ENVIRONMENTAL FACTORS DO NOT CHANGE FLAX FLOWERING PERIOD DURATION (*Linum ussitatisimum* L.)

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1. INTRODUCTION

Photoperiod and vernalization are important factors in emergence – flowering period in many crops (flax are long day plant and has vernalization requirements) (Sorlino, 1994; Sorlino and Trápani, 2000). But the flowering period hasn't the same information, especially in flax. Flax flowering period has not been characterised for current Argentine varieties. Moreover, the influences of different environmental factors on this period duration under climatic conditions of Argentine production were not established (Pascale et al., 1967/68; De Fina, 1939).

In Argentine, flax is sown in winter (June) (Acosta, 1987). In other countries spring sowing are done and crop flowering occurs under different environmental conditions (Dean Dybing et al., 1988; Hovland y Dean Dybing, 1973; Davidson y Yermanos, 1965). This paper wants to establish the photoperiodic and vernalization influence on flax flowering duration.

2. MATERIALS AND METHODS

25 sowings dates were carried out during two years at regular intervals with Areco, Salto and Rojas Argentine varieties, with and without vernalization treatment (18 days ± 2 in freezer at 4-5°C). The experiment took place in Buenos Aires, Argentine (34° 35' S, 58° 29' W, 25 m at sea level).

Design: Split plots (0.9 m x 4 m) with three replication, had three rows with vernalization treatment and three without treatment. Observations: Beginning and end of flowering were recorded. The flowering beginning was define like: 50% of the plants has one flower and the end was define like: 20% of the plants without flowers.

The period was established in thermal time (Base.temperature: 5,4°C).

3. RESULTS

The environmental conditions during the flowering periods were different (Figure 1).

When considering the earliest sowing, differences were seen ($P < 0.05$) among treatments of vernalization in the three varieties (Fig. 2). Vernalizated treatments, in these dates of rarely [1]early sowing, flowered before those without vernalization but with a lower initial rate in flower appearance.

There were not differences in period duration among treatments in the plants sown from May to September; plants without vernalization treatment were vernalizated at the field (Fig. 2).

Many of these sowings bloomed in September and beginning of October; has the mean photoperiod (beginning to end of flowering) varied between 13 hs and 15.5 hs.

Leaving aside the early sowings, the other ones, in thermal time, did not vary with the photoperiod (Figure 3, 4 and 5). This factor and vernalization did not change flowering response.

4.DISCUSSION

Only a few earliest sowing (three) has an apparent response to photoperiod and vernalization, but we need controlled conditions to be sure. It was a long day response (Major, 1980). The other 17 sowing dates could be represented in a model by a straight line (Figure 3, 4 and 5).

Perhaps, the especial conditions in emergence – flowering period determined the response observed in earliest sowing. Then, that response (see Figure 2) would not be due to photoperiodic or vernalization conditions affecting directly flowering period of the first three sowing dates.

In a wide range of sowing dates around June (May to November) the duration of the period only vary with the temperature.

If the Argentine varieties haven't variability on flowering period response with different photoperiod and vernalization treatments, then breeders couldn't use this characteristic in their programs of vegetable improvement.

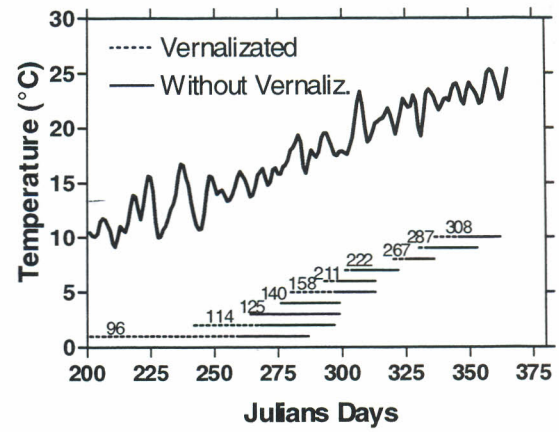

Figure 1: Five year-old averaged temperature smoothing with lag period of 5 days in Buenos Aires. Horizontal lines represent flowering periods of ten sowing dates between March and October (Example: Areco variety). Dotted line represents the advance caused by the vernalization treatment; full line is the total period without vernalization

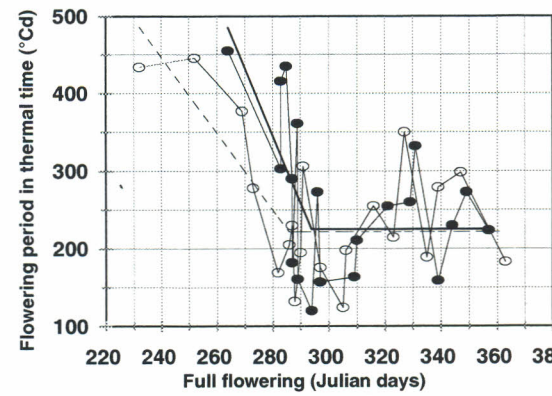

Figure 2: Flowering period in Thermal Time (°Cd) of Areco variety as a function of julian day of full flowering. The closed points represent treatments without vernalization (WV) and the open points, the vernalizated (V). First flowering flow is analysed. R^2 of vernalization treatment were 0.55 and without vernalization: 0.44.

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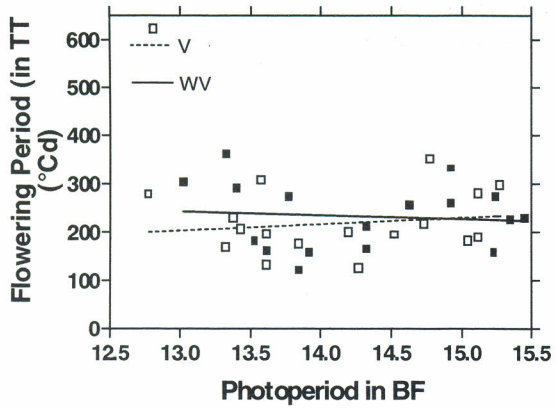

Figure 3: Flowering period in thermal time (BT: 5.4°C) as function of photoperiod in the beginning of flowering (BF). Variety Areco at 17 sowing dates in Buenos Aires, Argentine. Closed points: without vernalization, Open points: with vernalization. The regression lines are equal among it and they don't differ of the horizontal one (P>0.05).

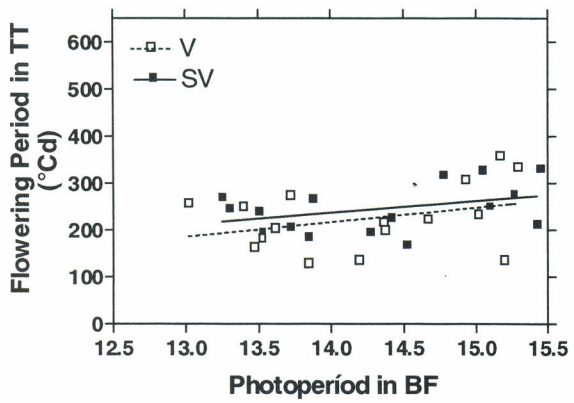

Figure 4: Idem Figure 3, Salto variety

5. CONCLUSION

Photoperiod and vernalization do not control the flowering period in common sowing dates and in a wide range of sowing dates around them .

The duration of the blooming period has a small variability as compared with the large variations in sowing dates (with different environmental conditions from emergence to flowering, Figure 1).

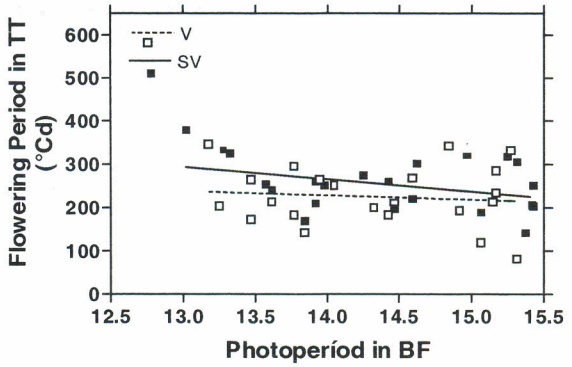

Figure 5: Idem Figure 3. Rojas variety

The flowering period observation is not an useful tool for flax yield improvement. High homogeneity exists among Argentine varieties in flowering period.

6. REFERENCES

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