

MORPHOGENESIS OF *PHLOMOIDES OREOPHILA* (LAMIACEAE) AND FEATURES OF FUNCTIONAL-ZONAL STRUCTURE OF ELEMENTARY SHOOTS UNDER DIFFERENT GROWTH CONDITIONS

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The architectural model of the herbs with undetermined growth in seasonal climate has not been sufficiently studied, these include *Phlomoides oreophila* (Kar. & Kir.) Adylov, Kamelin & Makhm. (Lamiaceae). *P. oreophila* is an Asian montane species whose range covers mountain systems from the Mountain Altai to the Pamir-Alai. The species grows in the forest-steppe and forest belts, reaching the subalpine one. The morphogenesis and functional-zonal structure of an elementary shoot of *P. oreophila* were studied in the shrub steppe (Aigulak Ridge, Altai Mountains) and in the alpine meadow (East Kazakhstan, Saur Ridge).

It is established that *P. oreophila* is a polycarpic caudex-forming plant following a monopodial rosette pattern of shoot formation. Its ontogeny is complex, the individual goes through the following stages of morphogenesis: skeletal monopodial shoot (j , im , v), skeletal monopodial shoot system (g_1), bush (g_2) and a clone of multiaxial and uniaxial particulars (g_3 , ss , s). The duration of *P. oreophila* ontogenesis in the steppe community is 70–80 years, in the alpine meadow – 50 years. The plants reach their greatest capacity in the shrub steppe. The main structural unit of the plant is a system of a perennial skeletal rosette shoot (skeletal axis), consisting of elementary shoots. The elementary shoot has assimilating and scaly leaves, and has the following sequence of zones: renewal zone → inhibition zone → amplification zone → apical bud. The floral (amplification) zone consists of laterate generative shoots formed in the axils of scaly leaves; such an arrangement of reproductive shoots is known as intercalary. We have established that the seasonal boundaries of annual and elementary shoots do not coincide. The annual shoot includes the amplification zone of a last year's elementary shoot, the renewal and inhibition zones of the elementary shoot of the current year. The rare branching of the skeletal axis is associated with instability of the elementary shoot renewal zone and is determined by the degree of development of the floral zone, depending on the age of an individual and its growing conditions. At the beginning and at the end of the generative period, the amplification zone is minimal and takes one metamer. In the mature generative state, it increases to two metamers and can reach maximum development (three metamers), in the latter case there is no renewal zone. In high-altitude conditions, the number of individuals with the most developed floral zone is almost half of adult generative individuals, while in steppe conditions their share is much lower (20%). The strengthening of the generative sphere, with a decrease in the size of the vegetative part of the plant in the alpine meadow, is considered by us as an adaptation aimed at increasing the efficiency of seed propagation in high-altitude conditions.

Keywords: architectural model, shoot formation, annual shoot, elementary shoot, functional-zonal structure, *Phlomoides oreophila*

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