

# Discussion

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individuals obtained from selfings and interpopulational hybridizations than those obtained from intrapopulation crosses. Small-sized pollen grains were most frequently found both in the self-compatible individuals as well as in their offspring, whereas the finds of abnormally large-sized pollen grains were mainly restricted to the latter ones. Incidentally, the lowest modal values of pollen size were observed in three individuals with small heads. Two of these were self-compatible plants (table 12).

## 7. Discussion

*Leontodon hispidus* L. s. l. is a remarkably variable taxon. The over-all picture of variation shows a wide intrapopulational variation and large interpopulational overlappings, apparently due both to genotypical as well as phenotypical factors. As a result, taxonomical treatment of the group is very difficult and some diagnostic characters that were formerly used, do not appear to be reliable.

No differentiation could be observed between the few investigated grassland populations of the Swiss Plateau, belonging to plant communities such as Molinion, Arrhenatherion and Bromion. *L. hispidus* var. *glabratus* (Koch) Bischoff is exemplary: apart from its glabrousness the taxon is not well-defined. Hairless plants corresponding to this taxon occur side by side with hairy individuals. The long, dentate leaves, which characterized the investigated material, tended to lose their typical shape under culture conditions. Some more characters, e.g. hair density and hair length occurred in haired grassland populations. However, the range of variation within the grassland samples was so wide that large overlappings occurred between them. Slight interpopulational, possibly geographical, differentiation was observed only in modal ray number of hairs.

More distinct interpopulational differentiation was found in the thickness of leaves. Differences between both wild and cultivated samples corresponded to the *L. hyoseroides* samples on the one hand (thick leaves)

and the grassland samples on the other hand (thin leaves). In some thick leaves a double layer of palissade parenchym was observed. However, this character is not of absolute validity, high degree of phenotypical variation being observed.

The investigated populations of *L. hyoseroides* inhabit scree habitats, often characterized by extreme or extremely changing microclimatic factors, viz. heat, including radiation and drought (FABIJANOWSKI 1950; DUVIGNEAUD et al. 1970). The thick leaves of *L. hyoseroides* might therefore have an adaptive value for such open stations, whereas the thin, drought-sensitive leaves occurring in the grassland forms might be adaptive for the relatively temperate microclimate of more closed vegetations. Hairiness might have a similar adaptive background; this problem, however, requires a detailed eco-physiological investigation.

Cytological differentiation in *L. hispidus* L. s. l. apparently is limited. The occurrence of autotriploids seems to be incidental (FINCH 1967; the present study). The triploids studied in the course of the present investigation produced abnormally long seeds. It should be noted that no other morphological differences were observed. Remarkably divergent karyotypes were reported by BERGMAN (1935), ELLIOT (1950), GUINOCHET and LOGEOIS (1962) and SKALINSKA et al. (1964). On the other hand, FINCH (1967) reported that variation in this material was too rare to constitute polymorphism. The results of the present investigation stay in agreement with FINCH's observations, for no significant distinctions were revealed between the diploid karyotypes of a *hyoseroides* and a grassland sample.

The described patterns of variation suggest that ecological-morphological differentiation in *L. hispidus* L. s. l. is rather unadvanced. The species is predominately outcrossing (ROUSI 1973; the present study). Observations on experimental hybrids suggest that the intrapopulation variation might be due, at least partly, to a continuous gene exchange between populations, in particular those from anthropogenous habitats, which are ecologically not well-isolated.

The present state of knowledge of the *L. hispidus* group lacks a sufficient geographical scope. The present study had a preliminary character and was confined to a few small population samples, mostly from anthropo-

genous habitats. A clear insight into the taxonomical rank of taxa like *hyseroides* or *pseudocrispus* might only be obtained by more intensive ecological and genetical investigations. Numerous morphological characters of the *L. hispidus* group overlap with related species of the genus *Leontodon*. Some experimental data indicate that the genetical differences between various species are not sharply defined even when divergences in chromosome morphology are distinct (FINCH 1967); further studies in this subject are required.

### Summary

The present study deals with variation on some Swiss population samples of *L. hispidus* L. s. l. from various habitats. The samples appeared to be closely similar in morphology and highly variable. Plants from scree habitats, identified as *L. hyoseroides* Welwitsch were, by their thicker leaves, mostly well-distinguishable from individuals growing in anthropogenous grassland habitats. No distinction could be observed between the karyotype of a grassland variety of *L. hispidus* L. and that of *L. hyoseroides* Welwitsch. The investigated material was predominantly outcrossing and panmixous.

The present observations suggest that ecological-morphological differentiation in *L. hispidus* L. s. l. is rather unadvanced, no pronounced barriers to gene exchange occurring in the studied material.

### Zusammenfassung

Die morphologische und zytologische Variationsbreite einiger schweizerischer Populationen von *Leontodon hispidus* s.l. aus verschiedenen Pflanzengesellschaften wurden untersucht. Die Variationen innerhalb der Populationen erwiesen sich als sehr gross, während die Unterschiede zwischen den Populationen oft gering waren. Pflanzen von Schuttgesellschaften, die morphologisch mit *L. hyoseroides* Welwitsch übereinstimmen, konnten vor allem durch die dickeren Blätter von Pflanzen aus bewirtschafteten Wiesen und Weiden abgetrennt werden. Der Karyotyp dieser Pflanzen lässt sich indessen nicht unterscheiden. Die untersuchten Pflanzen waren vorwiegend fremdbestäubend. Die vorliegenden Beobachtungen deuten an, dass die ökologisch-morphologische Differenzierung innerhalb von *L. hispidus* s.l. noch nicht sehr weit fortgeschritten ist. Es konnten keine Genaustauschbarrieren im untersuchten Material festgestellt werden.

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