	---	---	---	---
Probus	*	192	182	149	111	91	---	---	---	---	---
Eroica II	*	*	*	*	129	101	---	---	---	---	---
Varma	201	193	182	150	127	---	---	---	---	---	---
Concho	189	180	173	141	113	78	101	---	---	---	---

\* Seed received too late for this date.

\*\* Dashes refer to no heading from this seeding date.

\*\*\* Omitted through an error in planting.

Appendix Table 6. --- Days from emergence to headed for 25 varieties of wheat from 9 seeding dates in 1956 & 1957.

Variety	Seeding Dates - 1956 & 1957								
	Oct. 29	Nov. 23	Dec. 17	Jan. 15	Feb. 20	Mar. 1	Mar. 10	Apr. 12	May 9
Florence X Aurore	177	135	106	80	58	58	56	45	44
Mara	173	134	109	83	64	63	65	57	---
Autonomia B	169	134	110	85	66	70	65	---	---
Peko	194	154	133	103	83	84	82	67	---
Heine 13161	188	151	126	96	73	73	74	57	---
Blanka	193	156	132	103	86	84	82	67	---
Klein	182	146	117	91	71	72	69	62	---
Aniversario									
Novi Sad	183	147	121	98	104	---	---	---	---
Bersee	194	157	132	103	90	93	93	---	---
Magdalena	185	152	125	97	87	93	93	---	---
Reichersburger	194	153	133	108	101	---	---	---	---
Stamm 39									
Austro-Bankut	183	147	121	97	96	---	---	---	---
Etoile de Choisy	172	136	110	85	75	85	83	---	---
Derenburger	197	163	137	115	107	---	---	---	---
Silber									
Banco	199	160	144	128	---	---	---	---	---
Panter	197	162	137	116	---	---	---	---	---
Yeoman	197	160	137	116	101	105	---	---	---
Probus	194	153	127	107	101	---	---	---	---
Eroica II	204	170	145	123	---	---	---	---	---
Varma	197	161	138	124	---	---	---	---	---
Concho	179	141	117	93	87	91	---	---	---
TAP 67	183	146	122	99	79	79	79	---	---
Comanche	180	141	117	93	88	93	---	---	---
Ponca	180	145	121	95	92	105	---	---	---
Triumph	169	135	109	85	91	---	---	---	---

\* Dashes refer to no heading from this seeding date.

Appendix Table 7. Average day length from emergence to headed for 21 varieties of wheat  
 from 11 seeding dates in 1955 & 1956.

Variety	Seeding Dates - 1955 & 1956										
	Oct. 12	Oct. 18	Oct. 27	Nov. 15	Dec. 13	Jan. 17	Feb. 21	Mar. 1	Mar. 10	Apr. 1	May 3
Florence X	10.97	11.04	10.99	11.20	11.67	12.82	12.60	12.75	13.09	14.09	14.11
Aurore											
Mara	11.05	11.16	10.99	11.22	11.68	12.84	12.65	12.88	13.16	14.08	14.44
Autonomia B	*	11.05	10.99	11.20	11.67	12.89	12.89	13.16	13.30	14.09	-----**
Peko	11.12	11.27	11.21	11.47	11.93	13.02	12.89	13.03	13.33	13.92	-----
Heine 13161	*	11.21	11.18	11.45	11.89	12.95	12.83	12.96	13.25	14.09	14.42
Blanka	11.15	***	11.24	11.49	12.00	13.01	12.89	13.22	13.36	14.13	-----
Klein	11.04	11.13	11.13	11.38	11.88	12.92	12.89	12.99	13.28	14.10	14.18
Aniversario											
Novi Sad	*	*	*	*	11.91	12.96	12.93	14.05	-----	-----	-----
Bersee	11.12	11.22	11.22	11.47	11.94	13.04	12.95	13.13	13.44	-----	-----
Magdalena	11.08	11.19	11.17	11.40	11.94	13.04	12.95	13.19	-----	14.13	-----
Reichersburger	11.15	11.24	11.24	11.52	12.00	13.16	-----	-----	-----	-----	-----
Stamm 39											
Austro-Bankut	*	11.19	11.15	11.44	11.92	13.06	-----	-----	-----	-----	-----
Etoile de Choisy	*	11.08	11.05	11.27	11.71	12.89	12.94	13.31	-----	-----	-----
Derenburger	*	11.27	11.26	11.52	12.03	13.16	-----	-----	-----	-----	-----
Silber											
Banco	11.22	11.31	11.28	11.57	12.12	13.27	-----	-----	-----	-----	-----
Panter	11.20	***	11.24	11.52	12.03	13.20	-----	-----	-----	-----	-----
Yeoman	11.20	11.26	11.24	11.52	12.03	13.15	13.13	-----	-----	-----	-----
Probus	*	11.26	11.25	11.52	13.08	13.11	-----	-----	-----	-----	-----
Eroica II	*	*	*	*	12.12	13.22	-----	-----	-----	-----	-----
Varma	11.21	11.27	11.25	11.53	12.09	-----	-----	-----	-----	-----	-----
Concho	11.09	11.11	11.13	11.39	11.88	12.96	13.13	-----	-----	-----	-----

\* Seed received too late for this date.

\*\* Dashes refer to no heading from this seeding date.

\*\*\* Omitted through an error in planting.

Appendix Table 8. — Average day length from emergence to headed for 25 varieties of wheat from 9 seeding dates in 1956 & 1957.

Variety	Seeding Dates - 1956 & 1957								
	Oct. 29	Nov. 23	Dec. 17	Jan. 15	Feb. 20	Mar. 1	Mar. 10	Apr. 12	May 9
Florence X Aurore	11.16	11.48	11.87	12.80	12.94	13.03	13.15	13.73	14.18
Mara	11.11	11.47	11.92	12.83	13.03	13.10	13.27	13.83	-----*
Autonomia B	11.06	11.47	11.93	12.85	13.06	13.19	13.27	-----	-----
Peko	11.39	11.76	12.17	13.04	13.27	13.36	13.46	13.69	-----
Heine 13161	11.31	11.72	12.18	12.83	13.15	13.06	13.56	13.83	-----
Blanka	11.38	11.79	12.26	13.04	13.95	13.36	13.46	13.49	-----
Klein	11.23	11.63	12.04	12.91	13.12	13.21	13.32	13.65	-----
Aniversario									
Novi Sad	11.25	11.66	12.10	12.85	13.48	-----	-----	-----	-----
Bersee	11.39	11.81	12.35	13.04	13.20	13.45	13.41	-----	-----
Magdalena	11.27	11.73	12.16	12.98	13.16	13.45	13.56	-----	-----
Reichersburger	11.39	11.75	12.28	13.10	13.45	-----	-----	-----	-----
Stamm 39									
Austro-Bankut	11.25	11.66	12.10	12.98	13.41	-----	-----	-----	-----
Etoile de Choisy	11.10	11.50	11.93	12.85	13.17	13.37	13.47	-----	-----
Derenburger	11.43	11.89	12.33	13.16	13.37	-----	-----	-----	-----
Silber									
Banco	11.46	11.85	12.42	13.17	-----	-----	-----	-----	-----
Panter	11.43	11.88	12.33	13.17	-----	-----	-----	-----	-----
Yeoman	11.43	11.85	12.33	13.18	13.31	13.68	-----	-----	-----
Probus	11.39	11.75	12.19	13.21	13.45	-----	-----	-----	-----
Eroica II	11.52	12.05	12.44	13.24	-----	-----	-----	-----	-----
Varma	11.43	11.77	12.25	13.25	13.17	-----	-----	-----	-----
Concho	11.19	11.57	12.04	12.93	13.32	13.43	-----	-----	-----
TAP 67	11.25	11.64	12.12	12.72	13.22	13.30	13.25	-----	-----
Comanche	11.33	11.49	12.06	13.07	13.33	13.45	-----	-----	-----
Ponca	11.33	11.63	12.22	12.96	13.21	13.55	-----	-----	-----
Triumph	11.19	11.48	11.92	12.85	13.37	-----	-----	-----	-----

\* Dashes refer to no heading from this seeding date.

Appendix Table 9. -- Photothermal units from emergence to headed for 21 varieties of wheat  
 in seedling from 11 seeding dates in 1955 & 1956.

Variety	Seeding Dates - 1955 & 1956										
	Oct. 12	Oct. 18	Oct. 27	Nov. 15	Dec. 13	Jan. 17	Feb. 21	Mar. 1	Mar. 10	Apr. 1	May 3
Florence X	14,349	12,376	10,781	9,397	10,958	13,782	14,024	13,732	13,601	17,613	19,754
Aurore											
Mara	16,000	14,742	10,781	9,862	11,201	14,676	15,800	17,375	15,910	19,261	29,097
Autonomia B	*	12,608	10,781	9,397	10,958	16,048	23,112	21,780	21,054	19,050	-----**
Peko	17,436	18,021	15,593	14,877	17,096	21,965	23,550	22,451	22,008	27,478	-----
Heine 13161	*	16,019	14,791	14,461	15,826	19,205	21,259	20,127	19,173	22,741	32,301
Blanka	18,241	***	16,399	15,684	18,828	21,506	23,112	23,228	23,500	30,153	-----
Klein	15,765	14,258	13,367	12,438	15,408	17,843	23,112	21,057	20,571	21,065	34,954
Aniversario											
Novi Sad	*	*	*	*	16,257	19,660	24,502	25,164	-----	-----	-----
Bersee	17,436	16,415	15,989	14,877	17,110	22,442	25,188	26,352	26,867	-----	-----
Magdalena	16,487	15,610	14,398	13,235	17,110	22,442	25,421	29,110	-----	30,153	-----
Reichersburger	18,241	17,208	16,399	16,508	18,828	28,176	-----	-----	-----	-----	-----
Stamm 39											
Austro-Bankut	*	15,610	13,993	14,060	16,676	23,808	-----	-----	-----	-----	-----
Etoile de Choisy	*	13,307	13,492	10,583	11,698	16,486	24,961	35,232	-----	-----	-----
Derenburger	*	18,021	17,194	16,508	19,693	28,176	-----	-----	-----	-----	-----
Silber											
Banco	20,645	19,623	17,608	17,760	22,313	34,250	-----	-----	-----	-----	-----
Panter	19,846	***	16,399	16,116	19,693	30,373	-----	-----	-----	-----	-----
Yeoman	19,846	17,622	16,399	16,116	19,693	27,628	32,799	-----	-----	-----	-----
Probus	*	17,622	16,796	16,116	20,523	25,682	-----	-----	-----	-----	-----
Eroica II	*	*	*	*	22,313	30,948	-----	-----	-----	-----	-----
Varma	20,245	18,021	16,785	16,522	21,436	-----	-----	-----	-----	-----	-----
Concho	16,280	13,786	13,367	12,837	15,408	19,660	32,969	-----	-----	-----	-----

\* Seed received too late for this date.

\*\* Dashes refer to no heading from this seeding date.

\*\*\* Omitted through an error in planting.

Appendix Table 10. Photothermal units from emergence to headed for 25 varieties of wheat  
seeded from 9 seeding dates in 1956 & 1957.

Variety	Seeding Dates - 1956 & 1957								
	Oct. 29	Nov. 23	Dec. 17	Jan. 15	Feb. 20	Mar. 1	Mar. 10	Apr. 12	May 9
Florence X Aurore	14,776	12,100	12,380	13,760	13,445	14,281	14,925	16,078	20,348
Mara	15,910	11,768	13,434	14,870	15,727	16,192	18,405	22,004	-----*
Autonomia B	12,830	11,768	13,779	15,613	16,495	18,888	18,405	-----	-----
Peko	20,502	18,651	21,553	22,416	23,727	25,397	26,395	26,572	-----
Heine 13161	18,458	17,603	19,525	19,540	19,186	19,799	22,794	22,004	-----
Blanka	20,165	19,359	21,712	22,416	26,407	25,397	26,395	26,184	-----
Klein	16,441	15,514	16,266	17,854	18,407	19,656	20,060	24,106	-----
Aniversario									
Novi Sad	16,785	16,207	17,702	19,930	34,010	-----	-----	-----	-----
Bersee	20,502	19,723	21,872	22,416	26,836	29,805	31,460	-----	-----
Magdalena	17,446	17,947	19,152	20,132	25,372	29,805	31,812	-----	-----
Reichersburger	20,502	18,307	22,092	24,720	32,522	-----	-----	-----	-----
Stamm 39									
Austro-Bankut	16,785	16,207	17,702	20,132	30,079	-----	-----	-----	-----
Etoile de Choisy	13,475	12,443	13,779	15,613	19,953	25,884	26,886	-----	-----
Derenburger	21,534	21,854	23,822	28,057	35,270	-----	-----	-----	-----
Silber									
Banco	22,232	20,785	27,038	34,071	-----	-----	-----	-----	-----
Panter	21,534	21,503	23,822	28,539	-----	-----	-----	-----	-----
Yeoman	21,534	20,785	23,822	28,561	32,184	36,334	-----	-----	-----
Probus	20,502	18,307	19,882	24,465	32,522	-----	-----	-----	-----
Eroica II	23,962	25,016	27,517	31,935	-----	-----	-----	-----	-----
Varma	21,534	20,645	24,096	32,423	-----	-----	-----	-----	-----
Concho	15,442	14,139	16,266	18,606	25,681	28,821	-----	-----	-----
TAP 67	16,785	15,854	18,071	19,729	21,787	22,956	24,128	-----	-----
Comanche	15,953	14,041	16,631	18,808	26,167	29,805	-----	-----	-----
Ponca	15,953	15,514	18,220	19,375	27,318	35,989	-----	-----	-----
Triumph	12,980	12,100	13,434	15,613	27,649	-----	-----	-----	-----

\* Dashes refer to no heading from this seeding date.



Appendix Table 11. --- Daylight hours from emergence to headed for 21 varieties of wheat  
 from all seeding dates in 1955 & 1956.

Variety	Seeding Dates - 1955 & 1956										
	Oct. 12	Oct. 18	Oct. 27	Nov. 15	Dec. 13	Jan. 17	Feb. 21	Mar. 1	Mar. 10	Apr. 1	May 3
Florence X	1986	1921	1780	1433	1167	833	781	714	589	620	522
Aurore											
Mara	2078	2053	1780	1459	1180	860	835	824	658	676	751
Autonomia B	*	1934	1780	1433	1167	902	1057	961	811	662	---**
Peko	2158	2175	2007	1674	1396	1081	1070	977	840	877	---
Heine 13161	*	2107	1979	1660	1356	997	1001	907	755	761	822
Blanka	2185	***	2034	1701	1452	1067	1057	1005	882	947	---
Klein	2065	2026	1926	1593	1342	956	1057	935	797	719	879
Aniversario											
Novi Sad	*	*	*	*	1370	1011	1099	1005	---	---	---
Bersee	2158	2120	2020	1674	1397	1095	1127	1090	968	---	---
Magdalena	2105	2093	1966	1619	1397	1095	1127	1161	---	947	---
Reichersburger	2185	2147	2034	1728	1452	1263	---	---	---	---	---
Stamm 39											
Austro-Bankut	*	2093	1952	1647	1383	1136	---	---	---	---	---
Etoile de Choisy	1973	1846	1499	1206	915	1113	1318	---	---	---	---
Derenburger	*	2175	2061	1728	1480	1263	---	---	---	---	---
Silber											
Banco	2267	2229	2075	1770	1564	1420	---	---	---	---	---
Panter	2239	***	2034	1716	1480	1320	---	---	---	---	---
Yeoman	2239	2161	2034	1716	1480	1249	1326	---	---	---	---
Probus	*	2161	2048	1716	1452	1193	---	---	---	---	---
Eroica II	*	*	*	*	1564	1335	---	---	---	---	---
Varma	2253	2175	2048	1729	1536	---	---	---	---	---	---
Concho	2091	2000	1926	1606	1342	1011	1326	---	---	---	---

\* Seed received too late for this date.

\*\* Dashes refer to no heading from this seeding date.

\*\*\* Omitted through an error in planting.

Appendix Table 12. Daylight hours from emergence to headed for 25 varieties of wheat from 9 seeding dates in 1956 & 1957.

Variety	Seeding Dates - 1956 & 1957								
	Oct. 29	Nov. 23	Dec. 17	Jan. 15	Feb. 20	Mar. 1	Mar. 10	Apr. 12	May 9
Florence X Aurore	1976	1550	1258	1024	750	756	737	618	624
Mara	1923	1537	1299	1065	834	825	863	789	----*
Autonomia B	1869	1537	1313	1092	862	924	863	---	---
Peko	2209	1812	1619	1343	1102	1122	1104	917	---
Heine 13161	2126	1769	1534	1245	960	966	990	789	---
Blanka	2196	1839	1619	1343	1144	1122	1104	917	---
Klein	2044	1686	1409	1175	932	951	919	860	---
Aniversario									
Novi Sad	2058	1714	1464	1259	1402	---	---	---	---
Bersee	2209	1853	1619	1343	1201	1251	1247	---	---
Magdalena	2085	1783	1520	1259	1158	1251	1261	---	---
Reichersburger	2209	1797	1633	1415	1359	---	---	---	---
Stamm 39									
Austro-Bankut	2058	1714	1464	1259	1287	---	---	---	---
Etoile de Choisy	1909	1564	1313	1092	988	1137	1118	---	---
Derenburger	2252	1938	1689	1514	1431	---	---	---	---
Silber									
Banco	2280	1895	1789	1685	---	---	---	---	---
Panter	2252	1924	1689	1528	---	---	---	---	---
Yeoman	2252	1895	1690	1528	1345	1437	---	---	---
Probus	2210	1798	1548	1400	1359	---	---	---	---
Eroica II	2350	2037	1803	1628	---	---	---	---	---
Varma	2252	1895	1690	1642	---	---	---	---	---
Concho	2003	1631	1409	1203	1159	1222	---	---	---
TAP 67	2058	1700	1478	1259	1045	1051	1047	---	---
Comanche	2017	1631	1423	1203	1173	1252	---	---	---
Ponca	2017	1686	1478	1231	1216	1437	---	---	---
Triumph	1869	1550	1299	1092	1230	---	---	---	---

\* Dashes refer to no heading from this seeding date.

Appendix Table 13. Day-degrees from emergence to headed for 21 varieties of wheat  
seeded from 11 seeding dates in 1955 & 1956.

Variety	Seeding Dates - 1955 & 1956										
	Oct. 12	Oct. 18	Oct. 27	Nov. 15	Dec. 13	Jan. 17	Feb. 21	Mar. 1	Mar. 10	Apr. 1	May 3
Florence X	1308	1121	981	839	939	1075	1113	1077	1039	1250	1400
Aurore											
Mara	1448	1321	981	879	959	1143	1249	1349	1209	1368	2015
Autonomia B	*	1141	981	839	939	1245	1793	1655	1583	1352	-----**
Peko	1568	1599	1391	1297	1433	1687	1827	1723	1651	1974	-----
Heine 13161	*	1429	1323	1263	1331	1483	1657	1553	1447	1614	2240
Blanka	1639	***	1459	1365	1569	1653	1793	1757	1759	2134	-----
Klein	1428	1281	1201	1093	1297	1381	1793	1621	1549	1494	2465
Aniversario											
Novi Sad	*	*	*	*	1365	1517	1895	1791	-----	-----	-----
Bersee	1568	1463	1425	1297	1433	1721	1945	2007	1999	-----	-----
Magdalena	1488	1395	1289	1161	1433	1721	1963	2207	-----	2134	-----
Reichersburger	1636	1531	1459	1433	1569	2141	-----	-----	-----	-----	-----
Stamm 39											
Austro-Bankut	*	1395	1255	1229	1399	1823	-----	-----	-----	-----	-----
Etoile de Choisy	*	1201	1221	939	999	1279	1929	2647	-----	-----	-----
Derenburger	*	1599	1527	1433	1637	2141	-----	-----	-----	-----	-----
Silber											
Banco	1840	1735	1561	1535	1841	2581	-----	-----	-----	-----	-----
Panter	1772	***	1459	1399	1637	2301	-----	-----	-----	-----	-----
Yeoman	1772	1565	1459	1399	1637	2101	2498	-----	-----	-----	-----
Probus	*	1565	1493	1399	1569	1959	-----	-----	-----	-----	-----
Eroica II	*	*	*	*	1841	2341	-----	-----	-----	-----	-----
Varma	1806	1599	1492	1433	1773	-----	-----	-----	-----	-----	-----
Concho	1468	1241	1201	1127	1297	1517	2511	-----	-----	-----	-----

\* Seed received too late for this date.

\*\* Dashes refer to no heading from this seeding date.

\*\*\* Omitted through an error in planting.

Appendix Table 14. Day-degrees from emergence to headed for 25 varieties of wheat  
 from 9 seeding dates in 1956 & 1957.

Variety	Seeding Dates - 1956 & 1957								
	Oct. 29	Nov. 23	Dec. 17	Jan. 15	Feb. 20	Mar. 1	Mar. 10	Apr. 12	May 9
Florence X Aurore	1324	1054	1043	1075	1039	1096	1135	1171	1435
Mara	1432	1026	1127	1159	1207	1236	1387	1591	----- *
Autonomia B	1160	1026	1155	1215	1263	1432	1387	-----	-----
Peko	1800	1586	1771	1719	1788	1901	1961	1941	-----
Heine 13161	1632	1502	1603	1523	1459	1516	1681	1591	-----
Blanka	1772	1642	1771	1719	1893	1901	1961	1941	-----
Klein Aniversario	1464	1334	1351	1383	1403	1488	1506	1766	-----
Novi Sad	1492	1390	1463	1551	2523	-----	-----	-----	-----
Bersee	1800	1670	1771	1719	2033	2216	2346	-----	-----
Magdalena	1548	1530	1575	1551	1928	2216	2346	-----	-----
Reichersburger Stamm 39	1800	1558	1799	1887	2418	-----	-----	-----	-----
Austro-Bankut	1492	1390	1463	1551	2243	-----	-----	-----	-----
Etoile de Choisy	1214	1082	1155	1215	1515	1936	1996	-----	-----
Derenburger Silber	1884	1838	1932	2132	2638	-----	-----	-----	-----
Banco	1940	1754	2177	2587	-----	-----	-----	-----	-----
Panter	1884	1810	1932	2167	-----	-----	-----	-----	-----
Yeoman	1884	1754	1932	2167	2418	2656	-----	-----	-----
Probus	1800	1558	1631	1852	2418	-----	-----	-----	-----
Eroica II	2080	2076	2212	2412	-----	-----	-----	-----	-----
Varma	1884	1754	1967	2447	-----	-----	-----	-----	-----
Concho	1380	1222	1351	1439	1928	2146	-----	-----	-----
TAP 67	1492	1362	1491	1551	1648	1726	1821	-----	-----
Comanche	1408	1222	1379	1439	1963	2216	-----	-----	-----
Fonca	1408	1334	1491	1495	2068	2656	-----	-----	-----
Triumph	1160	1054	1127	1215	2068	-----	-----	-----	-----

\* Dashes refer to no heading from this seeding date.

Explanations to Appendix Tables 15 and 16

Tables 15 and 16 present all the data collected in this study. The numbers listed for seeding dates correspond to the following seeding and emergence dates:

Seeding Date	1955-56		1956-57	
	Seeded	Emerg'd	Seeded	Emerg'd
1	October 12	October 19	October 29	November 7
2	October 18	October 27	November 23	December 19
3	October 27	November 8	December 17	January 18
4	November 15	December 13	January 15**	February 17
5	December 13*	January 15	February 20**	March 17
6	January 17*	February 27	March 1**	March 20
7	February 21	March 3	March 10**	March 25
8	March 1	March 11	April 12	April 20
9	March 10	March 27	May 9	May 17
10	April 1	April 11	-----	-----
11	May 3	May 12	-----	-----

The numbers shown as column headings correspond to the Stages of Morphological Development of the wheat plant divided into 23 stages (Feekes Scale):

A. Germination

B. Tillering

1. One sprout (number of leaves may be counted).
2. Beginning of tillering.
3. Plant yet creeping or lying, leaves often forming a spiral.
4. Beginning of the erection of the pseudo stem.
5. Pseudo stem (formed by the sheaths of leaves) strongly erect.

C. Stem Development or Shooting

6. First node of the stem is formed.
7. Second node of the stem formed. This stage is called the beginning of shooting; it is obvious that a real stem is formed.

8. The last leaf is yet rolled up, the ear begins to swell.
9. Ligule of the last leaf visible.
10. Sheath of the last leaf completely grown out, head strongly swollen.

D. Heading

- 10.1. First heads just visible.
- 10.2.  $1/4$  of the process of heading completed.
- 10.3.  $1/2$  of the heading completed.
- 10.4.  $3/4$  of the heading completed.
- 10.5. All heads out of sheath.

E. Flowering

- 10.5.1. Beginning of flowering.
- 10.5.2. Flowering complete to the top of the heads.
- 10.5.3. Flowering ended at the base of the heads.
- u. Flowering ended, kernel "watery ripe".

F. Ripening

- I. Milky ripe; kernel fluid milky.
- II. Mealy ripe; kernel soft, but with dry contents.
- III. Fully ripe; kernel hard and difficult to divide with the nail.
- IV. Ripe for cutting; straw dead.

The date shown under each stage number gives the time at which the seeding reached that particular stage. The number in parenthesis following the dates under Stages 1 through 8 indicates the average number of leaves on the main tiller. In some cases, the number of leaves was higher for the first stages of development than in succeeding stages.

This was probably a result of some leaf-dying. Because of this, the leaf count is not necessarily a true measure of the number of leaves produced by the tiller in that particular stage.

It was difficult to determine when Stage 1 should have been read. It would probably have been more desirable to make the reading at about the time the three-leaf stage was reached, instead of just prior to Stage 2.

App. Table 15 Morphological development of the wheat plant divided into 23 stages (Feekes Scale) for 21 varieties in 1955-56.

Seeding Date	1	2	3	4	5	6	7	8	9	10
	Florence X Aurore									
1	11-2(4)	11-3(4)	2-15(4)	2-29(4)	3-5(3)	3-31(3)	4-5(4)	4-7(4)	4-9	4-11
2	11-14(4)	11-15(4)	<u>1/</u>	3-2(4)	3-7(2)	4-1(4)	4-5(4)	4-9(4)	4-11	4-14
3	12-16(3)	<u>1/</u>	<u>1/</u>	3-15(3)	3-27(5)	4-4(5)	4-6(5)	4-10(5)	4-13	4-15
4	2-25(4)	<u>1/</u>	<u>1/</u>	3-16(4)	3-27(5)	4-5(5)	4-7(5)	4-10(5)	4-13	4-15
5	3-9(4)	3-10(4)	<u>1/</u>	<u>1/</u>	4-7(4)	4-11(5)	4-13(5)	4-15(5)	4-17	4-20
6	3-13(5)	3-15(5)	<u>1/</u>	4-8(5)	4-12(5)	4-13(5)	4-15(5)	4-19(5)	4-26	4-30
7	3-26(4)	3-27(4)	<u>1/</u>	4-10(4)	4-14(5)	4-24(5)	4-26(5)	4-27(5)	4-29	5-1
8	<u>1/</u>	<u>1/</u>	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-23(5)	4-26(5)	4-28(5)	4-30	5-4
9	<u>1/</u>	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-23(5)	4-26(5)	4-28(5)	5-4(5)	5-6	5-8
10	4-15(5)	4-16(5)	<u>3/</u>	<u>3/</u>	5-8(5)	5-12(5)	5-16(5)	5-18(5)	5-21	5-23
11	5-17	5-18	<u>3/</u>	<u>3/</u>	5-25	6-2	6-7	6-11	6-13	6-16
	Mara <sup>2/</sup>									
1	11-3(5)	11-4(5)	2-20(5)	3-5(4)	3-12(4)	4-2(5)	4-7(5)	4-15(3)	4-18	4-22
2	11-14(3)	11-15(3)	<u>1/</u>	3-4(4)	3-10(4)	4-4(5)	4-7(5)	4-15(4)	4-20	4-24
3	12-16(3)	<u>1/</u>	<u>1/</u>	3-17(4)	3-29(4)	4-4(5)	4-6(5)	4-10(5)	4-12	4-15
4	2-24(4)	<u>1/</u>	<u>1/</u>	3-17(4)	3-28(5)	4-6(5)	4-9(5)	4-12(5)	4-14	4-18
5	3-9(4)	3-10(4)	<u>1/</u>	<u>1/</u>	4-7(4)	4-11(5)	4-13(5)	4-15(5)	4-17	4-23
6	3-13(5)	3-15(5)	<u>1/</u>	4-9(5)	4-14(5)	4-17(5)	4-20(5)	4-24(5)	4-27	4-30
7	3-25(4)	3-27(4)	<u>1/</u>	4-11(4)	4-15(5)	4-25(5)	4-26(5)	4-28(5)	5-1	5-5
8	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-24(4)	4-27(4)	5-1(4)	5-7(4)	5-9(4)	5-11	5-13
9	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-26(5)	4-29(5)	5-7(5)	5-9(5)	5-12(5)	5-13	5-15
10	4-18(5)	4-19(5)	<u>3/</u>	<u>3/</u>	5-14(5)	5-18(5)	5-20(5)	5-22(5)	5-25	5-27
11	5-16	5-17	<u>3/</u>	<u>3/</u>	5-22	6-11	6-17	<u>4/</u>		



Appendix Table 15 - Continued

Seeding Date	10.1	10.2	10.3	10.4	10.5	10.5.1	10.5.2	10.5.3	U	I	II	III	IV
Florence X Aurore													
1	4-17	4-19	4-20	4-22	4-24	4-21	4-22	4-24	5-9	5-13	5-16	5-22	5-27
2	4-18	4-20	4-21	4-22	4-25	4-22	4-24	4-28	5-10	5-12	5-19	5-23	5-29
3	4-18	4-20	4-21	4-23	4-26	4-22	4-24	4-26	5-11	5-13	5-16	5-24	5-31
4	4-19	4-21	4-23	4-25	5-1	4-22	4-25	4-30	5-10	5-13	5-16	5-24	5-31
5	4-24	4-26	4-28	4-29	4-30	4-27	4-29	4-30	5-10	5-14	5-23	5-27	6-4
6	5-2	5-4	5-5	5-6	5-8	5-4	5-6	5-9	5-14	5-20	5-27	6-2	6-8
7	5-4	5-5	5-6	5-8	5-10	5-6	5-9	5-12	5-17	5-21	5-26	6-4	6-9
8	5-6	5-7	5-8	5-10	5-14	5-7	5-10	5-13	5-18	5-23	5-28	6-8	6-14
9	5-11	5-13	5-14	5-15	5-17	5-13	5-16	5-19	5-23	5-28	6-2	6-10	6-16
10	5-25	5-28	5-29	5-31	6-3	5-27	5-31	6-4	6-7	6-12	6-15	6-22	6-30
11	6-18	5/											
Mara <sup>2/</sup>													
1	4-24	4-27	4-20	5-2	5-7	4-27	4-29	5-1	5-6	5-14	5-20	5-25	5-31
2	4-28	4-29	4-30	5-1	5-2	4-30	5-1	5-4	5-9	5-12	5-14	5-22	6-1
3	4-18	4-20	4-22	4-24	4-30	4-23	4-25	4-26	5-9	5-11	5-14	5-21	5-28
4	4-21	4-24	4-26	4-27	5-2	4-23	4-25	4-28	5-10	5-13	5-16	5-23	5-30
5	4-25	4-28	4-29	4-30	5-3	4-27	4-29	4-30	5-9	5-13	5-20	5-26	6-2
6	5-4	5-6	5-7	5-8	5-11	5-5	5-8	5-12	5-16	5-21	5-28	6-3	6-8
7	5-8	5-10	5-11	5-12	5-14	5-9	5-12	5-15	5-20	5-24	5-29	6-7	6-14
8	5-14	5-16	5-17	5-19	5-23	5-14	5-18	5-24	5-28	6-1	6-4	6-10	6-16
9	5-16	5-19	5-20	5-22	5-24	5-18	5-20	5-25	5-30	6-3	6-10	6-16	6-23
10	5-29	5-31	6-2	6-8	6-11	6-1	6-6	6-13	5/				
11	7-3	5/											

Appendix Table 15 - Continued

Seeding Date	1	2	3	4	5	6	7	8	9	10
	Peko									
1	11-3(5)	11-4(5)	2-20(5)	3-6(5)	3-13(5)	4-2(5)	4-7(5)	4-15(5)	4-22	4-29
2	11-14(3)	11-15(3)	<u>1/</u>	3-6(3)	3-17(3)	4-5(3)	4-14(4)	4-23(4)	4-30	5-3
3	12-15(4)	<u>1/</u>	<u>1/</u>	3-20(5)	4-1(5)	4-8(5)	4-13(5)	4-21(5)	4-26	5-1
4	2-21(4)	<u>1/</u>	<u>1/</u>	3-25(5)	4-1(5)	4-14(5)	4-16(5)	4-22(5)	4-30	5-4
5	3-9(4)	3-10(4)	<u>1/</u>	4-5(4)	4-13(5)	4-22(5)	4-27(5)	5-1(4)	5-5	5-7
6	3-13(5)	3-15(5)	<u>1/</u>	4-10(5)	4-15(5)	4-25(5)	5-3(5)	5-8(5)	5-11	5-15
7	3-23(3)	3-25(3)	4-9(3)	4-13(4)	4-23(4)	5-7(4)	5-12(4)	5-15(4)	5-19	5-22
8	<u>1/</u>	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-23(4)	5-7(4)	5-13(4)	5-16(4)	5-18	5-21
9	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-24(4)	4-27(4)	5-9(4)	5-13(4)	5-16(4)	5-18	5-23
10	4-15(4)	4-16(4)	<u>3/</u>	<u>3/</u>	5-11(4)	5-17(4)	5-24(4)	5-29(4)	6-2	6-8
11	5-18	5-19	<u>3/</u>	<u>3/</u>	5-20	<u>5/</u>				
	Autonomia B									
1	<u>6/</u>									
2	11-11(3)	11-12(3)	<u>1/</u>	3-5(5)	3-11(5)	4-4(5)	4-6(5)	4-10(5)	4-11	4-14
3	12-17(3)	<u>1/</u>	<u>1/</u>	3-18(5)	3-29(5)	4-5(5)	4-6(5)	4-10(5)	4-12	4-15
4	2-24(4)	<u>1/</u>	<u>1/</u>	3-23(5)	3-29(5)	4-6(5)	4-8(5)	4-11(5)	4-13	4-17
5	3-9(5)	3-10(5)	<u>1/</u>	<u>1/</u>	4-10(5)	4-14(5)	4-15(5)	4-17(5)	4-19	4-21
6	3-16(5)	3-18(5)	<u>1/</u>	4-10(5)	4-15(5)	4-17(5)	4-21(5)	4-26(5)	5-2	5-5
7	3-26(3)	3-27(3)	4-9(3)	4-14(5)	4-28(5)	5-8(5)	5-11(5)	5-13(5)	5-16	5-19
8	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-26(4)	5-4(4)	5-10(4)	5-12(4)	5-15(4)	5-18	5-21
9	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-26(4)	5-6(4)	5-12(4)	5-17(4)	5-20(4)	5-22	5-24
10	4-18(6)	4-19(6)	<u>3/</u>	<u>3/</u>	5-17(6)	5-19(6)	5-21(6)	5-23(6)	5-25	5-26
11	5-16	5-17	<u>5/</u>							

Appendix Table 15 - Continued

Seeding Date	10.1	10.2	10.3	10.4	10.5	10.5.1	10.5.2	10.5.3	U	I	II	III	IV
Peko													
1	4-30	5-2	5-3	5-4	5-7	5-3	5-4	5-8	5-14	5-19	5-24	5-30	6-5
2	5-7	5-9	5-11	5-13	5-16	5-8	5-10	5-14	5-18	5-23	5-26	6-2	6-11
3	5-5	5-7	5-9	5-11	5-13	5-6	5-8	5-10	5-17	5-22	5-26	6-5	6-13
4	5-7	5-8	5-9	5-11	5-14	5-7	5-10	5-15	5-19	5-23	5-27	6-8	6-14
5	5-11	5-13	5-14	5-15	5-21	5-12	5-15	5-21	5-24	5-29	6-3	6-10	6-15
6	5-20	5-25	5-29	5-31	6-2	5-22	5-28	6-2	6-5	6-12	6-17	6-22	6-29
7	5-25	5-28	5-30	5-31	6-3	5-27	5-31	6-4	6-8	6-13	6-18	6-24	6-30
8	5-25	5-29	5-30	5-31	6-2	5-26	5-30	6-3	6-8	6-12	6-17	6-24	6-30
9	5-29	6-1	6-3	6-5	6-9	6-2	6-5	6-11	6-15	6-19	6-21	6-25	6-30
10	6-13	6-17	6-22	<u>1/</u>	<u>1/</u>	6-15	<u>5/</u>						
11													

Autonomia B													
1													
2	4-19	4-20	4-21	4-22	4-25	4-24	4-26	4-27	5-10	5-12	5-15	5-23	5-29
3	4-18	4-21	4-24	4-25	4-30	4-24	4-26	4-27	5-3	5-9	5-12	5-23	5-30
4	4-19	4-21	4-23	4-25	5-2	4-24	4-26	4-28	5-10	5-14	5-17	5-25	6-1
5	4-24	4-26	4-27	4-28	4-30	4-26	4-27	4-28	5-9	5-14	5-23	5-31	6-4
6	5-7	5-8	5-9	5-10	5-12	5-8	5-10	5-13	5-16	5-21	5-28	6-3	6-8
7	5-24	5-27	5-29	5-31	6-2	5-25	5-29	6-3	6-8	6-11	6-14	6-19	6-25
8	5-23	5-25	5-26	5-27	5-29	5-24	5-27	5-30	6-3	6-5	6-8	6-15	6-26
9	5-27	6-1	6-3	6-6	6-9	6-2	6-7	6-10	6-14	6-17	6-21	6-26	7-3
10	5-28	<u>5/</u>											
11													

Appendix Table 15 - Continued

Seeding Date	1	2	3	4	5	6	7	8	9	10
	Blanka									
1	11-4(3)	11-5(3)	2-22(3)	3-7(4)	3-14(4)	3-21(4)	3-28(4)	4-13(4)	4-17	4-30
2	<u>7/</u>									
3	<u>12-16(4)</u>	<u>1/</u>	<u>1/</u>	3-20(4)	3-30(4)	4-8(4)	4-13(4)	4-23(4)	4-30	5-4
4	2-20(4)	<u>1/</u>	<u>1/</u>	3-28(4)	4-2(4)	4-11(4)	4-16(4)	4-24(4)	4-26	5-6
5	3-9(4)	3-10(4)	<u>1/</u>	4-7(4)	4-15(4)	4-22(4)	4-27(4)	5-3(4)	5-9	5-12
6	3-10(5)	3-12(5)	<u>1/</u>	4-11(5)	4-14(4)	4-28(4)	5-7(4)	5-9(4)	5-12	5-15
7	3-20(4)	3-22(4)	4-11(4)	4-15(4)	4-24(4)	5-6(4)	5-10(4)	5-13(4)	5-17	5-21
8	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-24(4)	5-4(4)	5-8(4)	5-12(4)	5-16(4)	5-19	5-22
9	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-26(3)	5-5(3)	5-12(3)	5-16(3)	5-20(3)	5-24	5-29
10	4-15(4)	4-16(4)	<u>3/</u>	<u>3/</u>	5-11(4)	5-24(4)	5-30(4)	6-3(4)	6-8	6-12
11	5-19	5-20	<u>3/</u>	<u>3/</u>	5-29	<u>5/</u>				
	Heine 13161									
1	<u>6/</u>									
2	<u>11-14(2)</u>	11-15(2)	3-1(1)	3-11(1)	3-21(4)	4-4(4)	4-13(4)	4-24(4)	4-27	4-30
3	12-17(3)	<u>1/</u>	<u>1/</u>	3-18(5)	3-27(5)	4-6(4)	4-10(4)	4-16(4)	4-24	4-30
4	2-22(4)	2-23(4)	<u>1/</u>	3-23(4)	3-29(4)	4-6(4)	4-13(4)	4-18(4)	4-26	5-3
5	3-8(4)	3-9(4)	<u>1/</u>	4-5(4)	4-12(5)	4-16(5)	4-21(5)	4-24(5)	5-1	5-5
6	3-10(4)	3-12(4)	<u>1/</u>	4-10(4)	4-13(4)	4-16(4)	4-21(4)	4-26(4)	5-5	5-11
7	3-25(3)	3-27(3)	4-10(3)	4-14(4)	4-23(5)	4-30(5)	5-7(5)	5-10(5)	5-13	5-16
8	<u>1/</u>	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-25(4)	5-4(4)	5-7(4)	5-10(4)	5-13	5-16
9	<u>1/</u>	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-27(4)	5-10(4)	5-12(4)	5-14(4)	5-16	5-19
10	4-15(4)	4-16(4)	<u>3/</u>	<u>3/</u>	5-10(4)	5-16(4)	5-20(4)	5-24(4)	5-29	6-2
11	5-15	5-16	<u>3/</u>	<u>3/</u>	5-20	6-8	6-18	6-27	7-1	7-4

Appendix Table 15 - Continued

Seeding Date	10.1	10.2	10.3	10.4	10.5	10.5.1	10.5.2	10.5.3	U	I	II	III	IV
Blanka													
1	5-2	5-3	5-5	5-7	5-9	5-5	5-7	5-9	5-15	5-20	5-25	6-1	6-7
2													
3	5-7	5-8	5-9	5-10	5-12	5-8	5-10	5-12	5-16	5-24	5-27	6-8	6-14
4	5-9	5-12	5-13	5-14	5-15	5-10	5-13	5-16	5-19	5-25	5-28	6-7	6-13
5	5-15	5-17	5-18	5-20	5-24	5-17	5-20	5-25	5-29	6-2	6-5	6-10	6-28
6	5-19	5-22	5-24	5-25	5-28	5-22	5-26	5-28	6-1	6-6	6-12	6-18	6-27
7	5-24	5-27	5-28	5-29	6-1	5-27	5-29	6-3	6-8	6-12	6-15	6-23	6-29
8	5-26	5-29	5-30	5-31	6-2	5-27	5-30	6-3	6-9	6-15	6-18	6-24	6-30
9	6-1	6-3	6-4	6-6	6-9	6-2	6-7	6-10	6-15	6-18	6-21	6-25	6-30
10	6-17	5/											
11													
Heine 13161													
1													
2	5-2	5-7	5-9	5-11	5-14	5-8	5-11	5-15	5-19	5-22	5-26	5-30	6-10
3	5-3	5-4	5-6	5-8	5-12	5-4	5-7	5-10	5-12	5-16	5-24	5-31	6-7
4	5-6	5-7	5-8	5-10	5-12	5-7	5-10	5-13	5-16	5-20	5-26	6-3	6-8
5	5-8	5-9	5-11	5-13	5-16	5-9	5-13	5-16	5-19	5-23	5-28	6-7	6-14
6	5-14	5-18	5-21	5-23	5-26	5-17	5-21	5-28	6-1	6-5	6-12	6-16	6-26
7	5-20	5-23	5-24	5-25	5-28	5-22	5-26	5-30	6-3	6-8	6-13	6-19	6-28
8	5-20	5-23	5-24	5-25	5-28	5-22	5-26	5-29	6-3	6-8	6-14	6-20	6-28
9	5-23	5-25	5-27	5-29	6-1	5-24	5-27	6-2	6-7	6-14	6-17	6-24	6-28
10	6-4	6-8	6-10	6-13	6-19	6-7	6-16	6-19	5/				
11	7-8	5/											

Appendix Table 15 - Continued

Seeding Date	1	2	3	4	5	6	7	8	9	10
Klein Aniversario										
1	11-3(4)	11-4(4)	2-20(4)	3-6(4)	3-11(4)	3-31(4)	4-4(5)	4-9(5)	4-13	4-19
2	11-11(3)	11-12(3)	3-1(5)	3-7(5)	3-20(5)	4-4(5)	4-7(5)	4-11(5)	4-15	4-23
3	12-13(3)	12-14(3)	<u>1/</u>	3-14(3)	3-27(4)	4-1(4)	4-4(4)	4-9(4)	4-17	4-24
4	2-18(4)	<u>1/</u>	<u>1/</u>	3-28(4)	4-1(4)	4-7(4)	4-13(4)	4-18(4)	4-21	4-25
5	3-7(4)	3-8(4)	<u>1/</u>	4-5(4)	4-13(4)	4-17(4)	4-20(4)	4-24(4)	5-1	5-4
6	3-13(5)	3-15(5)	<u>1/</u>	4-11(5)	4-14(4)	4-24(4)	4-26(4)	4-29(4)	5-4	5-7
7	3-23(3)	3-25(3)	4-11(3)	4-15(4)	4-25(4)	5-7(4)	5-11(4)	5-15(4)	5-18	5-21
8	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-24(4)	4-30(4)	5-6(4)	5-10(4)	5-12(4)	5-15	5-18
9	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-26(4)	5-4(4)	5-11(4)	5-16(4)	5-19(4)	5-22	5-24
10	4-18(4)	4-19(4)	<u>3/</u>	<u>3/</u>	5-12(4)	5-17(4)	5-20(4)	5-22(4)	5-25	5-27
11	5-19	5-20	<u>3/</u>	<u>3/</u>	5-29	6-18	6-25	6-29	7-3	7-9
Bersee										
1	11-4(4)	11-5(4)	2-20(4)	3-6(5)	3-12(5)	3-21(5)	4-1(5)	4-15(5)	4-20	4-25
2	11-14(3)	11-15(3)	3-1(4)	3-12(4)	3-24(4)	3-30(4)	4-8(4)	4-17(4)	4-24	4-28
3	12-13(3)	<u>1/</u>	<u>1/</u>	3-20(4)	3-31(4)	4-5(4)	4-10(4)	4-17(4)	4-26	5-3
4	2-20(4)	<u>1/</u>	<u>1/</u>	2-28(4)	4-2(4)	4-8(4)	4-16(4)	4-22(4)	5-1	5-4
5	3-9(4)	3-10(4)	<u>1/</u>	4-6(4)	4-14(4)	4-19(4)	4-22(4)	4-25(4)	5-5	5-8
6	3-10(5)	3-12(5)	<u>1/</u>	4-10(5)	4-14(4)	4-30(4)	5-7(4)	5-10(4)	5-14	5-16
7	3-22(4)	3-24(4)	4-11(4)	4-15(4)	4-24(4)	5-13(4)	5-16(4)	5-18(4)	5-20	5-24
8	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-24(4)	5-4(4)	5-17(4)	5-20(4)	5-26(4)	5-29	5-31
9	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-26(4)	5-6(4)	5-14(4)	5-20(4)	5-26(4)	5-30	6-5
10	4-17(4)	4-18(4)	<u>3/</u>	<u>3/</u>	5-11(4)	<u>5/</u>				
11	5-31	6-1	<u>5/</u>							

Appendix Table 15 - Continued

Seeding Date	10.1	10.2	10.3	10.4	10.5	10.5.1	10.5.2	10.5.3	U	I	II	III	IV
Klein Aniversario													
1	4-23	4-25	4-26	4-27	4-28	4-27	4-30	5-1	5-10	5-15	5-12	5-24	5-31
2	4-26	4-27	4-28	4-29	5-2	4-30	5-2	5-6	5-12	5-15	5-21	5-27	5-30
3	4-29	5-1	5-2	5-3	5-6	5-1	5-4	5-9	5-15	5-19	5-25	5-30	6-5
4	5-1	5-4	5-5	5-6	5-8	5-4	5-7	5-10	5-15	5-19	5-25	6-1	6-7
5	5-7	5-8	5-9	5-10	5-13	5-8	5-10	5-13	5-17	5-22	5-26	6-7	6-12
6	5-11	5-13	5-15	5-17	5-21	5-13	5-18	5-22	5-28	6-1	6-5	6-13	6-23
7	5-24	5-28	5-29	5-30	6-1	5-26	5-30	6-2	6-9	6-15	6-19	6-26	7-3
8	5-22	5-24	5-25	5-26	5-28	5-23	5-25	5-29	6-4	6-12	6-15	6-18	6-23
9	5-26	5-28	5-29	5-30	6-1	5-27	5-31	6-3	6-12	6-16	6-19	6-24	6-29
10	6-1	6-6	6-8	6-10	6-13	6-6	6-10	6-14	6-21	6-23	6-25	6-29	7-6
11	7-13	5/											
Bersee													
1	4-30	5-2	5-4	5-7	5-9	5-3	5-7	5-9	5-12	5-16	5-24	5-29	6-2
2	5-3	5-6	5-8	5-10	5-15	5-6	5-9	5-12	5-16	5-20	5-26	6-1	6-10
3	5-6	5-7	5-8	5-10	5-13	5-7	5-10	5-13	5-16	5-21	5-26	6-2	6-8
4	5-7	5-9	5-11	5-12	5-14	5-9	5-12	5-15	5-17	5-22	5-26	6-8	6-14
5	5-11	5-15	5-16	5-17	5-20	5-13	5-17	5-21	5-25	5-29	6-3	6-11	6-29
6	5-21	5-25	5-29	5-31	6-4	5-21	5-27	6-4	6-7	6-13	6-19	6-23	6-29
7	5-29	6-1	6-4	6-8	6-12	6-2	6-5	6-13	6-16	6-18	6-21	6-30	7-8
8	6-2	6-4	6-5	6-7	6-9	6-4	6-7	6-10	6-14	6-20	6-23	6-28	6-30
9	6-7	6-10	6-12	6-14	6-18	6-11	6-14	6-18	6-22	6-24	5/		
10													
11													

Appendix Table 15 - Continued

Seeding Date	1	2	3	4	5	6	7	8	9	10
Novi Sad										
1	<u>6/</u>									
2	<u>6/</u>									
3	<u>6/</u>									
4	<u>6/</u>									
5	3-9(4)	3-10(4)	<u>1/</u>	4-5(4)	4-13(4)	4-19(4)	4-21(4)	4-24(4)	5-2	5-6
6	3-10(4)	3-12(4)	4-9(4)	4-13(4)	4-20(4)	4-26(4)	4-29(4)	5-7(4)	5-11	5-13
7	3-21(4)	3-23(4)	4-11(4)	4-15(4)	4-24(4)	5-10(4)	5-18(4)	5-20(4)	5-22	5-25
8	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-24(4)	5-4(4)	5-10(4)	5-16(4)	5-19(4)	5-22	5-24
9	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-26(4)	5-7(4)	5-15(4)	5-20(4)	6-15(4)	<u>5/</u>	
10	4-16(5)	4-17(5)	<u>3/</u>	<u>3/</u>	5-11(5)	<u>5/</u>				
11	5-19	5-20	<u>5/</u>							
Magdalena										
1	11-3(5)	11-3(5)	3-1(5)	3-9(5)	3-12(5)	4-4(5)	4-7(5)	4-11(5)	4-16	4-23
2	11-14(3)	11-15(3)	3-1(4)	3-14(4)	3-26(4)	3-31(4)	4-7(4)	4-16(4)	4-22	4-29
3	12-15(3)	<u>1/</u>	<u>1/</u>	3-23(5)	3-31(5)	4-4(5)	4-9(5)	4-16(5)	4-24	4-27
4	2-20(4)	<u>1/</u>	<u>1/</u>	3-28(4)	4-2(4)	4-8(4)	4-15(4)	4-21(4)	4-25	4-29
5	3-9(4)	3-10(4)	<u>1/</u>	4-8(4)	4-15(4)	4-22(4)	4-25(4)	5-2(4)	5-5	5-8
6	3-15(5)	3-17(5)	<u>1/</u>	4-10(5)	4-14(4)	5-3(4)	5-8(4)	5-11(4)	5-13	5-16
7	3-25(4)	3-26(4)	<u>1/</u>	4-24(4)	4-30(4)	5-16(4)	5-18(4)	5-20(4)	5-23	5-25
8	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-23(4)	5-1(4)	5-26(4)	5-30(4)	6-1(4)	6-3	6-5
9	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-26(4)	5-5(4)	5-27(4)	6-11(4)	<u>5/</u>		
10	4-17(4)	4-18(4)	<u>3/</u>	<u>3/</u>	5-11(4)	5-18(4)	5-22(4)	5-29(4)	6-3	6-8
11	5-31	6-1	<u>5/</u>							



Appendix Table 15. - Continued

Seeding Date	10.1	10.2	10.3	10.4	10.5	10.5.1	10.5.2	10.5.3	U	I	II	III	IV
Novi Sad													
1													
2													
3													
4													
5	5-9	5-11	5-12	5-13	5-15	5-11	5-13	5-15	5-19	5-22	5-26	6-8	6-14
6	5-15	5-19	5-22	5-25	5-29	5-17	5-22	5-29	6-5	6-10	6-14	6-23	6-28
7	5-27	<u>5/</u>											
8	5-27	<u>5/</u>											
9													
10													
11													
Magdalena													
1	4-26	4-30	5-3	5-5	5-7	5-3	5-5	5-7	5-12	5-15	5-18	5-25	5-30
2	5-1	5-2	5-5	5-6	5-8	5-2	5-5	5-8	5-13	5-17	5-25	6-1	6-5
3	5-2	5-3	5-5	5-7	5-10	5-3	5-5	5-9	5-14	5-18	5-27	5-30	6-2
4	5-3	5-6	5-7	5-10	5-12	5-5	5-8	5-12	5-16	5-20	5-27	6-4	6-11
5	5-11	5-13	5-15	5-16	5-19	5-13	5-16	5-19	5-25	6-2	6-5	6-11	6-15
6	5-21	5-25	5-27	5-29	5-31	5-17	5-28	6-1	6-7	6-14	6-18	6-25	6-29
7	5-29	6-6	6-8	6-10	6-14	6-7	6-12	6-15	6-18	6-22	6-26	7-2	7-8
8	6-7	6-12	6-16	6-20	<u>1/</u>	6-15	<u>5/</u>						
9													
10	6-17	<u>5/</u>											
11													

Appendix Table 15 - Continued

Seeding Date	1	2	3	4	5	6	7	8	9	10
Reichersberger Stamm 39										
1	11-3(5)	11-4(5)	3-1(5)	3-20(5)	4-3(5)	4-9(5)	4-14(5)	4-19(5)	4-25	4-29
2	11-11(3)	11-12(3)	3-5(5)	3-20(5)	3-25(5)	3-31(5)	4-7(5)	4-18(5)	4-23	5-2
3	12-13(3)	<u>1/</u>	<u>1/</u>	3-25(4)	4-2(4)	4-6(4)	4-10(4)	4-17(4)	4-27	5-4
4	2-14(3)	<u>1/</u>	3-25(4)	3-27(4)	4-4(4)	4-9(4)	4-18(4)	4-22(4)	5-3	5-8
5	3-9(4)	3-10(4)	<u>1/</u>	4-13(4)	4-19(4)	4-27(5)	5-3(5)	5-7(5)	5-9	5-13
6	<u>1/</u>	<u>1/</u>	4-12(4)	4-24(4)	4-30(4)	5-12(4)	4-16(4)	5-21(4)	5-26	5-30
7	3-20(3)	3-22(3)	<u>1/</u>	4-24(4)	5-4(4)	5-30(4)	6-12(4)	<u>5/</u>		
8	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-24(3)	5-5(3)	5-31(3)	6-10(3)	<u>5/</u>		
9	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-28(4)	5-5(4)	6-2(4)	6-13(4)	<u>5/</u>		
10	4-17(4)	4-18(4)	<u>3/</u>	5-1(4)	5-11(4)	5-27(4)	<u>5/</u>			
11	5-30	5-31	<u>5/</u>							
Austro-Bankut										
1	<u>6/</u>									
2	<u>11-14(2)</u>	11-15(2)	3-5(4)	3-14(4)	3-26(4)	4-2(4)	4-8(4)	4-16(4)	4-22	4-25
3	12-11(3)	<u>1/</u>	<u>1/</u>	3-19(4)	3-28(4)	4-4(4)	4-7(4)	4-10(4)	4-14	4-25
4	2-14(3)	<u>1/</u>	<u>1/</u>	3-28(4)	4-1(4)	4-7(4)	4-13(4)	4-19(4)	4-25	5-3
5	3-7(4)	3-8(4)	<u>1/</u>	4-6(4)	4-13(5)	4-17(5)	4-20(5)	4-24(5)	4-28	5-5
6	3-13(4)	3-15(4)	4-10(4)	4-14(4)	5-4(4)	5-9(4)	5-12(4)	5-15(4)	5-17	5-20
7	3-19(4)	3-21(4)	<u>1/</u>	4-24(4)	5-4(4)	5-27(4)	5-31(4)	6-13(4)	<u>5/</u>	
8	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-24(3)	5-7(3)	5-26(3)	6-1(3)	<u>5/</u>		
9	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-26(4)	5-7(4)	5-27(4)	6-10(4)	6-20(4)	<u>5/</u>	
10	4-16(4)	4-17(4)	<u>3/</u>	<u>3/</u>	5-11(4)	5-30(4)	<u>5/</u>			
11	5-30	5-31	<u>5/</u>							

Appendix Table 15 - Continued

Seeding Date	10.1	10.2	10.3	10.4	10.5	10.5.1	10.5.2	10.5.3	U	I	II	III	IV
Reichersberger Stamm 39													
1	5-2	5-7	5-8	5-9	5-12	5-6	5-9	5-13	5-16	5-20	5-25	5-31	6-9
2	5-5	5-7	5-9	5-11	5-14	5-6	5-9	5-15	5-19	5-23	5-27	6-5	6-12
3	5-7	5-10	5-12	5-15	5-16	5-8	5-12	5-16	5-20	5-24	5-29	6-8	6-13
4	5-11	5-14	5-16	5-18	5-23	5-12	5-16	5-22	5-25	5-31	6-4	6-13	6-30
5	5-15	5-17	5-18	5-19	5-22	5-16	5-19	5-23	5-27	6-1	6-4	6-14	6-24
6	6-2	6-5	6-7	6-9	6-12	6-4	6-8	6-13	6-16	6-21	6-25	6-29	7-3
7													
8													
9													
10													
11													
Austro-Bankut													
1													
2	5-1	5-2	5-4	5-5	5-7	5-2	5-5	5-7	5-13	5-16	5-23	5-30	6-5
3	5-1	5-2	5-4	5-5	5-9	5-2	5-5	5-7	5-13	5-16	5-24	5-30	6-3
4	5-5	5-6	5-7	5-8	5-12	5-6	5-9	5-12	5-16	5-19	5-26	6-3	6-8
5	5-10	5-12	5-13	5-14	5-16	5-12	5-14	5-16	5-20	5-24	5-29	6-8	6-14
6	5-24	5-27	5-29	5-31	6-2	5-26	5-29	6-3	6-8	6-13	6-18	6-24	6-28
7													
8													
9													
10													
11													

Appendix Table 15 - Continued

Seeding Date	1	2	3	4	5	6	7	8	9	10
Etoile de Choisy										
1	<u>6/</u>									
2	11-14(3)	11-15(3)	3-4(5)	3-12(5)	3-25(5)	4-4(5)	4-7(5)	4-10(5)	4-14	4-19
3	12-14(3)	<u>1/</u>	<u>1/</u>	3-18(5)	3-26(5)	4-5(5)	4-13(4)	4-14(4)	4-17	4-21
4	2-14(3)	<u>1/</u>	<u>1/</u>	3-16(3)	3-27(5)	4-6(5)	4-13(5)	4-14(5)	4-17	4-21
5	3-9(4)	3-10(4)	<u>1/</u>	<u>1/</u>	4-9(4)	4-13(5)	4-17(5)	4-19(5)	4-22	4-25
6	3-10(4)	3-12(4)	<u>1/</u>	4-10(4)	4-14(5)	4-17(5)	4-21(5)	4-26(5)	4-30	5-5
7	3-20(4)	3-22(4)	<u>1/</u>	4-24(4)	4-30(4)	5-18(4)	5-20(4)	5-22(4)	5-24	5-26
8	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-23(4)	5-4(4)	5-24(4)	5-29(4)	6-2(4)	6-9	6-13
9	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-26(4)	5-4(4)	5-27(4)	6-1(4)	6-20(4)	<u>5/</u>	
10	4-16(4)	4-17(4)	<u>3/</u>	<u>3/</u>	5-11(4)	5-30(4)	<u>5/</u>			
11	5-30	5-31	<u>5/</u>							

Derenburger Silber										
1	<u>6/</u>									
2	11-14(3)	11-15(3)	3-5(4)	3-20(4)	3-28(4)	4-4(4)	4-13(4)	4-21(4)	4-30	5-4
3	12-13(3)	<u>1/</u>	<u>1/</u>	3-26(4)	4-4(4)	4-8(4)	4-14(4)	4-23(4)	4-27	5-5
4	2-24(4)	<u>1/</u>	3-28(4)	4-1(4)	4-6(4)	4-12(4)	4-19(4)	5-2(4)	5-6	5-8
5	3-9(4)	3-10(4)	<u>1/</u>	4-12(4)	4-20(4)	5-1(5)	5-6(5)	5-10(5)	5-13	5-15
6	3-15(5)	3-17(5)	4-12(4)	4-24(4)	4-30(4)	5-15(4)	5-18(4)	5-24(4)	5-29	5-31
7	3-20(4)	3-22(4)	<u>1/</u>	4-24(4)	5-4(4)	6-7(4)	6-18(4)	<u>5/</u>		
8	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-26(3)	5-7(3)	<u>5/</u>				
9	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-27(4)	5-7(4)	<u>6-7(4)</u>	6-18(4)	<u>5/</u>		
10	4-19(4)	4-20(4)	<u>3/</u>	5-1(4)	5-12(4)	<u>5/</u>				
11	5-30	5-31	<u>5/</u>							

Appendix Table 15 - Continued

Seeding Date	10.1	10.2	10.3	10.4	10.5	10.5.1	10.5.2	10.5.3	U	I	II	III	IV
Etoile de Choisy													
1													
2	4-22	4-24	4-25	4-26	5-2	4-27	4-29	5-3	5-9	5-12	5-15	5-22	5-29
3	4-23	4-25	4-26	4-28	5-4	4-26	4-28	4-29	5-7	5-11	5-15	5-22	5-31
4	4-24	4-25	4-26	5-1	5-3	4-26	4-28	4-29	5-10	5-14	5-20	5-25	5-31
5	4-27	4-29	4-30	5-2	5-5	4-29	5-3	5-5	5-12	5-16	5-21	5-27	6-4
6	5-8	5-9	5-11	5-13	5-16	5-9	5-12	5-16	5-20	5-25	5-29	6-5	6-13
7	5-28	5-31	6-2	6-4	6-8	5-29	6-2	6-9	6-13	6-19	6-23	6-27	7-1
8													
9													
10													
11													
Derenburger Silber													
1													
2	5-7	5-11	5-12	5-14	5-16	5-9	5-12	5-17	5-21	5-16	5-30	6-7	6-13
3	5-9	5-11	5-13	5-15	5-17	5-10	5-13	5-18	5-22	5-27	5-31	6-8	6-13
4	5-11	5-16	5-17	5-18	5-21	5-13	5-17	5-22	5-23	5-26	5-31	6-10	6-27
5	5-17	5-23	5-25	5-27	6-1	5-18	5-25	6-2	6-5	6-8	6-13	6-19	6-29
6	6-2	6-7	6-9	6-11	6-15	6-7	6-11	6-16	6-20	6-22	6-26	7-2	7-9
7													
8													
9													
10													
11													

Appendix Table 15 - Continued

Seeding Date	1	2	3	4	5	6	7	8	9	10
	Banco									
1	11-4(5)	11-5(5)	3-1(5)	3-20(5)	4-3(5)	4-15(4)	4-21(4)	4-25(4)	5-2	5-6
2	11-14(3)	11-15(3)	3-5(5)	3-20(5)	3-28(5)	4-4(5)	4-13(5)	4-23(5)	5-3	5-8
3	12-13(3)	<u>1/</u>	<u>1/</u>	3-26(4)	4-4(4)	4-9(4)	4-15(4)	4-24(4)	4-29	5-6
4	2-13(3)	2-14(3)	3-27(3)	3-31(4)	4-6(4)	4-12(4)	4-19(4)	5-2(4)	5-7	5-11
5	3-7(4)	3-8(4)	<u>1/</u>	4-12(4)	4-20(5)	5-6(5)	5-10(5)	5-14(5)	5-17	5-20
6	3-14(4)	3-16(4)	4-12(4)	4-24(4)	5-2(4)	5-16(4)	5-21(4)	5-27(4)	6-6	6-9
7	3-22(3)	3-25(3)	<u>1/</u>	4-23(4)	5-5(4)	5-29(4)	6-4(4)	<u>5/</u>		
8	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-26(3)	5-7(3)	<u>5/</u>				
9	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-26(4)	5-7(4)	6-8(4)	6-19(4)	<u>5/</u>		
10	4-20(4)	4-21(4)	<u>3/</u>	5-1(4)	5-12(4)	<u>5/</u>				
11	5-31	6-1	<u>5/</u>							
	Panter									
1	11-5(5)	11-6(5)	3-1(6)	3-19(6)	4-3(5)	4-13(5)	4-19(5)	4-24(4)	4-30	5-3
2	<u>7/</u>									
3	12-14(3)	<u>1/</u>	<u>1/</u>	3-22(5)	4-2(5)	4-8(5)	4-13(4)	4-22(4)	4-26	5-3
4	2-20(4)	<u>1/</u>	<u>1/</u>	3-3(5)	4-6(5)	4-16(5)	4-22(5)	4-21(4)	5-4	5-8
5	3-7(4)	3-8(4)	<u>1/</u>	4-10(4)	4-15(4)	4-25(4)	5-5(4)	5-8(4)	5-10	5-15
6	3-13(4)	3-15(4)	4-8(4)	4-12(4)	4-26(4)	5-11(5)	5-17(5)	5-26(5)	5-29	6-3
7	3-23(4)	3-25(4)	<u>1/</u>	4-24(4)	5-2(4)	6-4(4)	6-17(4)	<u>5/</u>		
8	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-26(4)	5-7(4)	6-2(4)	6-13(4)	<u>5/</u>		
9	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-26(4)	5-7(4)	6-8(4)	6-19(4)	<u>5/</u>		
10	4-17(4)	4-19(4)	<u>3/</u>	<u>3/</u>	5-14(4)	<u>5/</u>				
11	5-31	6-1	<u>5/</u>							

Appendix Table 15 - Continued

Seeding Date	10.1	10.2	10.3	10.4	10.5	10.5.1	10.5.2	10.5.3	U	I	II	III	IV
Banco													
1	5-8	5-12	5-14	5-16	5-17	5-10	5-13	5-17	5-20	5-24	5-28	6-8	6-13
2	5-11	5-14	5-16	5-18	5-24	5-13	5-16	5-19	5-24	5-27	6-1	6-8	6-14
3	5-10	5-14	5-16	5-18	5-24	5-13	5-16	5-19	5-24	5-27	5-31	6-8	6-15
4	5-14	5-16	5-17	5-18	5-23	5-14	5-18	5-23	5-26	5-31	6-4	6-12	6-26
5	5-23	5-25	5-28	5-30	6-3	5-24	5-28	6-4	6-8	6-13	6-19	6-23	6-29
6	6-13	6-20	5/										
7													
8													
9													
10													
11													
Panter													
1	5-6	5-7	5-9	5-11	5-14	5-6	5-9	5-14	5-17	5-24	5-27	6-4	6-12
2													
3	5-7	5-10	5-12	5-13	5-15	5-9	5-13	5-16	5-20	5-25	5-31	6-8	6-14
4	5-10	5-12	5-13	5-14	5-16	5-12	5-14	5-17	5-21	5-26	5-31	6-9	6-15
5	5-17	5-18	5-19	5-19	5-22	5-18	5-21	5-23	5-29	6-4	6-8	6-15	6-30
6	6-6	6-12	6-13	6-17	6-21	6-12	6-17	6-21	6-24	6-28	7-1	7-7	7-10
7													
8													
9													
10													
11													

Appendix Table 15 - Continued

Seeding Date	1	2	3	4	5	6	7	8	9	10
	Yeoman									
1	11-2(6)	11-3(6)	3-4(5)	3-23(5)	4-4(5)	4-13(5)	4-19(5)	4-23(4)	4-30	5-3
2	11-10(2)	11-11(2)	3-5(5)	3-20(5)	3-27(5)	4-3(5)	4-12(4)	4-22(4)	4-25	4-30
3	12-13(4)	<u>1/</u>	<u>1/</u>	3-25(5)	4-4(5)	4-8(5)	4-13(5)	4-18(5)	4-27	5-1
4	2-19(4)	<u>1/</u>	<u>1/</u>	4-1(4)	4-7(4)	4-18(4)	4-21(4)	4-25(4)	5-2	5-7
5	3-8(5)	3-9(5)	<u>1/</u>	4-11(4)	4-16(4)	4-25(4)	5-6(4)	5-10(4)	5-13	5-15
6	3-13(4)	3-15(4)	4-9(4)	4-13(4)	4-26(4)	5-11(4)	5-16(4)	5-21(4)	5-27	5-30
7	3-26(4)	3-27(4)	4-24(4)	5-7(4)	5-20(4)	5-27(4)	6-1(4)	6-4(4)	6-6	6-8
8	<u>1/</u>	<u>1/</u>	4-26(3)	4-29(3)	5-15(3)	6-7(3)	6-18(3)	<u>5/</u>		
9	<u>1/</u>	<u>1/</u>	4-26(4)	4-29(4)	5-20(4)	<u>5/</u>				
10	4-20(4)	4-21(4)	<u>3/</u>	<u>3/</u>	5-21(4)	<u>5/</u>				
11	5-31	6-1	<u>5/</u>							
	Probus									
1	<u>6/</u>									
2	11-14(3)	11-15(3)	3-2(5)	3-16(5)	3-26(5)	4-2(5)	4-9(5)	4-18(5)	4-22	4-30
3	12-13(3)	<u>1/</u>	<u>1/</u>	3-22(5)	3-31(5)	4-7(5)	4-14(5)	4-24(5)	4-30	5-5
4	2-25(4)	<u>1/</u>	<u>1/</u>	3-30(5)	4-6(5)	4-18(5)	4-23(5)	4-27(4)	5-4	5-7
5	3-9(4)	3-10(4)	<u>1/</u>	4-9(4)	4-14(5)	4-24(5)	4-30(5)	5-4(5)	5-9	5-13
6	3-13(5)	3-15(5)	<u>1/</u>	4-10(4)	4-15(4)	5-7(4)	5-11(4)	5-16(5)	5-19	5-23
7	3-20(4)	3-22(4)	<u>1/</u>	<u>1/</u>	4-24(4)	5-15(4)	5-22(4)	<u>5/</u>		
8	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-26(4)	5-4(4)	6-1(4)	6-11(4)	<u>5/</u>		
9	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-26(4)	5-5(4)	5-27(4)	6-10(4)	<u>5/</u>		
10	4-17(4)	4-18(4)	<u>3/</u>	<u>3/</u>	5-17(4)	<u>5/</u>				
11	5-31	6-1	<u>5/</u>							



Appendix Table 15 - Continued

Seeding Date	10.1	10.2	10.3	10.4	10.5	10.5.1	10.5.2	10.5.3	U	I	II	III	IV
Yeoman													
1	5-6	5-8	5-10	5-13	5-15	5-7	5-11	5-14	5-18	5-22	5-26	6-1	6-9
2	5-6	5-11	5-13	5-15	5-17	5-8	5-13	5-18	5-22	5-26	5-30	6-5	6-12
3	5-7	5-10	5-12	5-14	5-17	5-9	5-13	5-18	5-22	5-26	5-31	6-8	6-13
4	5-10	5-14	5-16	5-17	5-21	5-12	5-16	5-21	5-24	5-29	6-3	6-10	6-16
5	5-17	5-18	5-19	5-21	5-25	5-18	5-21	5-26	6-2	6-5	6-13	6-20	6-28
6	6-1	6-6	6-8	6-13	6-20	6-5	6-12	6-20	6-22	6-25	6-28	7-4	7-9
7	6-12	6-15	6-18	<u>1/</u>	<u>1/</u>	6-14	6-18	<u>5/</u>					
8													
9													
10													
11													
Probus													
1													
2	5-6	5-8	5-9	5-11	5-14	5-7	5-12	5-15	5-19	5-25	5-29	6-4	6-11
3	5-8	5-9	5-10	5-11	5-13	5-8	5-12	5-15	5-19	5-25	5-30	6-7	6-13
4	5-10	5-12	5-14	5-15	5-19	5-11	5-15	5-19	5-23	5-28	6-3	6-9	6-14
5	5-15	5-17	5-18	5-19	5-22	5-17	5-20	5-23	5-29	6-3	6-6	6-12	6-27
6	5-28	5-30	6-1	6-5	6-11	5-29	6-4	6-12	6-15	6-19	6-22	6-26	6-30
7													
8													
9													
10													
11													

Appendix Table 15 - Continued

Seeding Date	1	2	3	4	5	6	7	8	9	10
Eroica II										
1	<u>6/</u>									
2	<u>6/</u>									
3	<u>6/</u>									
4	<u>6/</u>									
5	3-9(4)	3-10(4)	<u>1/</u>	4-10(4)	4-14(4)	5-4(4)	5-10(4)	5-14(4)	5-16	5-19
6	3-13(5)	3-15(5)	4-9(5)	4-14(4)	4-30(4)	5-17(4)	5-21(4)	5-27(4)	5-31	6-4
7	3-21(4)	3-23(4)	<u>1/</u>	4-24(4)	5-5(4)	6-7(4)	6-17(4)	<u>5/</u>		
8	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-26(3)	5-4(3)	5-28(3)	6-3(3)	<u>5/</u>		
9	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-26(4)	5-4(4)	5-29(4)	6-10(4)	<u>5/</u>		
10	4-17(4)	4-18(4)	<u>3/</u>	<u>3/</u>	5-20(4)	<u>5/</u>				
11	5-31	6-1	<u>5/</u>							
Varma										
1	11-4(4)	11-5(4)	3-1(5)	3-22(5)	4-5(4)	4-14(4)	4-18(4)	4-22(4)	4-25	5-2
2	11-14(3)	11-15(3)	3-5(4)	3-18(4)	3-28(4)	4-8(4)	4-13(4)	4-22(4)	4-29	5-3
3	12-13(3)	<u>1/</u>	<u>1/</u>	3-27(4)	4-5(4)	4-10(4)	4-14(4)	4-24(4)	5-1	5-5
4	2-26(4)	<u>1/</u>	<u>1/</u>	4-1(5)	4-7(4)	4-18(4)	4-22(4)	4-25(4)	5-5	5-8
5	3-9(4)	3-10(4)	<u>1/</u>	4-10(4)	4-16(4)	4-30(5)	5-7(5)	5-9(5)	5-12	5-15
6	3-16(3)	3-18(3)	4-9(4)	4-13(4)	4-26(4)	5-17(4)	5-29(4)	6-2(4)	6-30	<u>5/</u>
7	3-23(3)	3-25(3)	<u>1/</u>	<u>1/</u>	4-24(4)	5-22(4)	5-30(4)	6-4(4)	<u>5/</u>	
8	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-24(4)	5-3(4)	5-28(4)	6-2(4)	<u>5/</u>		
9	<u>1/</u>	<u>1/</u>	<u>1/</u>	4-26(4)	5-3(4)	5-30(4)	6-4(4)	6-18(4)	<u>5/</u>	
10	4-16(4)	4-17(4)	<u>3/</u>	<u>3/</u>	5-19(4)	6-3(4)	<u>5/</u>			
11	5-30	5-31	<u>5/</u>							

Appendix Table 15 - Continued

Seeding Date	10.1	10.2	10.3	10.4	10.5	10.5.1	10.5.2	10.5.3	U	I	II	III	IV
	Eroica II												
1													
2													
3													
4	5-23	5-26	5-28	5-30	6-3	5-24	5-28	6-4	6-12	6-17	6-21	6-26	6-30
5	6-7	6-10	6-12	6-14	6-18	6-10	6-13	6-18	6-22	6-26	6-29	7-8	7-12
6													
7													
8													
9													
10													
11													
	Varma												
1	5-7	5-9	5-12	5-15	5-17	5-9	5-13	5-17	5-22	5-26	5-31	6-4	6-11
2	5-7	5-11	5-12	5-14	5-16	5-8	5-13	5-17	5-20	5-24	5-27	6-7	6-13
3	5-8	5-10	5-12	5-14	5-17	5-9	5-13	5-18	5-20	5-24	5-27	6-7	6-13
4	5-11	5-14	5-16	5-17	5-20	5-12	5-17	5-20	5-23	5-26	5-31	6-8	6-30
5	5-21	5-26	5-28	5-30	6-2	5-25	5-29	6-3	6-9	6-12	6-17	6-23	6-30
6													
7													
8													
9													
10													
11													

Appendix Table 15 - Continued

Seeding Date	1	2	3	4	5	6	7	8	9	10
	Concho									
1	11-5(4)	11-6(4)	3-1(5)	3-18(5)	4-1(5)	<del>4-4</del> (5)	4-7(5)	4-12(5)	4-15	4-18
2	11-14(3)	11-15(3)	3-5(5)	3-13(5)	3-27(5)	4-4(5)	4-8(5)	4-14(5)	4-18	4-21
3	12-14(3)	<u>1/</u>	<u>1/</u>	3-24(4)	3-31(4)	4-5(4)	4-11(4)	4-14(4)	4-20	4-25
4	2-23(4)	<u>1/</u>	<u>1/</u>	3-31(4)	4-6(4)	4-9(4)	4-14(4)	4-19(4)	4-25	4-29
5	3-9(4)	3-10(4)	<u>1/</u>	4-9(4)	4-15(5)	4-18(5)	4-22(5)	4-25(5)	4-30	5-4
6	3-16(4)	3-18(4)	4-11(4)	4-15(4)	4-27(4)	5-4(4)	5-7(4)	5-8(4)	5-10	5-12
7	3-21(3)	3-23(3)	<u>1/</u>	4-24(4)	5-1(4)	5-23(4)	6-1(4)	6-4(4)	6-6	6-8
8	<u>1/</u>	<u>1/</u>	4-24(3)	4-29(3)	5-9(3)	6-3(3)	6-14(3)	<u>5/</u>		
9	<u>1/</u>	<u>1/</u>	4-26(4)	4-30(4)	5-10(4)	5-29(4)	6-9(4)	6-19(4)	<u>5/</u>	
10	4-18(4)	4-19(4)	<u>3/</u>	<u>3/</u>	5-20(4)	<u>5/</u>				
11	5-30	5-31	<u>5/</u>							

Appendix Table 15 - Concluded

Seeding Date	10.1	10.2	10.3	10.4	10.5	10.5.1	10.5.2	10.5.3	U	I	II	III	IV
	Concho												
1	4-25	4-26	4-27	4-29	5-5	4-28	5-1	5-5	5-8	5-12	5-15	5-23	5-30
2	4-24	4-25	4-26	4-28	5-2	4-30	5-2	5-4	5-10	5-13	5-16	5-23	5-30
3	4-29	4-30	5-2	5-4	5-7	4-30	5-2	5-5	5-12	5-15	5-18	5-25	6-2
4	5-2	5-4	5-5	5-6	5-7	5-3	5-5	5-7	5-13	5-16	5-19	5-26	6-4
5	5-7	5-8	5-9	5-10	5-13	5-8	5-10	5-13	5-17	5-21	5-25	6-5	6-12
6	5-15	5-18	5-19	5-21	5-25	5-17	5-22	5-25	6-3	6-8	6-13	6-20	6-29
7	6-12	6-16	6-20	6-23	6-26	6-15	6-21	6-27	<u>5/</u>				
8													
9													
10													
11													

1/ Indicates no readings taken.

2/ There is a definite mixture in seed for Dates 1 and 2. The mixture consisted of Mara and a late maturing variety.

3/ Stage not present.

4/ Stages 8-10 very difficult to distinguish from another.

5/ High temperatures prevented further development.

6/ Seed was not received in time for planting.

7/ Date 2 was omitted through an error in planting.

App. Table 16 Morphological development of the wheat plant divided into 23 stages (Feekes Scale) for 25 varieties in 1956-57.

Seeding Date	1	2	3	4	5	6	7	8	9	10
	Florence X Aurore									
1	11-28(4)	11-29(4)	2-1(2)	3-4(2)	3-19(3)	3-30(4)	4-8(4)	4-18	4-21	4-30
2	3-7(3)	3-8(3)	<u>1/</u>	3-26(4)	3-31(4)	4-10(5)	4-18(5)	4-21	4-22	4-27
3	3-7(4)	3-8(4)	<u>1/</u>	3-24(4)	3-30(4)	4-8(5)	4-16(5)	4-24	4-28	5-1
4	3-15(4)	3-16(4)	<u>1/</u>	3-28(4)	4-6(4)	4-17(4)	4-21(4)	4-27	5-1	5-4
5	3-27(4)	3-28(4)	<u>1/</u>	4-5(4)	4-15(4)	4-23(4)	4-27(4)	5-2	5-6	5-10
6	4-6(4)	4-7(4)	<u>1/</u>	4-15(4)	4-21(4)	4-27(4)	5-2(4)	5-11	5-12	5-14
7		4-13(4)	<u>1/</u>	4-21(4)	4-24(4)	5-2(4)	5-6(4)	5-10	5-13	5-16
8		5-5(4)	<u>1/</u>	<u>1/</u>	5-13(4)	5-19(5)	5-24(5)	5-27	5-29	5-31
9		5-31(4)	<u>1/</u>	<u>1/</u>	6-6(4)	6-17(5)	6-20(5)	6-23	6-25	6-27
	Mara									
1	12-4(4)	12-5(4)	2-1(3)	3-1(3)	3-10(3)	3-28(4)	4-4(4)	4-15	4-23	4-26
2	2-12(4)	2-13(4)	<u>1/</u>	3-10(3)	3-21(4)	4-5(5)	4-14(5)	4-19	4-21	4-25
3	3-7(4)	3-8(4)	<u>1/</u>	3-18(4)	3-28(4)	4-8(4)	4-16(5)	4-22	4-27	5-1
4	3-15(4)	3-16(4)	<u>1/</u>	3-30(4)	4-8(4)	4-18(4)	4-23(4)	4-29	5-3	5-7
5	3-27(4)	3-28(4)	<u>1/</u>	4-6(4)	4-17(4)	4-26(4)	4-30(4)	5-5	5-9	5-14
6	4-6(3)	4-7(3)	<u>1/</u>	4-16(4)	4-22(4)	5-9(4)	5-11(5)	5-14	5-16	5-18
7		4-11(4)	<u>1/</u>	4-21(4)	4-26(4)	5-5(4)	5-11(4)	5-18	5-23	5-25
8		5-5(4)	<u>1/</u>	<u>1/</u>	5-15(5)	6-4(5)	6-7(5)	6-9	6-11	6-13
9		5-30(4)	<u>2/</u>							
	Autonomia B									
1	12-5(4)	12-6(4)	2-1(4)	2-23(4)	3-2(4)	3-25(5)	4-1(5)	4-13	4-20	4-23
2	2-13(4)	2-14(4)	<u>1/</u>	3-12(4)	3-24(4)	4-5(5)	4-14(5)	4-19	4-21	4-25
3	3-9(3)	3-10(3)	3-15(4)	3-20(4)	3-28(4)	4-10(4)	4-19(5)	4-26	4-30	5-3
4	3-17(4)	3-18(4)	3-22(4)	4-1(4)	4-10(4)	4-20(4)	4-25(4)	5-1	5-6	5-9
5	3-27(4)	3-28(4)	4-3(4)	4-8(4)	4-19(4)	4-27(4)	5-4(5)	5-9	5-15	5-18
6	4-6(4)	4-7(4)	4-12(4)	4-16(4)	4-22(4)	5-12(5)	5-20(5)	5-22	5-24	5-26
7		4-13(5)	<u>1/</u>	4-21(4)	4-28(4)	5-14(5)	5-21(5)	5-23	5-25	5-27
8		5-5(4)	<u>1/</u>	<u>1/</u>	5-17(4)	<u>2/</u>				
9		5-30(4)	<u>1/</u>	<u>1/</u>	6-7(4)	<u>2/</u>				

Appendix Table 16 - Continued

Seeding Date	10.1	10.2	10.3	10.4	10.5	10.5.1	10.5.2	10.5.3	U	I	II	III	IV
Florence X Aurore													
1	5-2	5-4	5-5	5-6	5-9	5-6	5-8	5-11	5-17	5-23	5-30	6-10	6-17
2	5-2	5-4	5-5	5-6	5-9	5-6	5-9	5-11	5-17	5-23	5-30	6-15	6-20
3	5-3	5-5	5-6	5-7	5-9	5-6	5-9	5-11	5-17	5-23	5-31	6-15	6-20
4	5-7	5-9	5-10	5-11	5-13	5-11	5-15	5-18	5-24	5-31	6-4	6-13	6-20
5	5-13	5-14	5-15	5-16	5-18	5-15	5-17	5-20	5-26	5-31	6-7	6-16	6-21
6	5-16	5-17	5-18	5-19	5-21	5-18	5-20	5-22	5-30	6-4	6-6	6-17	6-21
7	5-19	5-21	5-22	5-23	5-25	5-22	5-24	5-27	6-5	6-8	6-11	6-20	6-24
8	6-3	6-5	6-6	6-7	6-10	6-6	6-7	6-10	6-15	6-20	6-23	7-2	<u>2/</u>
9	6-29	<u>2/</u>											
Mara													
1	4-28	4-30	5-2	5-4	5-6	4-30	5-3	5-8	5-14	5-17	5-20	6-10	6-13
2	5-1	5-3	5-6	5-7	5-9	5-6	5-9	5-11	5-17	5-20	5-25	6-8	6-13
3	5-6	5-8	5-9	5-10	5-12	5-9	5-11	5-13	5-19	5-24	5-31	6-12	6-16
4	5-10	5-12	5-13	5-14	5-16	5-13	5-16	5-19	5-26	6-2	6-6	6-14	6-20
5	5-19	5-20	5-21	5-22	5-25	5-21	5-23	5-26	6-2	6-6	6-12	6-19	6-25
6	5-21	5-23	5-24	5-25	5-27	5-23	5-25	5-27	6-5	6-12	6-15	6-21	6-25
7	5-28	5-30	6-1	6-3	6-6	6-1	6-4	6-7	6-11	6-14	6-18	6-24	6-29
8	6-15	6-18	6-21	6-24	6-30	6-18	6-22	6-30	<u>2/</u>				
9													
Autonomia B													
1	4-24	4-27	4-29	4-30	5-2	4-28	4-30	5-3	5-9	5-16	5-19	6-10	6-15
2	5-1	5-3	5-5	5-7	5-10	5-5	5-9	5-12	5-19	5-24	5-28	6-10	6-18
3	5-7	5-9	5-10	5-11	5-13	5-10	5-12	5-14	5-20	5-25	6-4	6-13	6-20
4	5-12	5-14	5-15	5-16	5-18	5-15	5-18	5-21	5-28	6-2	6-6	6-14	6-20
5	5-21	5-24	5-25	5-27	5-29	5-24	5-26	5-29	6-6	6-11	6-15	6-21	6-25
6	5-28	5-31	6-2	6-4	6-6	6-1	6-4	6-6	6-11	6-14	6-18	6-24	7-1
7	5-28	6-6	6-8	6-9	6-11	6-6	6-8	6-11	6-16	6-20	6-24	6-29	7-3
8													
9													

Appendix Table 16 - Continued

Seeding Date	1	2	3	4	5	6	7	8	9	10
	Peko									
1	11-30(4)	12-10(4)	2-1(4)	2-26(4)	3-4(4)	4-2(5)	4-16(5)	4-30	5-8	5-13
2	2-11(4)	2-12(4)	3-5(4)	3-19(4)	3-28(4)	4-6(5)	4-24(5)	5-4	5-12	5-18
3	3-7(4)	3-8(4)	3-13(4)	3-18(4)	4-2(4)	4-21(4)	4-29(5)	5-10	5-18	5-25
4	3-13(4)	3-14(4)	3-26(4)	4-8(4)	4-15(4)	4-25(4)	5-2(4)	5-13	5-20	5-27
5	3-27(4)	3-28(4)	4-1(4)	4-6(4)	4-17(4)	5-1(4)	5-10(4)	5-18	5-24	5-30
6	4-3(4)	4-4(4)	4-9(4)	4-14(4)	4-20(4)	5-10(5)	5-16(5)	5-20	5-24	5-31
7		4-13(4)	<u>1/</u>	4-22(4)	4-28(4)	5-18(5)	5-25(5)	5-28	6-5	6-11
8		5-4(4)	<u>1/</u>	<u>1/</u>	5-14(4)	5-30(5)	6-6(5)	6-12	6-16	6-20
9		5-28(3)	<u>1/</u>	<u>1/</u>	6-7(4)	<u>2/</u>				
	Heine 13161									
1	12-10(3)	12-11(3)	2-1(3)	2-28(3)	3-6(3)	4-2(5)	4-14(5)	4-26	5-6	5-11
2	3-9(3)	3-10(3)	3-5(3)	3-20(3)	3-30(4)	4-10(5)	4-18(5)	5-1	5-9	5-14
3	3-11(4)	3-12(4)	3-15(4)	3-20(4)	4-2(4)	4-19(5)	4-24(5)	5-7	5-14	5-20
4	3-17(4)	3-18(4)	3-28(4)	4-6(4)	4-13(4)	4-20(5)	4-25(5)	5-10	5-15	5-20
5	3-26(4)	3-27(4)	4-1(4)	4-6(4)	4-17(4)	5-1(4)	5-10(5)	5-17	5-21	5-24
6	4-4(4)	4-5(4)	4-10(4)	4-15(4)	4-21(4)	4-29(4)	5-7(4)	5-17	5-21	5-25
7		4-11(4)	<u>1/</u>	4-21(4)	4-28(4)	5-8(5)	5-15(5)	5-20	5-26	6-1
8		5-4(4)	<u>1/</u>	<u>1/</u>	5-15(5)	5-24(4)	5-29(5)	5-31	6-6	6-12
9		5-28(5)			6-7(4)	6-20(5)	6-24(5)	6-25	<u>2/</u>	
	Blanka									
1	12-3(3)	12-4(3)	2-1(4)	3-1(4)	3-9(4)	4-2(5)	4-14(5)	4-26	5-6	5-14
2	2-8(4)	2-9(4)	3-5(4)	3-20(4)	4-1(4)	4-15(5)	4-28(4)	5-6	5-12	5-20
3	3-1(4)	3-2(4)	3-12(4)	3-20(4)	4-2(4)	4-22(4)	4-29(5)	5-9	5-15	5-21
4	3-11(3)	3-12(3)	3-26(4)	4-10(4)	4-17(4)	4-26(5)	5-3(5)	5-12	5-18	5-24
5	3-26(4)	3-27(4)	4-1(4)	4-6(4)	4-17(4)	5-6(4)	5-14(5)	5-19	5-26	5-31
6	4-4(4)	4-5(4)	4-10(4)	4-16(4)	4-22(4)	5-12(5)	5-19(5)	5-24	5-29	6-4
7		4-8(4)	<u>1/</u>	4-19(4)	4-28(4)	5-16(5)	5-24(5)	5-27	6-1	6-10
8		5-3(4)	<u>1/</u>	5-12(5)	5-17(4)	6-10(5)	6-14(5)	6-18	6-21	6-23
9		5-30(4)	<u>2/</u>							



Appendix Table 16 - Continued

Seeding Date	10.1	10.2	10.3	10.4	10.5	10.5.1	10.5.2	10.5.3	U	I	II	III	IV
	Peko												
1	5-19	5-21	5-22	5-23	5-25	5-21	5-24	5-27	6-4	6-10	6-14	6-19	6-26
2	5-21	5-24	5-25	5-27	5-31	5-25	5-28	6-1	6-7	6-10	6-15	6-30	7-4
3	5-29	6-1	6-2	6-3	6-5	6-1	6-4	6-6	6-12	6-14	6-17	6-27	7-1
4	5-30	6-1	6-2	6-4	6-7	6-2	6-4	6-7	6-12	6-15	6-20	6-27	7-2
5	6-7	6-8	6-9	6-10	6-12	6-8	6-10	6-12	6-16	6-20	6-25	<u>2/</u>	
6	6-11	6-13	6-14	6-15	6-20	6-14	6-18	6-21	6-23	6-25	6-30	<u>2/</u>	<u>2/</u>
7	6-14	6-17	6-20	6-27	7-2	6-17	6-24	7-2	<u>2/</u>				
8	6-25	6-29	7-2	<u>2/</u>									
9													
	Heine 13161												
1	5-13	5-16	5-17	5-18	5-21	5-19	5-21	5-24	5-30	6-5	6-10	6-17	6-24
2	5-18	5-20	5-22	5-24	5-27	5-22	5-25	5-28	6-5	6-9	6-14	6-19	6-26
3	5-23	5-25	5-27	5-28	5-30	5-28	5-31	6-2	6-9	6-12	6-15	<u>3/</u>	
4	5-23	5-25	5-26	5-27	5-29	5-25	5-27	5-30	6-7	6-12	6-16	6-26	7-1
5	5-28	5-31	6-2	6-5	6-6	6-3	6-5	6-7	6-12	6-18	6-23	6-27	7-1
6	5-31	6-4	6-6	6-7	6-11	6-5	6-7	6-11	6-14	6-18	6-22	6-26	7-1
7	6-6	6-7	6-8	6-9	6-12	6-7	6-9	6-12	6-16	6-20	6-25	<u>2/</u>	
8	6-15	6-18	6-21	6-24	6-30	6-18	6-22	6-30	<u>2/</u>				
9													
	Blanka												
1	5-18	5-20	5-21	5-22	5-24	5-21	5-23	5-26	6-4	6-8	6-12	<u>3/</u>	
2	5-23	5-25	5-26	5-27	5-31	5-25	5-28	6-1	6-7	6-12	6-15	6-22	6-27
3	5-29	6-1	6-2	6-4	6-8	6-1	6-4	6-8	6-14	6-17	6-20	<u>3/</u>	
4	5-30	6-2	6-4	6-6	6-8	6-3	6-6	6-8	6-13	6-17	6-24	<u>3/</u>	
5	6-10	6-11	6-12	6-14	<u>2/</u>	6-11	6-13	6-15	6-18	6-21	6-25	<u>2/</u>	
6	6-11	6-13	6-15	6-18	<u>2/</u>	6-14	6-18	6-21	6-24	6-27	<u>2/</u>		
7	6-14	6-16	6-20	<u>2/</u>		6-16	6-20	<u>2/</u>					
8	6-25	7-2	<u>2/</u>										
9													

Appendix Table 16 - Continued

Seeding Date	1	2	3	4	5	6	7	8	9	10
	Klein Aniv.									
1	11-26(4)	11-27(4)	2-1(4)	2-25(4)	3-4(4)	3-20(4)	3-30(4)	4-17	4-27	5-3
2	2-8(4)	2-9(4)	3-5(4)	3-19(4)	3-29(4)	4-9(4)	4-17(5)	4-24	4-29	5-7
3	3-1(4)	3-2(4)	3-12(4)	3-22(4)	4-2(4)	4-15(4)	4-24(4)	5-2	5-7	5-10
4	3-13(4)	3-14(4)	3-26(4)	4-8(4)	4-13(4)	4-20(4)	4-26(4)	5-5	5-10	5-14
5	3-26(4)	3-27(4)	4-3(4)	4-8(4)	4-19(4)	4-28(4)	4-26(4)	5-8	5-16	5-23
6	4-7(4)	4-8(4)	4-13(4)	4-18(4)	4-24(4)	5-11(5)	5-16(5)	5-20	5-23	5-27
7		4-8(4)	<u>1/</u>	4-19(4)	4-28(4)	5-8(4)	5-16(5)	5-21	5-24	5-27
8		5-5(4)	<u>1/</u>	5-12(4)	5-17(4)	6-8(5)	6-11(5)	6-12	6-14	6-15
9		5-28(3)	<u>2/</u>							
	Novi Sad									
1	12-5(3)	12-6(3)	2-1(4)	3-1(4)	3-6(4)	3-24(4)	3-30(4)	4-15	4-27	5-3
2	2-11(4)	2-12(4)	3-5(4)	3-20(4)	3-29(4)	4-6(4)	4-14(5)	4-23	4-30	5-8
3	2-26(4)	2-27(4)	3-12(4)	3-20(4)	4-2(4)	4-15(4)	4-24(5)	5-2	5-8	5-13
4	3-11(3)	3-12(3)	3-26(4)	4-10(4)	4-18(4)	4-23(4)	4-29(5)	5-9	5-15	5-21
5	3-29(4)	3-30(4)	4-3(4)	4-10(4)	4-22(4)	5-15(4)	5-23(5)	5-27	6-7	6-12
6	4-3(4)	4-4(4)	4-11(4)	4-19(4)	4-28(4)	5-29(5)	<u>2/</u>			
7		4-8(4)	<u>1/</u>	4-20(4)	4-30(4)	5-31(5)				
8		5-4(4)	<u>1/</u>	5-12(4)	5-17(4)	<u>2/</u>				
9		5-27(3)	<u>2/</u>							
	Bersee									
1	11-30(3)	12-1(3)	2-1(4)	3-1(5)	3-19(4)	4-1(4)	4-16(5)	4-26	5-6	5-14
2	2-18(4)	2-19(4)	3-5(4)	3-27(4)	4-5(4)	4-23(4)	4-29(4)	5-9	5-13	5-18
3	3-3(4)	3-4(4)	3-12(4)	3-20(4)	4-6(4)	4-28(4)	5-2(5)	5-11	5-17	5-23
4	3-17(4)	3-19(4)	3-28(5)	4-13(5)	4-20(4)	4-27(4)	5-3(5)	5-15	5-21	5-27
5	3-27(4)	3-27(4)	4-3(4)	4-10(4)	4-22(4)	5-8(5)	5-15(5)	5-24	6-4	6-8
6	4-4(4)	4-5(4)	4-10(4)	4-16(4)	4-22(4)	5-20(5)	5-25(5)	5-30	6-7	6-12
7		4-11(4)	<u>1/</u>	4-20(4)	4-30(4)	5-26(5)	6-4(5)	6-12	6-14	6-20
8		5-4(4)	<u>1/</u>	5-12(4)	5-17(5)	6-24(5)	6-30(5)	<u>2/</u>		
9		5-30(4)	<u>2/</u>							

Appendix Table 16. - Continued

Seeding Date	10.1	10.2	10.3	10.4	10.5	10.5.1	10.5.2	10.5.3	U	I	II	III	IV
	Klein Aniv.												
1	5-7	5-9	5-10	5-11	5-13	5-10	5-13	5-15	5-19	5-27	6-5	6-12	6-16
2	5-12	5-14	5-15	5-16	5-18	5-14	5-18	5-22	5-27	6-4	6-7	6-14	6-20
3	5-14	5-15	5-16	5-17	5-19	5-17	5-19	5-23	5-29	6-5	6-8	6-17	6-21
4	5-18	5-20	5-21	5-22	5-24	5-21	5-23	5-25	5-31	6-4	6-8	6-19	6-26
5	5-26	5-27	5-28	5-29	5-31	5-27	5-29	6-1	6-7	6-14	6-18	6-24	6-30
6	5-30	6-1	6-2	6-4	6-6	6-2	6-5	6-6	6-12	6-17	6-21	6-27	7-2
7	6-1	6-3	6-6	6-7	6-9	6-4	6-6	6-9	6-13	6-18	6-23		
8	6-20	6-23	6-25	6-30	<u>2/</u>	6-23	6-26	<u>2/</u>					
9													
	Novi Sad												
1	5-8	5-10	5-11	5-12	5-14	5-12	5-14	5-16	5-20	5-29	6-5	6-12	6-16
2	5-14	5-16	5-17	5-18	5-20	5-16	5-19	5-22	5-28	6-4	6-7	6-16	6-24
3	5-18	5-20	5-21	5-22	5-24	5-20	5-22	5-25	6-3	6-7	6-10	6-17	6-21
4	5-24	5-26	5-27	5-28	5-31	5-27	5-28	6-1	6-6	6-9	6-13	6-24	6-29
5	6-28	<u>2/</u>											
6													
7													
8													
9													
	Bersee												
1	5-19	5-21	5-22	5-23	5-25	5-22	5-24	5-27	6-5	6-10	6-14	6-20	6-25
2	5-24	5-27	5-28	5-29	5-31	5-28	5-30	6-2	6-8	6-10	6-17	<u>3/</u>	
3	5-29	6-1	6-2	6-4	6-7	6-1	6-4	6-7	6-12	6-16	6-20	<u>3/</u>	
4	5-30	6-3	6-5	6-6	6-8	6-3	6-6	6-8	6-13	6-16	6-20	<u>3/</u>	
5	6-14	6-18	6-22	6-25	6-29	6-17	6-20	6-29	7-1	<u>2/</u>			
6	6-20	6-22	6-25	6-29	7-2	6-23	6-27	7-2	<u>2/</u>				
7	6-25	6-29	7-2	<u>2/</u>									
8													
9													

Appendix Table 16 - Continued

Seeding Date	1	2	3	4	5	6	7	8	9	10
	Magdalena									
1	11-30(4)	12-1(4)	2-1(4)	3-4(4)	3-20(4)	4-1(4)	4-16(5)	4-25	4-30	5-8
2	2-9(3)	2-10(3)	3-5(4)	3-27(4)	4-5(4)	4-23(5)	4-28(4)	5-2	5-8	5-13
3	3-5(4)	3-6(4)	3-12(4)	3-24(4)	4-8(4)	4-24(5)	4-29(5)	5-9	5-14	5-20
4N	3-15(4)	3-16(4)	3-28(4)	4-8(4)	4-14(4)	4-24(5)	4-30(4)	5-10	5-14	5-20
4V	3-15(4)	3-16(4)	3-28(4)	4-8(4)	4-14(4)	4-24(5)	4-30(4)	5-10	5-14	5-20
5N	3-27(4)	3-28(4)	4-3(4)	4-10(4)	4-22(4)	5-8(4)	5-15(5)	5-20	5-27	5-31
5V	3-27(4)	3-28(4)	4-3(4)	4-10(4)	4-22(4)	5-8(4)	5-15(5)	5-20	5-26	5-30
6N	4-1(4)	4-2(4)	4-10(4)	4-18(4)	4-26(4)	5-24(5)	5-28(5)	5-31	6-5	6-14
6V		4-2(4)	4-10(4)	4-18(4)	4-26(4)	5-18(5)	5-24(5)	5-28	5-31	6-4
7N		4-6(4)	<u>1/</u>	4-24(4)	5-8(4)	<u>6-12(5)</u>	6-17(5)	6-20	6-22	6-24
7V		4-6(4)	<u>1/</u>	4-24(4)	5-8(4)	5-26(5)	5-31(5)	6-3	6-5	6-8
8		5-3(4)	<u>1/</u>	5-14(5)	<u>2/</u>					
9		5-28(4)	<u>2/</u>							
	Reichersburger Stamm 39									
1	12-4(3)	12-5(3)	2-1(4)	3-4(4)	3-20(4)	4-6(4)	4-19(5)	4-28	5-9	5-14
2	2-8(3)	2-9(3)	3-5(4)	3-29(4)	4-8(4)	4-23(4)	4-28(4)	5-9	5-13	5-17
3	3-1(4)	3-2(4)	3-25(4)	4-8(4)	4-20(5)	4-30(5)	5-5(5)	5-15	5-21	5-25
4	3-15(4)	3-16(4)	3-28(4)	4-17(4)	4-26(4)	5-2(4)	5-8(4)	5-19	5-26	5-30
5	3-28(4)	3-29(4)	4-5(4)	4-14(4)	4-30(5)	6-8(5)	6-21(5)	6-14	6-16	6-19
6	4-4(4)	4-5(4)	4-12(4)	4-19(4)	5-2(4)	6-15(5)	6-2(5)	6-24	6-28	7-2
7		4-11(4)	<u>1/</u>	4-24(4)	5-14(4)	<u>2/</u>				
8		4-30(4)	<u>1/</u>	5-15(4)	<u>2/</u>					
9		5-28(4)	<u>2/</u>							

Appendix Table 16 - Continued

Seeding Date	10.1	10.2	10.3	10.4	10.5	10.5.1	10.5.2	10.5.3	U	I	II	III	IV
	Magdalena												
1	5-10	5-12	5-14	5-16	5-19	5-15	5-17	5-21	5-25	5-31	6-10	6-15	6-20
2	5-19	5-21	5-22	5-23	5-25	5-22	5-24	5-26	6-2	6-7	6-11	6-15	<u>3/</u>
3	5-22	5-24	5-26	5-27	5-29	5-26	5-28	5-31	6-5	6-8	6-13	6-22	6-26
4N	5-24	5-26	5-27	5-29	5-31	5-27	5-29	6-1	6-7	6-12	6-15	<u>3/</u>	
4V	5-24	5-26	5-27	5-29	5-31	5-27	5-29	6-1	6-7	6-12	6-15	<u>3/</u>	
5N	6-11	6-13	6-14	6-15	<u>2/</u>	6-14	6-15	6-16	<u>2/</u>				
5V	6-4	6-6	6-7	6-8	6-11	6-6	6-7	6-11	6-15	6-20	<u>2/</u>		
6N	6-20	6-23	6-26		<u>2/</u>								
6V	6-11	6-12	6-16	6-20	<u>2/</u>	6-13	6-17	6-21	<u>2/</u>				
7N	6-25	<u>2/</u>											
7V	6-12	6-15	6-19	6-25	<u>2/</u>	6-16	6-20	<u>2/</u>					
8													
9													
	Reichersburger Stamm 39												
1	5-19	5-21	5-22	5-23	5-25	5-22	5-24	5-27	6-7	6-11	6-14	6-22	6-30
2	5-20	5-25	5-27	5-29	5-31	5-28	5-30	6-20	6-8	6-11	6-15	<u>3/</u>	
3	5-30	6-3	6-6	6-9	6-11	<del>6-4</del>	6-7	6-11	6-14	6-17	6-21	<u>3/</u>	
4	6-4	6-11	6-14	6-15	<u>3/</u>	6-12	6-15	6-17	<u>3/</u>				
5	6-25	<u>2/</u>											
6	<u>2/</u>												
7													
8													
9													

Appendix Table 16 - Continued

Seeding Date	1	2	3	4	5	6	7	8	9	10
	Austro-Bankut									
1	11-26(4)	11-27(4)	2-1(4)	3-1(4)	3-15(4)	3-26(4)	4-5(4)	4-16	4-28	5-3
2	2-8(3)	2-9(3)	3-5(4)	3-17(4)	3-26(4)	4-9(4)	4-17(5)	4-25	5-2	5-10
3	3-1(4)	3-2(4)	3-22(4)	3-30(4)	4-7(4)	4-14(4)	4-22(5)	5-2	5-9	5-14
4	3-11(3)	3-12(3)	3-26(5)	4-8(5)	4-15(5)	4-26(5)	5-1(5)	5-9	5-15	5-19
5	3-25(3)	3-26(3)	4-3(4)	4-10(4)	4-22(4)	5-8(4)	5-16(5)	5-26	6-3	6-15
6	4-4(4)	4-5(4)	4-11(4)	4-17(4)	4-23(4)	6-15(5)	6-21(5)	6-27	7-2	<u>2/</u>
7		4-8(4)	<u>1/</u>	4-20(4)	4-30(4)	<u>2/</u>				
8		4-30(4)	<u>1/</u>	5-12(4)	5-17(4)	<u>7-2(5)</u>	<u>2/</u>			
9		5-28(4)	<u>2/</u>							
	Etoile de Choisy									
1	11-30(4)	12-1(4)	2-1(4)	2-19(4)	2-27(4)	3-19(4)	3-26(5)	4-16	4-23	4-25
2	2-14(4)	2-15(4)	3-5(4)	3-14(4)	3-23(5)	4-5(4)	4-13(5)	4-21	4-25	4-30
3	3-7(4)	3-8(4)	3-13(4)	3-18(4)	3-28(4)	4-8(4)	4-13(5)	4-24	4-30	5-3
4	3-13(4)	3-14(4)	3-26(4)	4-6(4)	4-13(5)	4-24(5)	4-29(5)	5-3	5-6	5-9
5	3-26(3)	3-27(3)	4-3(4)	4-8(4)	4-19(4)	5-11(4)	5-18(5)	5-22	5-26	5-28
6	4-4(4)	4-5(4)	4-11(4)	4-16(4)	4-22(4)	5-24(4)	5-31(5)	6-4	6-6	6-8
7N		4-11(5)	<u>1/</u>	4-20(5)	4-28(5)	5-28(5)	6-8(5)	6-10	6-12	6-13
7V		4-11(5)	<u>1/</u>	4-20(5)	4-28(5)	5-28(5)	6-5(5)	6-8	6-10	6-11
8		4-30(4)	<u>1/</u>	5-10(4)	5-15(4)	<u>2/</u>				
9		5-28(4)	<u>2/</u>							
	Derenburger Silber									
1	11-30(3)	12-1(3)	2-1(4)	3-4(4)	3-20(4)	4-5(5)	4-22(5)	5-6	5-11	5-15
2	2-12(4)	2-13(4)	3-1(4)	3-30(4)	4-10(4)	4-25(4)	4-30(4)	5-10	5-20	5-24
3	3-1(4)	3-2(4)	3-25(4)	4-5(4)	4-16(4)	4-24(4)	5-1(5)	5-14	5-22	5-28
4	3-15(4)	3-16(4)	3-28(4)	4-12(4)	4-22(4)	5-6(5)	5-12(5)	5-20	5-27	5-31
5	3-29(3)	3-30(3)	4-5(4)	4-14(4)	4-30(4)	6-7(5)	6-11(5)	6-17	6-21	6-25
6	4-7(4)	4-8(4)	4-13(4)	4-19(4)	5-2(4)	<u>2/</u>				
7		4-9(4)	<u>1/</u>	4-24(4)	5-14(5)	<u>2/</u>				
8		5-1(4)	<u>1/</u>	5-15(4)	<u>2/</u>	<u>2/</u>				
9		5-28(4)	<u>2/</u>							

Appendix Table 16 - Continued

Seeding Date	10.1	10.2	10.3	10.4	10.5	10.5.1	10.5.2	10.5.3	U	I	II	III	IV
Austro-Bankut													
1	5-8	5-11	5-12	5-13	5-15	5-15	5-18	5-20	5-24	5-28	6-9	6-13	6-17
2	5-14	5-15	5-16	5-17	5-19	5-16	5-19	5-22	5-27	6-5	6-9	6-17	6-24
3	5-18	5-20	5-21	5-22	5-24	5-21	5-23	5-26	6-4	6-7	6-12	6-16	6-21
4	5-24	5-26	5-28		5-31	5-27	5-30	6-1	6-6	6-11	6-14	6-24	6-28
5	6-20	6-30	<u>2/</u>										
6													
7													
8													
9													
Etoile de Choisy													
1	4-27	4-28	4-29	4-30	5-2	4-29	5-2	5-6	5-14	5-18	5-21	6-12	6-16
2	5-3	5-5	5-6	5-7	5-10	5-5	5-10	5-13	5-18	5-21	5-27	6-12	6-20
3	5-7	5-9	5-10	5-11	5-13	5-10	5-13	5-16	5-20	5-29	6-4	6-12	6-18
4	5-12	5-14	5-15	5-16	5-18	5-15	5-18	5-20	5-27	6-4	6-7	6-15	6-20
5	5-30	6-4	6-7	6-9	6-11	6-7	6-9	6-11	6-14	6-18	6-23	6-28	7-2
6	6-12	6-14	6-18	6-20	6-27	6-15	6-18	6-27	<u>2/</u>				
7N	6-15	6-24	6-28	7-2	<u>2/</u>								
7V	6-12	6-20	6-25	6-30	<u>2/</u>	6-22	6-26	<u>2/</u>					
8													
9													
Derenburger Silber													
1	5-22	5-25	5-27	5-28	5-30	5-26	5-28	5-31	6-10	6-12	6-16	<u>3/</u>	
2	5-30	6-2	6-4	6-6	6-8	6-2	6-5	6-8	6-10	6-15	<u>3/</u>		
3	6-3	6-6	6-8	6-10	<u>3/</u>	6-6	6-9	6-11	6-16	6-20	6-29	<u>3/</u>	
4	6-11	6-13	6-14	6-15	<u>3/</u>	6-13	6-15	6-17	<u>3/</u>				
5	7-1	<u>2/</u>											
6													
7													
8													
9													

Appendix Table 16 - Continued

Seeding Date	1	2	3	4	5	6	7	8	9	10
	Banco									
1	11-30(3)	12-1(3)	2-1(4)	3-6(4)	3-26(4)	4-9(4)	4-25(5)	5-10	5-16	5-21
2	2-12(4)	2-13(4)	3-5(4)	3-30(4)	4-9(4)	4-23(4)	4-28(4)	5-9	5-20	5-24
3	3-1(4)	3-2(4)	3-22(4)	4-7(4)	4-18(4)	5-7(4)	5-12(5)	5-19	5-25	5-29
4	3-11(3)	3-12(3)	3-26(4)	4-14(4)	4-24(4)	5-14(5)	5-25(5)	5-29	6-10	6-18
5	3-27(4)	3-28(4)	4-5(4)	4-10(4)	4-22(4)	<u>2/</u>				
6	4-7(3)	4-8(3)	4-13(4)	4-18(4)	4-30(4)	<u>2/</u>				
7		4-8(4)	<u>1/</u>	4-24(4)	5-8(5)	<u>2/</u>				
8		4-30(4)	<u>1/</u>	5-15(4)	<u>2/</u>					
9		5-28(4)	<u>2/</u>							
	Panter									
1	11-30(4)	12-1(4)	2-1(4)	3-2(4)	3-20(4)	4-6(4)	4-22(5)	5-3	5-9	5-14
2	2-13(4)	2-14(4)	3-5(4)	3-23(4)	3-30(4)	4-17(4)	4-25(5)	5-9	5-18	5-25
3	3-5(4)	3-6(4)	3-19(4)	4-5(4)	4-15(5)	4-26(5)	5-3(5)	5-14	5-21	5-28
4	3-9(3)	3-10(3)	3-24(4)	4-9(4)	4-20(4)	5-11(4)	5-16(5)	5-20	6-1	6-8
5N	3-26(4)	3-27(4)	4-3(4)	4-8(4)	4-19(4)	<u>2/</u>				
5V	3-26(4)	3-27(4)	4-3(4)	4-8(4)	4-19(4)	6-24(5)	6-28(5)	7-1	<u>2/</u>	
6	4-4(4)	4-5(4)	4-11(4)	4-16(4)	4-22(4)	<u>2/</u>	<u>2/</u>			
7	4-10(4)	4-11(4)	<u>1/</u>	4-21(4)	5-4(5)	<u>2/</u>	<u>2/</u>			
8	4-29(4)	4-30(4)	<u>1/</u>	5-12(4)	5-17(4)	<u>2/</u>				
9	5-27(4)	5-28(4)	<u>2/</u>							
	Yeoman									
1	12-4(4)	12-5(4)	2-1(4)	3-12(4)	3-28(4)	4-11(4)	4-25(5)	5-3	5-9	5-15
2	2-14(4)	2-15(4)	3-15(4)	4-4(4)	4-13(5)	4-24(4)	4-30(4)	5-10	5-17	5-24
3	3-7(5)	3-8(5)	3-22(5)	4-8(5)	4-19(5)	4-28(5)	5-6(5)	5-18	5-24	5-28
4	3-15(4)	3-16(4)	3-28(4)	4-15(4)	4-25(4)	5-14(5)	5-20(5)	5-24	5-28	6-9
5	3-29(4)	3-30(4)	4-7(4)	4-14(4)	5-12(4)	6-8(5)	6-12(5)	6-15	6-18	6-20
6	4-4(4)	4-5(4)	4-13(4)	4-20(4)	5-15(5)	6-12(5)	6-18(5)	6-21	6-24	6-28
7	4-7(4)	4-8(4)	4-16(4)	4-25(4)	5-14(4)	<u>2/</u>	<u>2/</u>			
8	5-3(4)	5-4(4)	<u>1/</u>	5-15(4)	<u>2/</u>					
9	5-27(4)	5-28(4)	<u>2/</u>							



Appendix Table 16 - Continued

Seeding Date	10.1	10.2	10.3	10.4	10.5	10.5.1	10.5.2	10.5.3	U	I	II	III	IV
	Banco												
1	5-24	5-27	5-29	<u>1/</u>	<u>3/</u>	5-27	6-1	6-5	<u>3/</u>	Completely sterile			
2	5-27	6-4	6-8	6-12	<u>3/</u>	6-4	6-7	6-12	6-15	6-20	6-25	<u>3/</u>	
3	6-10	6-14	6-16	6-18	<u>3/</u>	6-14	6-17	6-19	<u>3/</u>				
4	6-24	<u>3/</u>											
5													
6													
7													
8													
9													
	Panter												
1	5-22	5-26	5-27	5-28	5-30	5-26	5-28	5-31	6-7	6-12	6-16	6-25	6-30
2	5-29	5-30	6-1	6-3	6-5	6-2	6-5	6-7	6-11	6-15	6-24	7-1	7-5
3	6-3	6-5	6-6	6-7	6-10	6-6	6-8	6-10	6-16	6-19	6-24	6-29	7-4
4	6-12	6-14	6-15	6-17	<u>2/</u>	6-15	6-17	6-19	6-22	6-24	6-28	<u>2/</u>	
5N													
5V													
6													
7													
8													
9													
	Yeoman												
1	5-22	5-26	5-27	5-28	5-31	5-26	5-29	6-1	6-7	6-12	6-16	<u>3/</u>	
2	5-27	5-30	6-4	6-6	6-9	6-4	6-6	6-9	6-12	6-16	<u>3/</u>		
3	6-3	6-7	6-11	6-15	<u>3/</u>	6-8	6-11	6-13	<u>3/</u>				
4	6-12	6-15	6-19	6-23	<u>2/</u>	6-16	6-19	6-23	<u>2/</u>				
5	6-25	<u>2/</u>											
6	7-2	<u>2/</u>											
7													
8													
9													

Appendix Table 16 - Continued

Seeding Date	1	2	3	4	5	6	7	8	9	10
	Probus									
1	11-30(4)	12-1(4)	2-1(4)	3-1(4)	3-19(4)	4-8(5)	4-22(5)	5-1	5-6	5-14
2	2-18(4)	2-19(4)	3-5(5)	3-24(5)	3-30(5)	4-18(4)	4-25(4)	5-7	5-11	5-15
3	3-9(4)	3-10(4)	3-17(4)	3-27(4)	4-6(4)	4-19(5)	4-30(5)	5-9	5-15	5-21
4	3-15(4)	3-16(4)	3-26(4)	4-11(4)	4-20(4)	5-1(4)	5-10(5)	5-18	5-23	5-28
5N	3-27(4)	3-28(4)	4-3(4)	4-10(4)	4-22(4)	6-9(5)	6-13(5)	6-17	6-20	6-22
5V	3-27(4)	3-28(4)	4-3(4)	4-10(4)	4-22(4)	6-9(5)	6-13(5)	6-18	6-24	7-1
6	4-5(4)	4-6(4)	4-12(4)	4-17(4)	4-24(4)	<u>2/</u>				
7	4-10(4)	4-11(4)	<u>1/</u>	4-22(4)	4-30(4)	<u>2/</u>				
8	5-3(4)	5-4(4)	<u>1/</u>	5-10(4)	4-16(4)	<u>2/</u>				
9	5-27(4)	5-28(4)	<u>2/</u>							
	Eroice II									
1	12-4(4)	12-5(4)	2-1(4)	3-4(4)	3-23(4)	4-10(5)	4-23(5)	5-8	5-18	5-23
2	2-16(4)	2-17(4)	3-5(4)	3-27(4)	4-6(4)	4-24(4)	5-1(5)	5-13	5-20	5-26
3	3-7(4)	3-8(4)	3-19(4)	4-4(4)	4-16(4)	4-26(4)	5-3(5)	5-12	5-25	5-29
4	3-15(4)	3-16(4)	3-26(4)	4-12(4)	4-25(4)	5-14(5)	5-20(5)	5-24	6-7	6-12
5N	3-27(4)	3-28(4)	4-3(4)	4-10(4)	4-22(4)	6-21(5)	6-25(5)	<u>2/</u>		
5V	3-27(4)	3-28(4)	4-3(4)	4-10(4)	4-22(4)	6-11(5)	6-17(5)	6-21	6-25	7-1
6	4-7(4)	4-8(4)	4-13(4)	4-18(4)	4-25(4)	<u>2/</u>				
7	4-10(4)	4-11(4)	4-16(4)	4-22(4)	5-2(4)	<u>2/</u>				
8	5-3(4)	5-4(4)	<u>1/</u>	5-10(4)	4-16(5)	<u>2/</u>				
9	5-27(4)	5-28(4)	<u>2/</u>							
	Varma									
1	12-4(4)	12-5(4)	2-1(4)	3-5(5)	3-23(5)	4-8(5)	4-22(5)	5-2	5-9	5-15
2	2-16(3)	2-17(3)	3-5(4)	3-27(4)	4-6(4)	4-24(4)	4-28(5)	5-10	5-19	5-25
3	3-9(4)	3-10(4)	3-20(4)	4-4(4)	4-15(4)	4-26(4)	5-3(5)	5-10	5-20	5-25
4N	3-15(4)	3-16(4)	3-26(4)	4-12(4)	4-24(4)	5-18(5)	5-24(5)	5-28	6-4	6-10
4V	3-15(4)	3-16(4)	3-26(4)	4-12(4)	4-24(4)	5-18(5)	5-24(5)	5-28	6-5	6-9
5N	3-28(4)	3-29(4)	4-3(4)	4-9(4)	4-21(4)	7-1(5)	<u>2/</u>			
5V	3-28(4)	3-29(4)	4-3(4)	4-9(4)	4-21(4)	6-15(5)	6-20(5)	6-24	6-28	7-2
6	4-5(4)	4-6(4)	4-12(4)	4-17(4)	4-24(4)	<u>2/</u>				
7	4-8(4)	4-9(4)	4-15(4)	4-21(4)	4-30(4)	<u>2/</u>				
8	5-3(4)	5-4(4)	<u>1/</u>	5-10(4)	5-16(5)	<u>2/</u>				
9	5-27(4)	5-28(4)	<u>2/</u>							

Appendix Table 16 - Continued

Seeding Date	10.1	10.2	10.3	10.4	10.5	10.5.1	10.5.2	10.5.3	U	I	II	III	IV
	Probus												
1	5-19	5-21	5-22	5-23	5-25	5-22	5-24	5-26	6-4	6-9	6-12	6-18	6-26
2	5-20	5-24	5-25	5-26	5-27	5-25	5-27	5-29	6-5	6-10	6-14	<u>2/</u>	
3	5-24	5-27	5-28	5-29	5-31	5-28	5-30	6-2	6-7	6-12	6-15	6-20	6-24
4	6-3	6-5	6-6	6-7	6-11	6-5	6-7	6-11	6-15	6-18	6-23	6-29	7-4
5N	6-25	<u>2/</u>											
5V	<u>2/</u>												
6													
7													
8													
9													
	Erocia II												
1	5-29	6-2	6-6	<u>3/</u>	<u>3/</u>	6-2	6-5	6-7	6-14	6-18	6-24	<u>3/</u>	
2	6-6	6-9	6-10	6-12	<u>3/</u>	6-9	6-11	6-13	6-16	6-19	6-24		
3	6-11	6-14	6-16	<u>3/</u>	<u>3/</u>	6-14	6-16	6-18	<u>3/</u>				
4	6-19	6-24	6-27	6-30	<u>2/</u>								
5N													
5V	<u>2/</u>												
6													
7													
8													
9													
	Varma												
1	5-22	5-25	5-26	5-27	5-30	5-28	5-31	6-2	6-7	6-14	6-19	<u>3/</u>	
2	5-27	5-31	6-5	6-7	<u>3/</u>	6-5	6-8	6-10	6-15	6-18	<u>3/</u>		
3	6-4	6-7	6-11	6-15	<u>3/</u>	6-8	6-11	6-16	<u>3/</u>				
4N	6-20	6-26	7-1	<u>2/</u>									
4V	6-12	6-17	6-25	<u>2/</u>									
5N													
5V	<u>2/</u>												
6													
7													
8													
9													

Appendix Table 16 - Continued

Seeding Date	1	2	3	4	5	6	7	8	9	10
	Concho									
1	11-30(3)	12-1(3)	2-1(4)	3-4(4)	3-21(4)	3-28(4)	4-2(4)	4-15	4-26	4-30
2	2-11(3)	2-12(3)	3-5(4)	3-22(4)	3-30(4)	4-10(4)	4-17(5)	4-25	4-28	5-2
3	3-9(4)	3-10(4)	3-19(4)	4-1(4)	4-9(4)	4-17(4)	4-24(4)	5-1	5-6	5-10
4	3-15(4)	3-16(4)	3-26(4)	4-11(4)	4-20(4)	4-25(4)	4-30(4)	5-6	5-14	5-17
5N	3-26(4)	3-27(4)	4-3(4)	4-11(4)	4-22(4)	5-19(5)	5-25(5)	5-29	6-4	6-6
5V	3-27(4)	3-28(4)	4-3(4)	4-11(4)	4-22(4)	5-19(5)	5-25(5)	5-27	6-2	6-6
6N	4-5(4)	4-6(4)	4-12(4)	4-19(4)	4-25(4)	6-5(5)	6-11(5)	6-13	6-14	6-15
6V	4-5(4)	4-6(4)	4-12(4)	4-18(4)	4-25(4)	6-5(5)	6-11(5)	6-13	6-14	6-15
7N	4-14(4)	4-15(4)	4-20(4)	4-28(4)	5-12(4)	6-13(5)	6-18(5)	6-23	6-28	7-2
7V	4-14(4)	4-15(4)	4-20(4)	4-28(4)	5-12(4)	6-10(5)	6-14(5)	6-15	6-18	6-22
8	5-3(4)	5-4(4)	<u>1/</u>	5-15(4)	<u>2/</u>					
9	5-27(4)	5-28(4)	<u>2/</u>							
	TAP									
1	12-8(3)	12-9(3)	2-1(3)	3-6(3)	3-23(4)	4-8(4)	4-14(5)	4-21	4-28	5-2
2	2-13(3)	2-14(3)	3-5(4)	3-25(4)	4-3(4)	4-13(4)	4-20(4)	4-29	5-4	5-10
3	3-9(4)	3-10(4)	3-21(4)	4-4(4)	4-13(4)	4-24(4)	4-30(5)	5-7	5-11	5-15
4	3-15(3)	3-16(3)	3-26(4)	4-12(4)	4-21(4)	4-28(4)	5-3(4)	5-9	5-14	5-20
5N	3-29(3)	3-30(3)	4-3(4)	4-9(4)	4-21(4)	5-9(4)	5-18(5)	5-24	5-27	5-30
5V	3-29(3)	3-30(3)	4-3(4)	4-9(4)	4-21(4)	5-9(4)	5-16(5)	5-21	5-24	5-27
6	4-5(4)	4-6(4)	4-11(4)	4-17(4)	4-24(4)	5-18(5)	5-24(5)	5-27	5-30	6-4
7	4-14(4)	4-15(4)	<u>1/</u>	4-24(4)	5-2(4)	5-24(5)	5-28(5)	5-31	6-2	6-5
8	5-3(4)	5-4(4)	<u>1/</u>	5-12(4)	<u>2/</u>					
9	5-27(3)	5-28(3)	<u>2/</u>							

Appendix Table 16 - Continued

Seeding Date	10.1	10.2	10.3	10.4	10.5	10.5.1	10.5.2	10.5.3	U	I	II	III	IV
	Concho												
1	5-4	5-6	5-7	5-8	5-11	5-9	5-12	5-14	5-20	5-26	5-30	6-10	6-15
2	5-8	5-10	5-11	5-12	5-14	5-15	5-18	5-20	5-27	6-2	6-7	6-14	6-20
3	5-14	5-16	5-17	5-18	5-21	5-17	5-20	5-23	5-28	6-5	6-8	6-15	6-20
4	5-20	5-23	5-25	5-26	5-27	5-25	5-26	5-27	6-5	6-8	6-12	6-21	6-25
5N	6-11	6-14	6-18	6-20	6-23	6-14	6-19	6-24	6-28	7-1	<u>2/</u>		
5V	6-8	6-12	6-14	6-19	6-22	6-13	6-18	6-23	6-28	7-1	<u>2/</u>		
6N	6-18	6-25	6-29	7-3	<u>2/</u>								
6V	6-15	6-20	6-25	6-30	<u>2/</u>								
7N	<u>2/</u>												
7V	6-29	<u>2/</u>											
8													
9													
	TAP												
1	5-8	5-10	5-11	5-12	5-14	5-12	5-15	5-18	5-25	5-30	6-7	6-15	6-20
2	5-13	5-15	5-16	5-17	5-19	5-16	5-20	5-23	5-29	6-4	6-7	6-17	6-24
3	5-19	5-21	5-22	5-23	5-25	5-24	5-26	5-28	6-4	6-6	6-12	6-20	6-26
4	5-24	5-27	5-28	5-29	5-31	5-27	5-29	6-1	6-7	6-14	6-18	6-25	6-30
5N	6-3	6-5	6-7	6-9	6-11	6-6	6-8	6-11	6-15	6-19	6-24	6-30	7-4
5V	5-30	6-1	6-3	6-6	6-8	6-3	6-6	6-8	6-13	6-17	6-20	6-27	7-2
6	6-6	6-8	6-9	6-10	6-12	6-8	6-10	6-12	6-17	6-20	<u>2/</u>		
7	6-10	6-12	6-13	6-14	6-18	6-13	6-16	6-19	6-22	6-25	<u>2/</u>		
8													
9													

Appendix Table 16 - Continued

Seeding Date	1	2	3	4	5	6	7	8	9	10
Comanche										
1	11-30(3)	12-1(3)	2-1(4)	3-4(4)	3-19(4)	3-27(4)	4-2(4)	4-15	4-26	4-30
2	2-12(4)	2-13(4)	3-5(4)	3-22(4)	3-30(4)	4-10(4)	4-17(5)	4-25	4-28	5-2
3	3-7(4)	3-8(4)	3-19(4)	4-1(4)	4-9(4)	4-17(4)	4-24(4)	5-1	5-6	5-10
4	3-15(4)	3-16(4)	3-26(4)	4-11(4)	4-20(4)	4-25(4)	4-30(4)	5-6	5-14	5-17
5N	3-26(4)	3-27(4)	4-3(4)	4-11(4)	4-24(4)	5-19(5)	5-25(5)	5-29	6-2	6-9
5V	3-26(4)	3-27(4)	4-3(4)	4-11(4)	4-24(4)	5-19(5)	5-23(5)	5-27	5-29	5-31
6N	4-4(4)	4-5(4)	4-11(4)	4-18(4)	4-25(4)	6-5(5)	6-11(5)	6-12	6-14	6-18
6V	4-4(4)	4-5(4)	4-11(4)	4-18(4)	4-25(4)	6-5(5)	6-11(5)	6-12	6-14	6-18
7N	4-12(4)	4-13(4)	4-20(4)	4-28(4)	5-12(4)	<u>2/</u>	<u>2/</u>			
7V	4-12(4)	4-13(4)	4-20(4)	4-28(4)	5-10(4)	6-11(5)	6-15(5)	6-16	6-23	6-30
8	5-3(4)	5-4(4)	<u>1/</u>	5-13(4)	5-17(4)	<u>2/</u>				
9	5-27(4)	5-28(4)	<u>2/</u>							
Ponca										
1	11-30(3)	12-1(3)	2-1(4)	3-10(4)	3-23(4)	3-30(4)	4-6(4)	4-20	4-27	5-1
2	2-12(3)	2-13(3)	3-5(4)	3-25(4)	4-3(4)	4-10(4)	4-19(5)	4-29	5-4	5-9
3	3-7(4)	3-8(4)	3-21(4)	4-4(4)	4-12(4)	4-23(4)	4-30(5)	5-7	5-11	5-15
4	3-15(4)	3-16(4)	3-26(4)	4-12(4)	4-21(4)	4-28(4)	5-3(4)	5-9	5-14	5-20
5N	3-26(4)	3-27(4)	4-3(4)	4-11(4)	4-24(4)	5-24(5)	5-28(5)	6-4	6-11	6-13
5V	3-26(4)	3-27(4)	4-3(4)	4-11(4)	4-24(4)	5-24(5)	5-28(5)	5-30	6-2	6-9
6N	4-5(4)	4-6(4)	4-13(4)	4-19(4)	5-2(4)	6-17(5)	6-22(5)	6-25	6-28	6-30
6V	4-5(4)	4-6(4)	4-13(4)	4-19(4)	5-2(4)	5-28(5)	6-2(5)	6-5	6-8	6-12
7N	4-14(4)	4-15(4)	4-21(4)	4-28(4)	5-12(4)	<u>2/</u>				
7V	4-14(4)	4-15(4)	4-21(4)	4-28(4)	5-12(4)	6-11(5)	6-15(5)	6-16	6-23	6-28
8	5-3(4)	5-4(4)	<u>1/</u>	5-12(4)	<u>2/</u>					
9	5-27(4)	5-28(4)	<u>2/</u>							

Appendix Table 16 - Continued

Seeding Date	10.1	10.2	10.3	10.4	10.5	10.5.1	10.5.2	10.5.3	U	I	II	III	IV
	Gomanche												
1	5-5	5-7	5-8	5-9	5-11	5-10	5-13	5-15	5-20	5-26	5-30	6-10	6-15
2	5-8	5-10	5-11	5-12	5-15	5-15	5-18	5-20	5-27	6-2	6-7	6-14	6-20
3	5-15	5-17	5-18	5-19	5-22	5-19	5-21	5-24	5-28	6-5	6-8	6-15	6-20
4	5-20	5-23	5-25	5-26	5-27	5-25	5-26	5-27	6-5	6-8	6-12	6-21	6-25
5N	6-12	6-15	6-19	6-21	6-24	6-15	6-20	6-25	6-28	7-1	<u>2/</u>		
5V	6-7	6-11	6-13	6-15	6-20	6-12	6-17	6-21	6-24	6-26	7-1	<u>2/</u>	
6N	6-20	6-25	6-30	<u>2/</u>									
6V	6-20	6-25	6-30	<u>2/</u>									
7N													
7V													
8													
9													
	Ponca												
1	5-5	5-7	5-8	5-9	5-11	5-9	5-12	5-14	5-20	5-26	5-30	6-11	6-16
2	5-12	5-14	5-15	5-16	5-18	5-21	5-24	5-26	5-31	6-4	6-8	6-16	6-23
3	5-19	5-21	5-22	5-23	5-25	5-22	5-24	5-27	6-4	6-6	6-12	6-17	6-22
4	5-22	5-25	5-26	5-27	5-29	5-26	5-27	5-29	6-6	6-11	6-15	6-23	6-29
5N	6-15	6-20	6-24	6-26	6-30	6-21	6-24	6-30	<u>2/</u>				
5V	6-11	6-12	6-14	6-17	6-20	6-13	6-18		6-21	6-27	7-1	<u>2/</u>	
6N	7-2	<u>2/</u>											
6V	6-15	6-19	6-22	6-25	<u>2/</u>	6-19	6-23	<u>2/</u>					
7N													
7V	7-1	<u>2/</u>											
8													
9													

Appendix Table 16 - Continued

Seeding Date	1	2	3	4	5	6	7	8	9	10
	Triumph									
1	11-30(4)	12-1(4)	2-1(4)	3-3(4)	3-19(4)	3-25(4)	3-30(4)	4-12	4-20	4-22
2	2-12(3)	2-13(3)	3-5(4)	3-17(4)	3-27(4)	4-7(5)	4-13(5)	4-20	4-24	4-29
3	3-5(4)	3-6(4)	3-17(4)	3-28(4)	4-6(4)	4-13(5)	4-21(5)	4-25	4-30	5-3
4N	3-15(4)	3-16(4)	3-26(4)	4-9(4)	4-18(4)	4-24(4)	4-28(4)	5-3	5-6	5-9
4V	3-15(4)	3-16(4)	3-26(4)	4-9(4)	4-18(4)	4-23(4)	4-27(4)	5-1	5-4	5-7
5N	3-26(4)	3-27(4)	4-3(4)	4-11(4)	4-24(4)	5-26(5)	6-4(5)	6-8	6-11	6-13
5V	3-26(4)	3-27(4)	4-3(4)	4-11(4)	4-24(4)	5-10(5)	5-14(4)	5-16	5-18	5-21
6N	4-4(4)	4-5(4)	4-12(4)	4-20(4)	5-2(4)	<u>2/</u>	<u>2/</u>			
6V	4-4(4)	4-5(4)	4-12(4)	4-20(4)	5-2(4)	5-24(5)	5-28(5)	5-30	6-2	6-4
7N	4-14(4)	4-15(4)	4-21(4)	4-28(4)	5-12(4)	<u>2/</u>	<u>2/</u>			
7V	4-14(4)	4-15(4)	4-21(4)	4-28(4)	5-12(4)	6-6(5)	6-10(5)	6-12	6-13	6-15
8	5-3(4)	5-4(4)	<u>1/</u>	5-12(4)	<u>2/</u>					
9	5-28(4)	5-29(4)	<u>2/</u>							



Appendix Table 16 - Concluded

Seeding Date	10.1	10.2	10.3	10.4	10.5	10.5.1	10.5.2	10.5.3	U	I	II	III	IV
						Triumph							
1	4-24	4-26	4-27	4-28	4-30	4-28	4-30	5-2	5-9	5-14	5-20	6-5	6-13
2	5-2	5-4	5-5	5-6	5-8	5-4	5-8	5-11	5-15	5-21	5-29	6-9	6-15
3	5-6	5-8	5-9	5-10	5-12	5-9	5-12	5-15	5-21	5-28	6-4	6-12	6-16
4N	5-12	5-14	5-15	5-16	5-18	5-15	5-19	5-22	5-27	6-6	6-12	6-19	6-25
4V	5-8	5-11	5-12	5-13	5-16	5-13	5-17	5-20	5-25	6-5	6-11	6-18	6-25
5N	6-15	6-20	6-28		<u>2/</u>								
5V	5-24	5-26	5-27	5-29	6-3	5-27	5-30	6-5	6-10	6-14	6-19	6-26	6-30
6N													
6V	6-5	6-12	6-20		<u>2/</u>	6-10		<u>2/</u>					
7N													
7V	6-20	7-2	<u>2/</u>										
8													
9													

- 1/ Stage not in evidence.  
2/ High temperatures prevented further development.  
3/ Plants damaged by hail and/or disease.

VITA

Lavoy I. Croy

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