Gesamtphenolgehalt von jungen, aber völlig entfalteten Laubblättern verschieden alter, unter Kurztag (KT; 8 h Sonnenlicht) bzw. Langtagbedingungen (LT; 8 h Sonnenlicht und 16 h Zusatzlicht) gehaltenen Lupinus-Pflanzen (Sorte „Gyulatanyai édes") nach SWAIN und HILLIS[3]) und gleichzeitig die Aktivität der IES-Oxydase nach STUTZ[1]) bestimmt. Es ist bekannt, daß gewisse Polyphenole die Aktivität der IES-Oxydase herabsetzen[1]),[4]),[5]) und daß ein Anstieg des Phenolspiegels ihre Aktivität vermindert[6]),[7]); weiterhin wird in der Literatur mitgeteilt, daß die Auxinoxydase-Aktivität von der Dauer des verabreichten Lichts (Photoperiode) abhängt[8]),[9]). Zum Vergleich wurde die IES-Oxydase-Aktivität von Blättern älterer Pflanzen nach einer Dialyse und Zugabe von 2,4-Dichlorphenol (DCP)[1]) gemessen. Die Ergebnisse zeigt die Tabelle.

Wie aus der Tabelle ersichtlich ist, erhöht sich der Gehalt an Phenolen in den Laubblättern mit zunehmendem Alter der Pflanzen, und nach Übertreten eines Grenzwertes hört die IES-Oxydation auf. Das Enzym wird in den älteren Pflanzen nicht abgebaut, denn die Blattextrakte weisen nach einer Dialyse und mit DCP bedeutende Auxinoxydase-Aktivitäten auf. Es ist also wahrscheinlich, daß die Erhöhung des Phenolgehaltes die Blockierung der IES-Oxydase in den Laubblättern älterer Lupinus-Pflanzen nach sich zieht.

Im Einklang mit Ergebnissen von DAWSON und WADA[10]) wurde von uns bei den Blättern von Lupinus albus auch noch erwiesen, daß die längeren Photoperioden die Phenolsynthese stimulieren. Der Unterschied zwischen dem Phenolgehalt der Blätter 14tägiger Kurztag- bzw. Langtagexemplaren verschwindet aber nach weiteren zwei Wochen. Man kann in diesem Zusammenhang annehmen, daß der Phenolgehalt der Blätter in der photoperiodisch bedingten Regulierung der Auxinoxydase-Tätigkeit von Lupinus albus[9]) eine gewisse Rolle spielt.

In den Blatthomogenisaten konnten wir mit den gewöhnlichen Substraten im Warburg-Apparat keine Polyphenoloxydase-Aktivität nachweisen.

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The Relationship Between Leaf Growth and Induction of Flowering in Long-day Plants (LDP)

The development of plants to flowering is very widely accompanied by an inhibition of leaf growth[1]), and a slight inhibition also occurs in some LDPs and short-day plants (SDPs) in inductive daylengths even though the plants be maintained in a vegetative state[2]). In *Chenopodium amaranticolor*, however, conditions leading to the initiation of "double ridges" also stimulate leaf growth[3]),[4]), and this stimulation is probably widespread in SDPs. It was therefore of interest to investigate the effect of such conditions on the LDPs *Spinacia oleracea* and *Trifolium repens*.

Seedlings of *Spinacia* were germinated in 8-hour photoperiods (SD) in a glasshouse at phototemperatures of $25 \pm 3°$ C. and nyctotemperatures of $20 \pm 3°$ C. Two weeks after germination, they were divided into 4 groups of 8 plants which received 0, 2, 4 or 6 days of continuous light (CL) and were then returned to SD. CL consisted of natural summer daylight supplemented at night by light at approximately 3,500 lux from "British General Electric" 1,000 watt mercury flourescent-coated lamps (type MBF/U). Measurements made 2 weeks after the start of CL show a pronounced stimulation of leaf growth by such treatment (Table 1). 6 days of CL induced the formation of flowers and concomitant stem elongation. No macroscopic flower primordia formed in response to the other treatments, but apices of plants exposed to 2 or 4 days' CL were seen from dissections to be more elongated than those of the controls.

Ramets of a single clone of *T. repens* were grown for 4 months in a glasshouse at a phototemperature of $21 \pm 2°$ C. and a nyctotemperature of $15 \pm 2°$ C. in the natural SDs of winter (from May to August). They were then divided into 4 groups, exposed to 0, 2, 4 or 6 days' CL, and returned to natural SDs. CL consisted of natural daylight supplemented at night by light at approximately 3,500 lux from 200 watt "Sieray" mercury vapour lamps ballasted with a tungsten filament. The youngest leaf with unfolded leaflets was marked on 18 equally vigorous runners in each group immediately before the start of CL. At this stage each runner possessed a total of 7 or 8 young leaves and leaf primordia beyond the marked leaf. All leaves which unfolded after CL began were measured 4 weeks later (Table 2).

Table 1. *Average lengths of selected leaf laminae (mm.) on the main stem of Spinacia. Leaves are numbered from the base of the stem upwards*

Treatment (days CL)	Leaf number				
	1	5	9	13	17
a)	41·5	28·0	2·2	—	—
0	46·4	60·1	34·9	13·3	—
2	44·3	59·4	41·0	18·1	—
4	42·2	57·6	41·6	28·9	6·4
6	45·2	60·4	41·3	37·0	24·0

a) Lamina lengths at the time CL started.

Table 2. *The response of Trifolium repens to various inductive treatments*

Treatment (days CL)	Node number									
	2	3	4	5	6	7	8	9	10	11
0[a])	19·3	19·3	19·9	18·9	18·2	17·4	13·8	4·4	0·4	—
2[a])	20·2	21·5	22·6	22·4	21·4	19·4	15·4	4·9	0·8	—
4[a])	20·8	22·3	24·4	24·6	23·7	22·1	17·1	9·2	2·5	—
6[a])	20·4	21·2	22·5	23·7	23·0	23·2	19·8	14·2	3·7	0·4
Sig. Diff. ($p = 0·05$)	—	—	2·6	2·4	2·6	2·9	3·2	6·2	—	—
0[b])	—	—	—	—	—	—	—	—	—	—
2[b])	—	—	—	—	—	—	—	12	5	—
4[b])	—	—	—	—	—	—	1	15	3	—
6[b])	—	—	—	—	—	—	5	16	3	—

a) Average lengths (mm.) of the middle leaflet of all leaves with leaflets longer than 3 mm. Nodes are numbered acropetally, starting at that bearing the youngest unfolded leaf when treatment began. b) Total number of inflorescences at each node (18 runners per treatment).

Inflorescence primordia were initiated in the axils of the first leaf primordia formed after the start of CL (i.e. in the region of the 8th. to 10th. nodes), but after the return to SDs the apical meristem rapidly reverted to a vegetative state. 2 days' CL stimulated the growth of young leaves and leaf primordia at and below the 7th. and 8th. nodes. Further treatment with CL led to a greater promotion of growth the effect of which extended to the 9th. and 10th. nodes.

In both *Spinacia* and *T. repens*, petiole elongation responded to the various treatments in the same way as lamina elongation, and in *T. repens* internode elongation was affected similarly.

Daylengths leading to the initiation of "double ridges" thus stimulate leaf growth in LDPs as well as SDPs. A strong stimulation of meristematic activity at the stem apex is also a characteristic of the transition to the reproductive phase[4]). It is considered probable that conditions leading to the onset of flowering result in a widespread stimulation of growth processes throughout the plant and that the promotion of leaf growth and meristematic activity of the stem apices are both manifestations of this single basic effect of induction.

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