Pollination mechanisms in *Strobilanthes kunthianus*

Princy

Semelparous or monocarpic species are perennial flowering plants that flower once in their lifetime and die.

- **Semelparous species invest all their resources into seeds** and generally produce a larger seed crop.

- Semelparous plants have only one chance to reproduce; they are committed to a reproductive event at a specific time regardless of the environmental conditions.

- Several species of *Strobilanthes* (Acanthaceae) distributed in the Indian subcontinent and South-East Asia are also semelparous and flower at intervals of **3–12 years**.

- ***Strobilanthes kunthianus* (Nees) T. Anderson,** known as ‘neelakurinji’ in the vernacular, is a species endemic to the southern Western Ghats.

FLORAL MORPHOLOGY

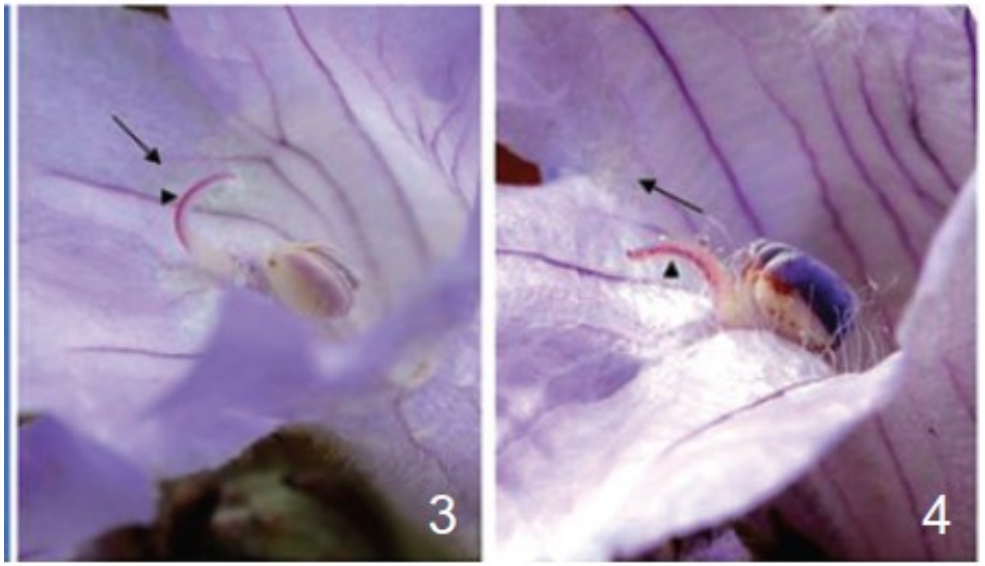
- An interesting feature of the anthers is that they do not dehisce until touched by the visiting insect.
- The corolla is tubular and five lobed at the tip.
- The two stamens are epipetalous.
- The pollen grains are elliptic, cream coloured, and sticky.

- Example of didynamous stamens with anther fusion in pairs.

- *Lamium barbatum* Sieb. et Zucc. (Labiatae).

- The pistil is long and the basal part of the ovary is covered with a conspicuous, yellow nectary.

- The stigma is narrow and sharply curved.
- The receptive surface is pink facing the front of the flower with a shallow longitudinal groove at the centre. Each ovary bears four ovules.



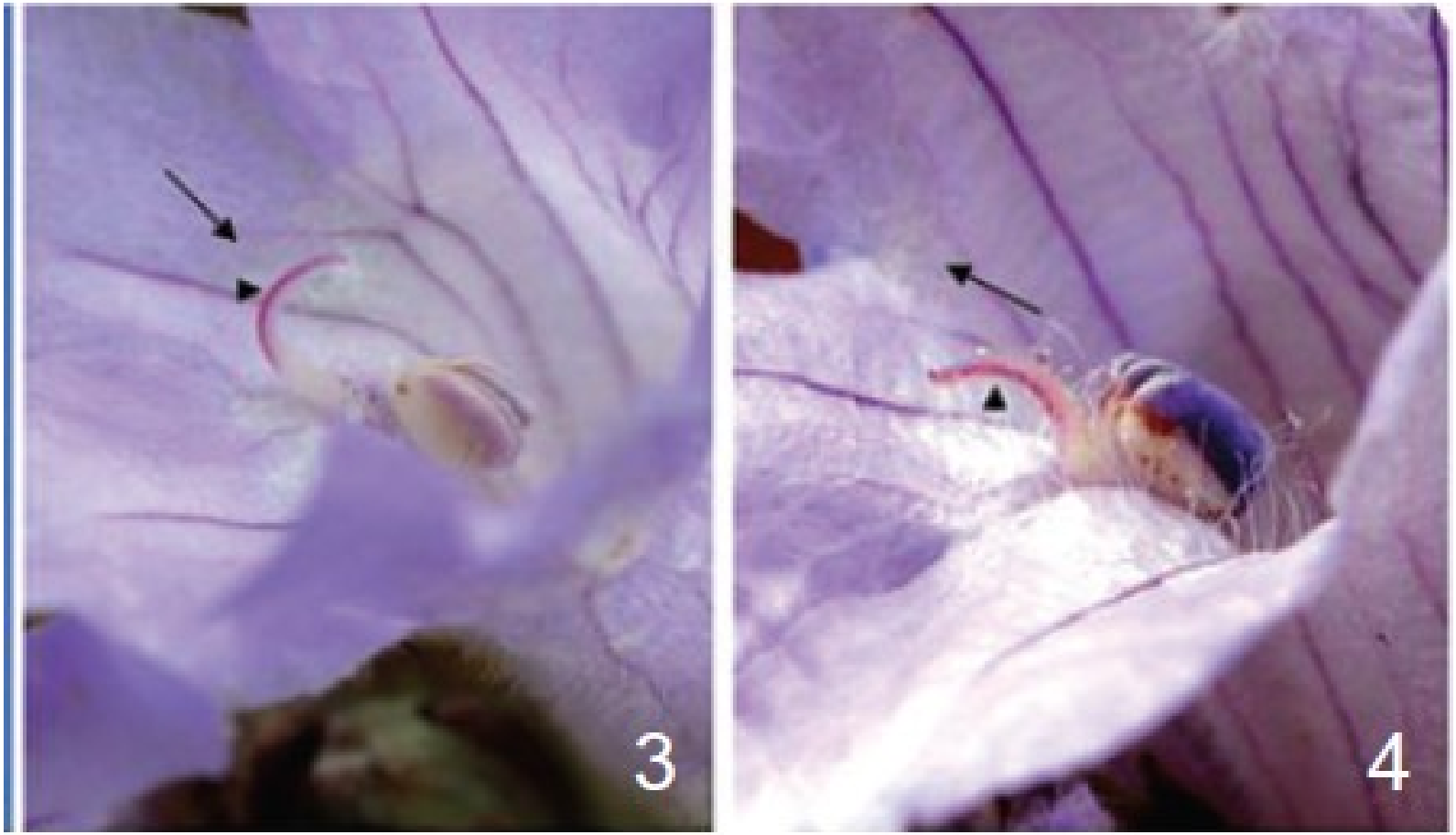
POLLINATION BIOLOGY

- Flowers offer both **pollen and nectar as reward**. The amount of nectar was limited in freshly opened flowers.

- When a bee enters the flower, it first brushes the receptive surface of the stigma and reaches the anthers for foraging. Bee visit induces two immediate responses in the flower.

1) The stigma, which is curved in a fresh flower, exposing the receptive surface to the path of bee entry, straightens and curves slightly backwards within seconds before the bee departs the flower.

- This movement orients the stigma, particularly the receptive surface, away from the path of the exiting bee.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2) The **anthers dehisce immediately on bee contac**t, exposing the pollen grains; they stick to the ventral surface of the bee during foraging.

- During exiting, the body of the pollen loaded bee does not come into contact with the stigma.

- When the pollen-loaded bee enters another fresh flower, it brushes the outward-facing receptive surface of the curved stigma and thus causes pollination.

- As the bee tends to move from one flower to another of the same inflorescence before moving to the neighbouring inflorescence of the same or another plant, there is a high level of geitonogamy. After the bee visit, the stigma eventually comes back to its original position in 30–60 min.

FLORAL TRAITS THAT FACILITATE POLLINATION EFFICIENCY

- 1. **The extension of floral longevity** for 2 days enables pollination on the second day of flowers that remain unpollinated on the first day.

- 2. **Along with pollen, the flowers offer a considerable amount of nectar to the visitors**, and the **stigma remains receptive** even on the second day.

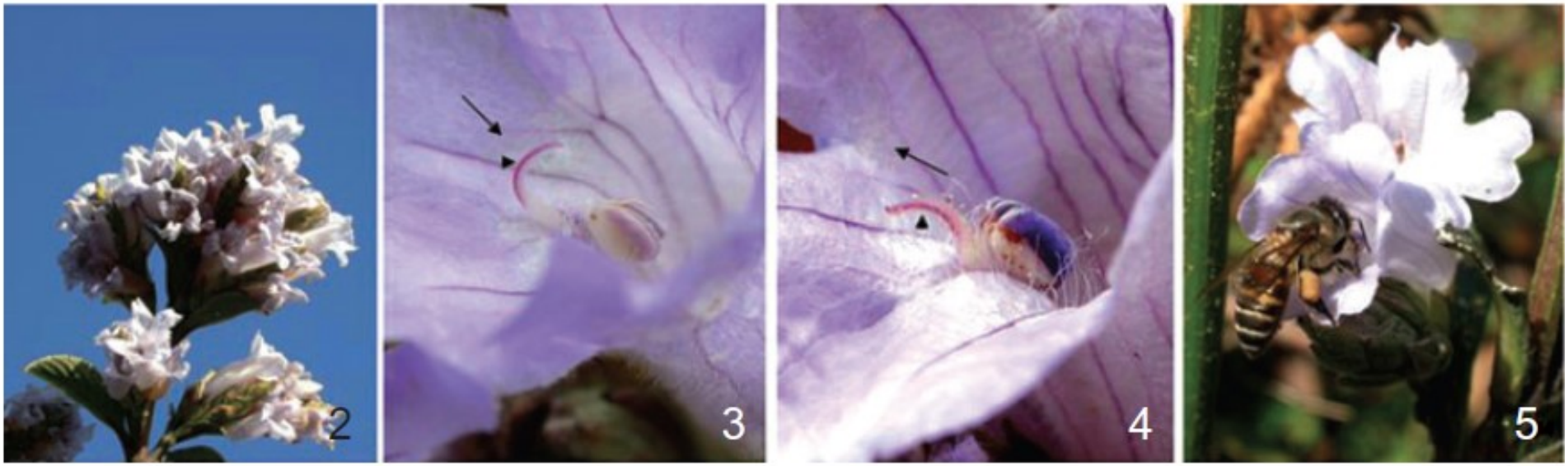
- 3. **Dehiscence of anthers only in response to touch by a visiting insect**.
- **This keeps the pollen fresh until insect visitation and prevents pollen wastage.** It also ensures that most of the available pollen comes into contact with the ventral surface of the pollinator during foraging.

- 4. **The stigma in *S. kunthianus* is sensitive to touch by the pollinator and removes the receptive surface away from the path of the exiting pollinator**.

- The change in position is instantaneous and occurs even when the pollinator is still foraging the pollen, thus effectively preventing intrafloral selfing.

- After 30–60 min, the stigma returns to the original position to expose the receptive surface ready to receive pollen from the next bee visit.

- Apart from preventing intrafloral selfing, the sensitive stigma **effectively removes interference between pollen receipt and pollen export.**



- Fig. **3**. Freshly opened flowers to show the position of the stigma in an undisturbed virgin flower.
- Fig. **4**. The stigma touched by a needle to induce the backward curvature of the stigma away from the path of the pollinator. Arrows indicate the path of bee entry and exit; arrowheads point to the receptive surface of the stigma.

Thank you