



# Demography and reproductive ecology of *Satyrium muticum*, a critically endangered orchid on Gondwana game reserve.

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## Introduction:

- *Satyrium muticum* is a critically endangered orchid previously known from three subpopulations of less than 200 mature plants<sup>1</sup>.
- Very little is known of their ecology and specifically their pollination.
- Largest known population newly discovered on Gondwana Game Reserve by Raquel de Castro Maia in 2017 in one location and on a second site in 2018.

## Key Questions:

- What is the estimated population size on Gondwana game reserve?
- What are the traits of *Satyrium muticum* on Gondwana game reserve?
- Does the population have a healthy pollination and fruiting rate?
- What are the potential pollinators of *Satyrium muticum*?

Figure 1: Picture A shows the *Satyrium muticum*, B shows the *Satyrium muticum* with a potential pollinator inside the flower

1) von Staden, L. 2018. *Satyrium muticum* Lindl. National Assessment: Red List of South African Plants version 2020.1. Accessed on 2020/08/24



A

B



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## Method:

- Line counts of the area are done every year to estimate the population size at the two sites on Gondwana game reserve. Measured in three categories non-flowering, flowering and consumed.
- Measurements of leaf length and flower height are taken from a random sample of the population.
- Number of flowers present and number of flowers that have set seed are done as a random sample.
- 6 plants were covered with bags to prevent insects from entering to determine if the *S. muticum* self pollinated.
- Plants are observed for potential pollinators.

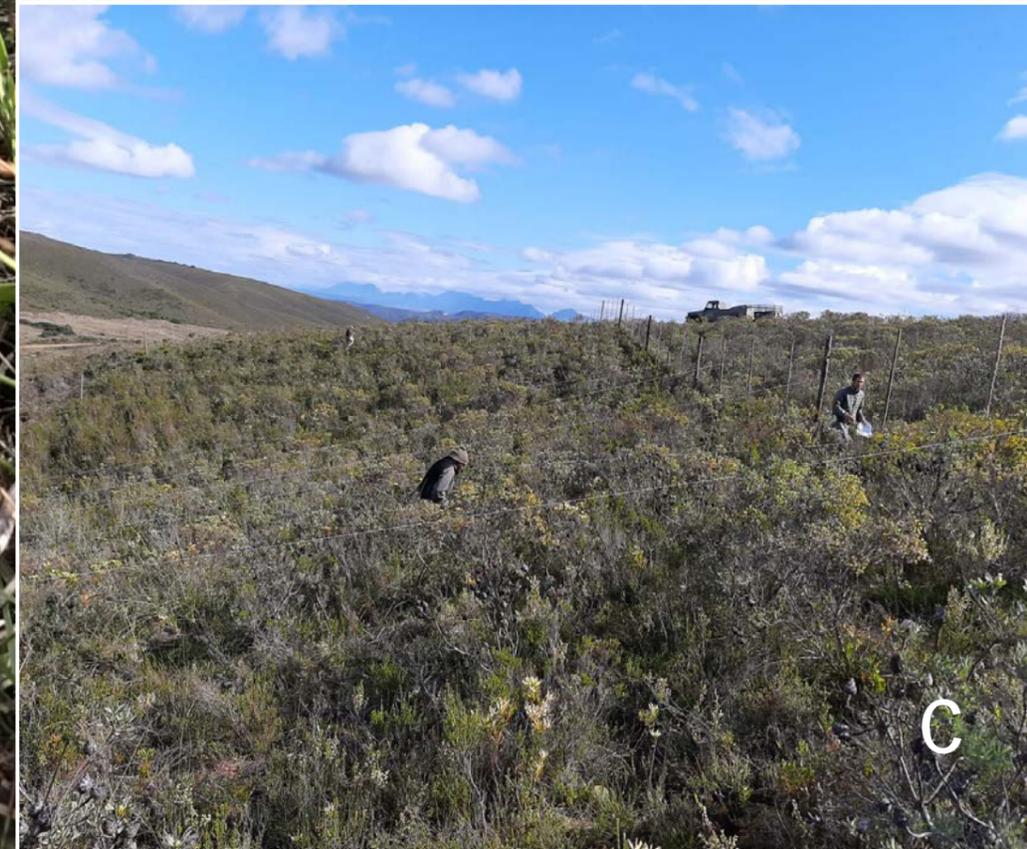


Figure 2: A shows *S. muticum* being measured, B Team member taking measurements of *S. muticum*, C members of the GCF team doing line counts



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## Results:

**Table 1:** Number of *S. muticum* counted at known sites on Gondwana game reserve for 2019 and 2020.

		2019	2020
Research site	Non-Flowering	2646 (81.72%)	2456 (82.08%)
	Flowering	592 (18.28%)	423 (14.14%)
	Consumed	~	113 (3.78%)
	<b>Total</b>	<b>3238</b>	<b>2992</b>
Reserve site	Non-Flowering	1214 (97.82%)	3130 (89.07%)
	Flowering	27 (2.18%)	139 (3.96%)
	Consumed	~	245 (6.97%)
	<b>Total</b>	<b>1241</b>	<b>3514</b>
Overall	Non-Flowering	3860 (86.18%)	5586 (85.86%)
	Flowering	619 (13.82%)	562 (8.64%)
	Consumed	~	358 (5.50%)
	<b>Total</b>	<b>4479</b>	<b>6506</b>

- Flower height and leaf length showed no significant correlation.

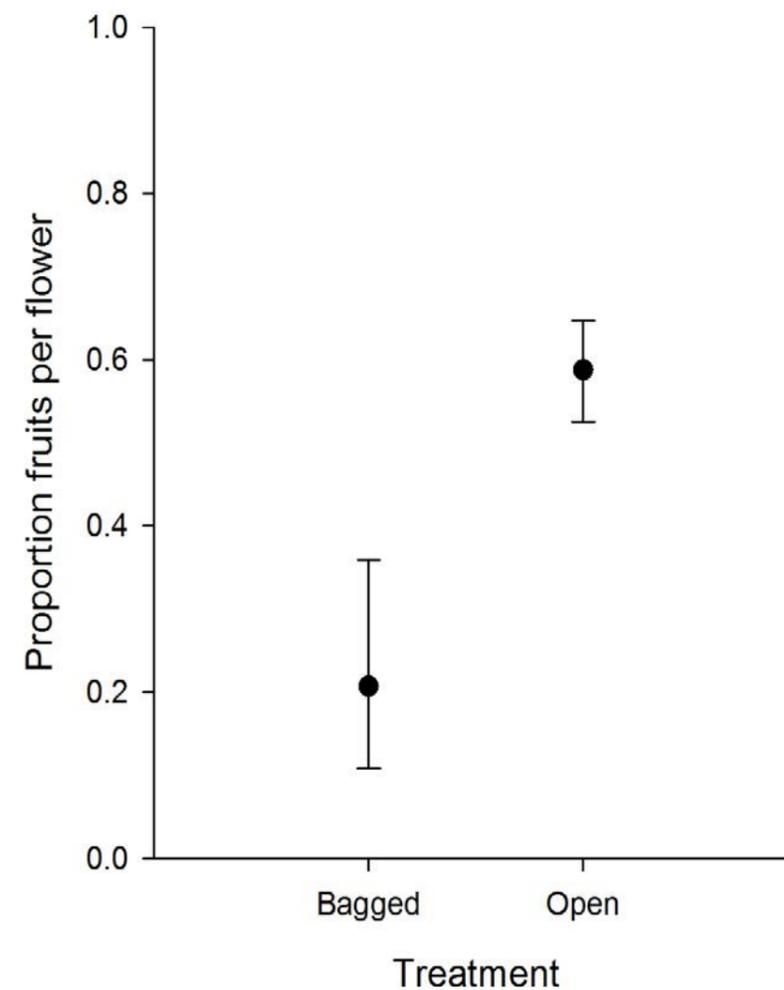


Figure 3 Above: Graph showing fruiting rate for flowers in bagged to exclude insects versus flowers open to insects

Figure 4 Right: A *S. muticum* with a monkey beetle in the flower, B Monkey Beetle collected after observation



- Observations were made of monkey beetles with pollinaria attached to their thorax.



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## Discussion:

- As we are constantly improving our study, we have included the consumed category for the 2020 count to determine the herbivory seen at the time of the count.
- In 2019 a complete count of the reserve site was not done, with increased resources we were able to expand the count for 2020. Therefore no comparative observations can be made.
- No correlation found between leaf length and flowering height.
- It was found that the population had a healthy fruiting rate of 60%. The flowers that were closed to prevent insects entering showed a 20% flowering rate, this was due to one beetle finding its way into a bag.
- Monkey beetles were the only observed potential pollinators and may be attracted to the bright pink inner labellum chamber, the sepals and petals.

## What next:

- To measure the impact that large herbivores might have on the occurrence of *S. muticum* a camera trap study has been initiated with the assistance of Wildlife & Ecological investments and Dr Gabi Teren.
- Individual plants may be marked to measure recurrence and growth over time.
- Counts will continue every year.

Figure 5 Below: Shows Camera trap placed in the research site  
Figure 6 Right: *S. muticum*

