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To flower or not to flower ? The crucial decision of *Lilium longiflorum* bulbs

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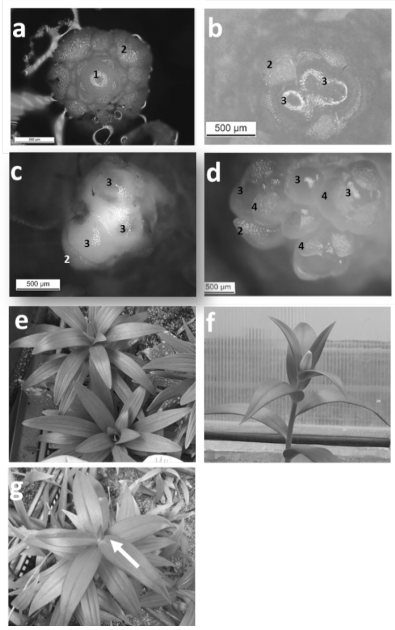
Statement of the Problem: It is generally accepted that Lilium longiflorum has an obligatory requirement for vernalization and that long day (LD) regime hastens flowering. However, the effect of bulb size and origin, with respect to axillary or apical meristem on flowering, as well as the interactions between these meristems are largely unknown. Methodology & Theoretical Orientation: The aim of this study was to explore the effect of bulb size, vernalization and photoperiod on *L. longiflorum* flowering. To this end, we applied vernalization and photoperiod treatments on the different bulb sizes and used a system of constant ambient temperature of 25oC, above vernalization spectrum, to avoid cold-dependent floral induction during plant growth. Findings: Vernalization and LD hasten flowering in all bulbs. Large, non-vernalized bulbs invariably remained at a vegetative stage. However, small non-vernalized bulbs flowered under LD conditions. Metabolomic profiling revealed a significant effect of a metabolic pathway on the difference between large and small bulbs. Conclusion & Significance: The results demonstrate that cold exposure is not an obligatory requisite for *L. longiflorum* flowering, and that an alternative flowering pathway can by-pass vernalization in small bulbs. We suggest that apical dominance interactions determine the distinct flowering pathways of the apical and the axillary meristems, and that biosynthesis of a specific metabolite is the mechanism of this phenomenon. These innovative findings in the field of geophyte floral induction represent valuable applicative knowledge for lily production.



Shoot apical meristem (SAM) development in *L. longiflorum*
a: vegetative stage, b, c: floral transition, d: Flower differentiation
1: vegetative apex, 2: leaf primordium, 3: reproductive apex, 4: tepal primordium

Biography

Silit Lazare is a PhD student, exploring flower bulbs physiology and development. She has a long and extensive experience in growing geophytes and other ornamentals as an agronomist of commercial nurseries. Her scientific research is focusing on several aspects of plant physiology- growth and flowering control, meristems' morphogenesis, flower development, metabolism and more. Her novel theory regarding flowering pathways in Lilium longiflorum shakes the scientific knowledge and offers an improved agricultural practice to grow this crop

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