

台灣都蘭山倒地蜈蚣傳粉生物學研究

Introduction



Torenia concolor

(*Amegilla calceifera* & *Lassioglossum leiosoma*)

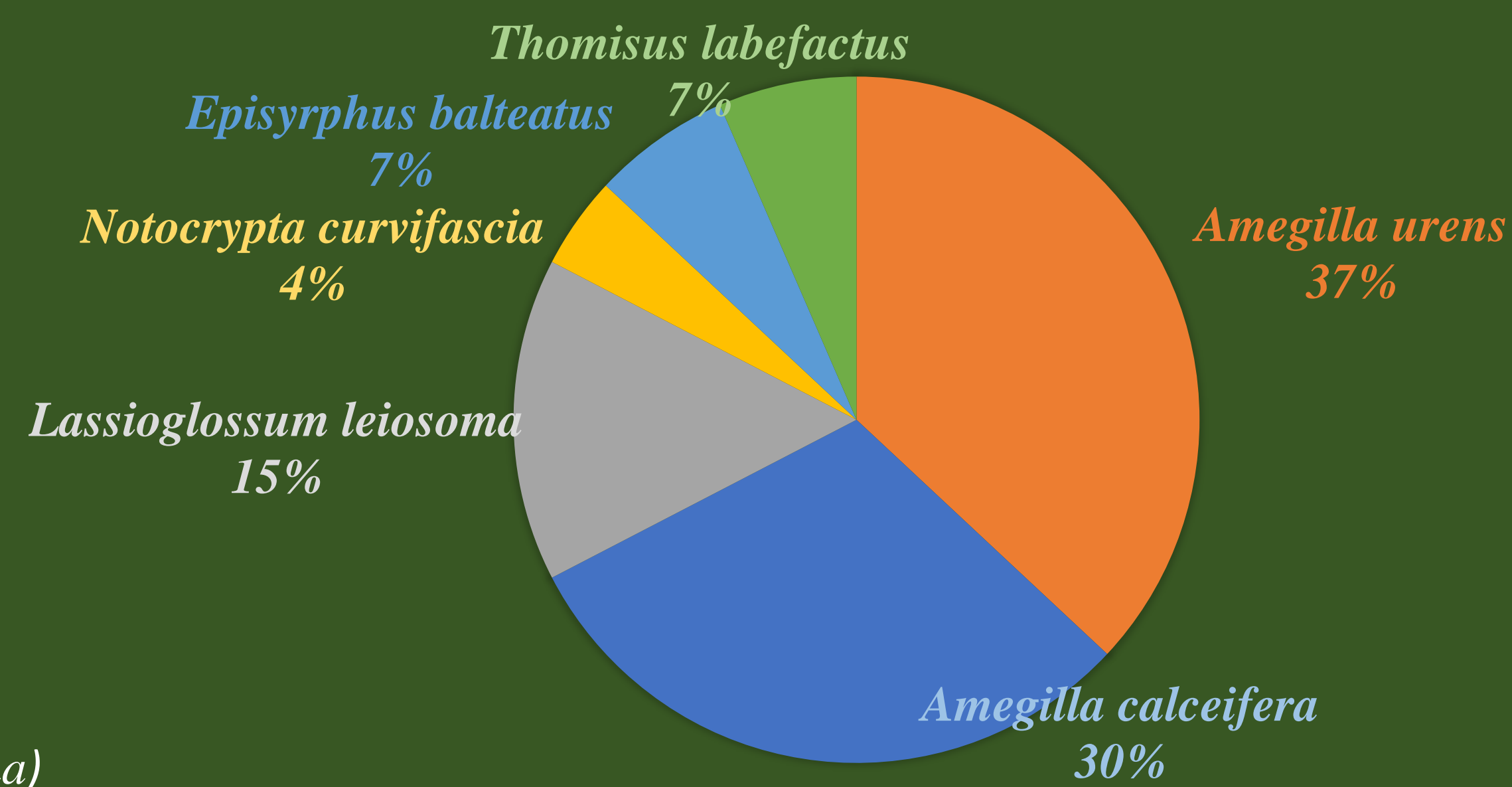


Fig 1. Pollinator structure

Flowering phenology

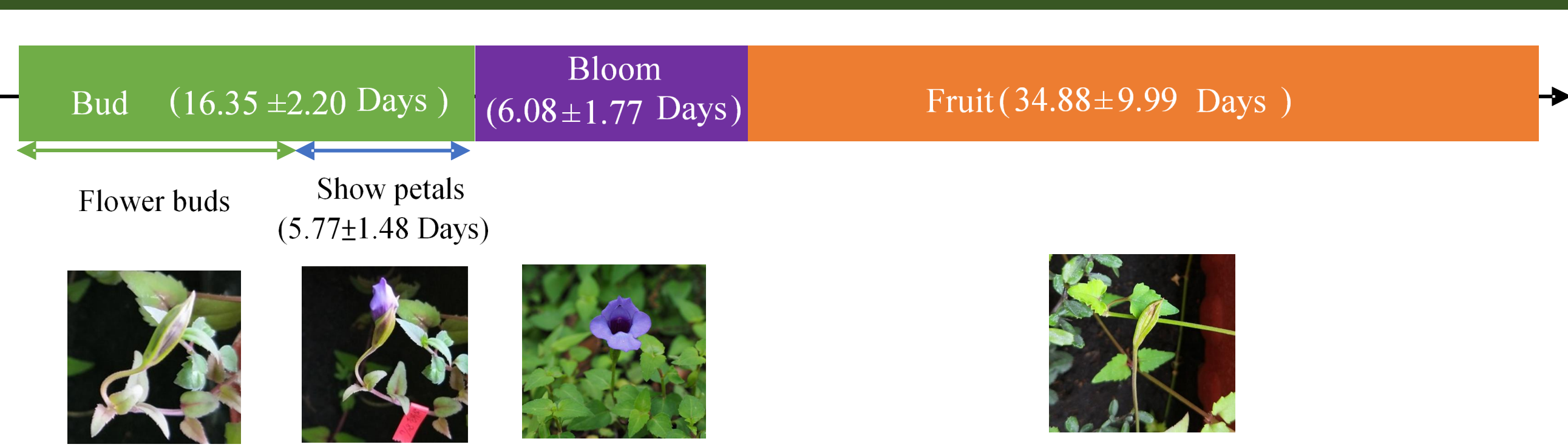


Fig 2. Flowering cycle of *Torenia concolor*

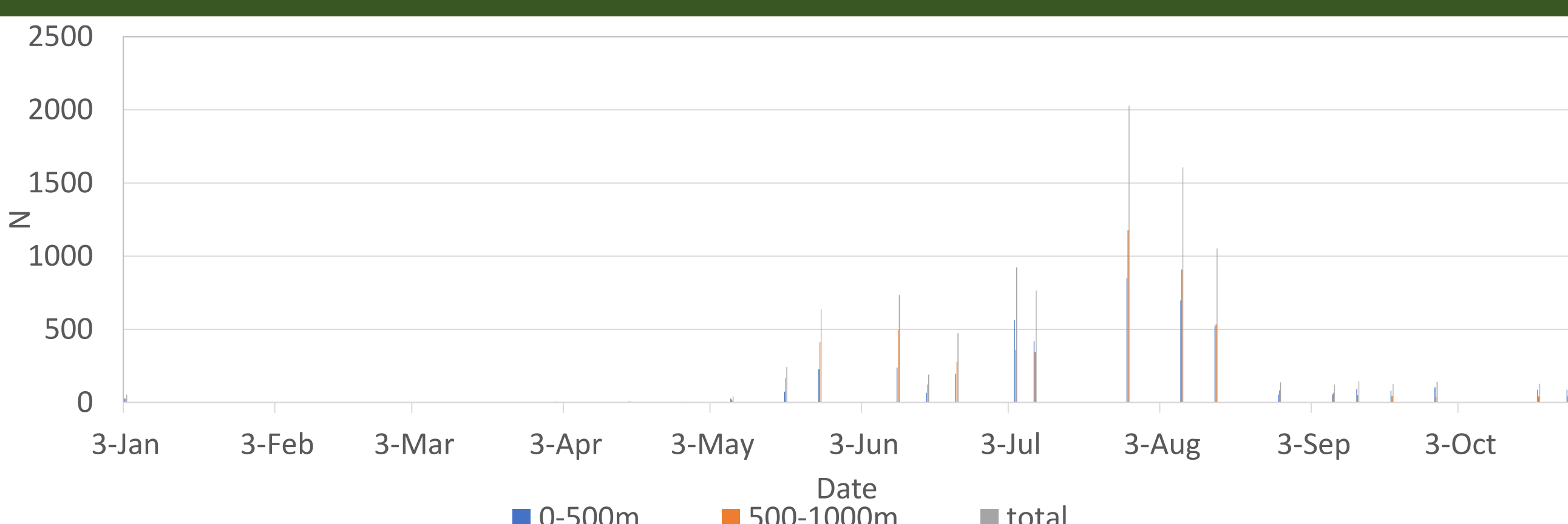


Fig 3. Flowering Phenology of *Torenia concolor* in Dulan Mountain

Study goal

Examine the previous hypotheses of *Torenia concolor* in pollination ecology. Investigate the composition of pollinators and reproductive system of *Torenia concolor*. Finally, understand their pollination mechanism in plant evolution.

Hypotheses

1. Bees populations may be too large in Dulan Mountain, and the flowers' nectar cannot be sufficient to feed bees, and thus cause bees to steal honey.
2. The specific clavate appendages of anterior stamens in *Torenia concolor* do not support pollination.
3. Anterior stamens and posterior stamen may function in self-pollination or outcrossing pollination, separately.

Materials & Methods

Torenia concolor plants were next to the hiking trail in Dulan Mountain, Taiwan.

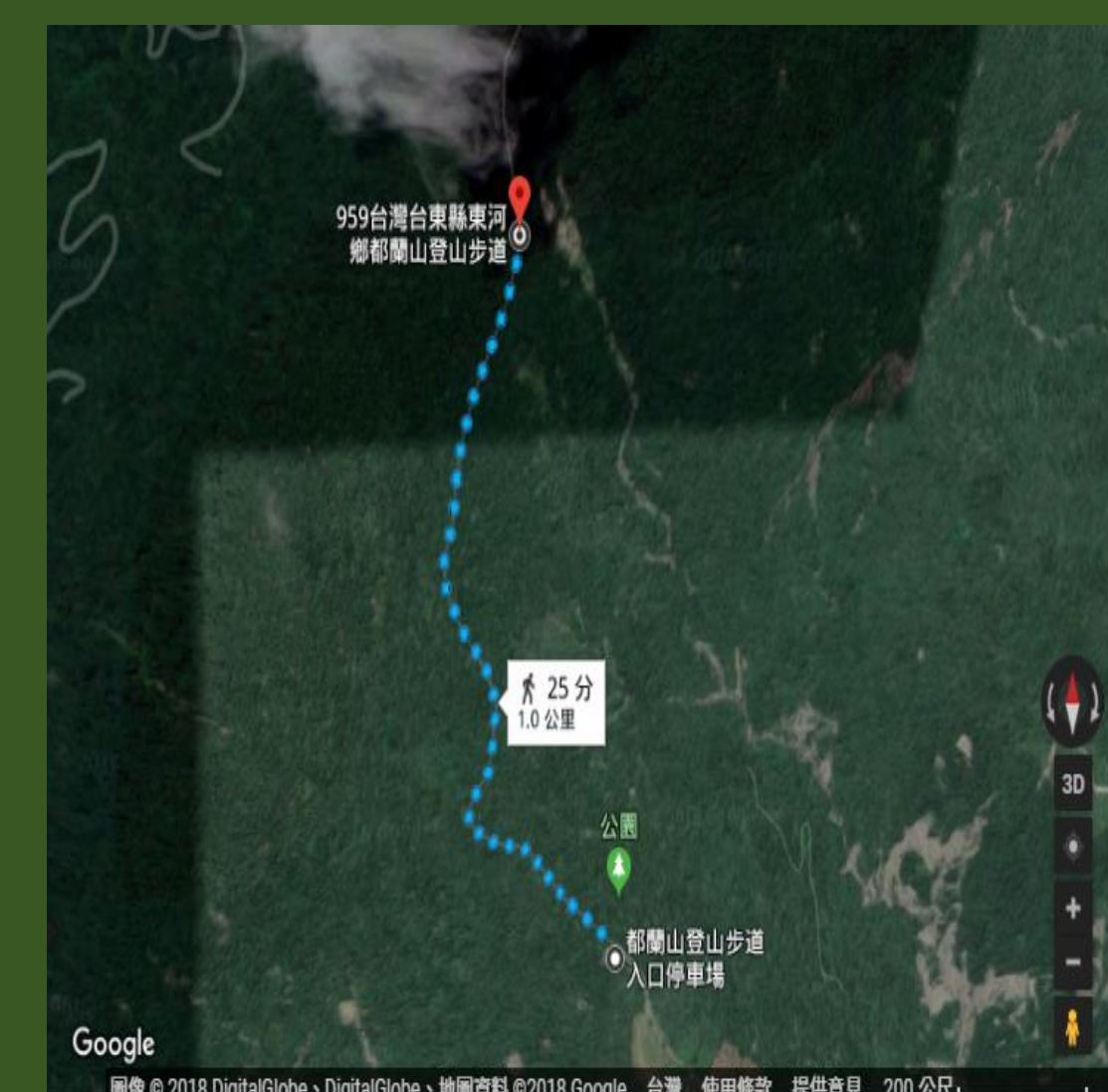


Fig 4. Study site

1. flowering phenology
2. pollinator structure
3. pollinator behavior
4. pollen observation
5. reproduction system.

Results

Table 1. Results of Pollination treatment in *Torenia concolor* (Linderniaceae)

Trial	Flowers (No.)	Fruits (No.)	Fruiting rate(%)	Seeds(No.)	Capsule length(cm)
Open	49	34	69.4%	245±141	1.47±0.48
Remove	20	0	0%	-	-
Cross	20	10	50%	213±63	1.20±0.32
Self-fertilize	20	10	50%	248±140	1.23±0.31
Baged	28	0	0%	-	-

Table 2. Results of testing clavate appendages for pollination function

Trial	Flowers (No.)	Fruits (No.)	Fruiting rate(%)	Seeds(No.)	Capsule length(cm)
Open	49	34	69.4%	245±141	1.47±0.48
Remove clavate appendages of anterior stamens	37	20	54%	340±96	1.54±0.23
Remove anterior stamens	34	29	85.3%	325±70	1.53±0.23

Table 3. Pollinator structure .

a. Drilling into the flower to suck nectar. b. Elongated labium stops at the petals and sucks nectar. c. Use labial palpus to cut a small hole in the base of the flower tube to suck nectar .d. Drill into the flowers to eat pollen, and eat the pollen on the body before leaving the flower.e. stop on the largest petal and elongate proboscis to draw nectar.f. hide inside the flower tube and wait to hunt visiting insects.

Species	N	Flower visit	Visit frequency	Pollen attachment location
<i>Amegilla urens</i>	17	a	16	Abdomen, Wing, Corbiculum
		b	32	Head, Wing
		c	5	-
<i>Amegilla calceifera</i>	14	a	19	Thorax, Corbiculum
		b	4	Corbiculum
		c	5	-
<i>Lassioglossum leiosoma</i>	7	d	7	whole body
<i>Notocrypta curvifascia</i>	2	e	2	-
<i>Episyrrhus balteatus</i>	3	b	3	-
<i>Thomisus labefactus</i>	3	f	2	-

Table 4. The insects live in plants' reproductive organs.

N: Sampling numbers.

LN: The rate of larva in N (%).

EN: The rate of eating flowers or seeds by insects (%).

A. Larva biting flower. B. Larva eating seeds.

Species	N	LN	EN	Behavior of insects visiting flowers
<i>Metoea nymphulalis</i>	43	11	26%	A
<i>Conocephalus melas</i>	43	8	19%	A
<i>Ochyrotica concursa</i>	45	13	29%	B



Fig 5. *Ochyrotica concursa*

Conclusion

- 1) *Amegilla urens* and *Amegilla calceifera* both steal honey of *Torenia concolor*.
- 2) support Armstrong (1992) results and theory.
- 3) remove anterior stamens increases fruiting rate.
- 4) Anterior stamens has no lever action.
- 5) Anterior stamens help in self-pollination and posterior stamen helps in outcrossing pollination.

Acknowledgement

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Reference

Liu et al.,2008;Armstrong 1992;Chen et al.,2013;Chen et al.,2017;Liang 2016.

