IECPS 2021

The 2nd International Electronic Conference on Plant Science

01–15 DECEMBER 2021 | ONLINE

10th Anniversary 2012 – 2021

Chaired by DR. ADRIANO SOFO

plants MDPI

Use of native geophytes of ornamental interest: the case study of *Sternbergia lutea* (L.) Ker. Gawl. Ex Spreng

Giovanna Potenza[1,*], Francesco Vairo[1] , Donato Castronuovo[1], Simonetta Fascetti[1], Vincenzo Candido[1]

[1]Affiliation 1 School of Agricultural, Forestry, Food and Environmental Sciences, University of Basilicata, Viale dell'Ateneo Lucano, 10 - 85100 Potenza, Italy.

*Correspondence: giao76.potenza@gmail.com; giovanna.potenza@unibas.it

IECPS 2021

Use of native geophytes of ornamental interest: the case study of *Sternbergia lutea* (L.) Ker. Gawl. Ex Spreng

Photos by researchers at the Unibas Applied Botany and Horticolyure laboratories

Wild geophytes potential floricultural interest to

- ✓ **urban ecosystems,**
- ✓ **gardens**
- ✓ **turfing**

Photos by researchers at the Unibas Applied Botany and Horticolyure laboratories

Mediterranean flora in particularly is rich in genera and species, with many opportunities for innovation in the floriculture.

Abstract:

Currently, the strong influence of developing countries, the globalization of the economy and the increase of production costs have reduced the Italian nursery gardening production.

Scope research

- ✓ to evaluate the potential use of Mediterranean wild geophyte for ornamental purposes.
- ✓ to focus on *Sternbergia lutea* (L.) Ker. Gawl. Ex Spreng wilde bulbs.

Keywords: : native geophyte; ornamental interest; wild bulbs; urban biodiversity

Materials and methods

S. lutea, collected from uncultivated lands nearby Irsina (Matera province, Basilicata, Southern Italy).

https://ontheworldmap.com/it/italy/region/basilicata/

The propagating material was split into 4 diameter classes: <20 mm, 20-25 mm, 25 -30 mm, and > 30 mm.

Photo by F. Vairo

For each size class, four different cutting (incision) methods were used on the basal plate:

- deep cross incisions (TP),
- superficial cross incisions (TS),
- basal plate emptying (SV),
- bulb with no incisions (control, C).

Use of native geophytes of ornamental interest: the case study of *Sternbergia lutea* (L.) Ker. Gawl. Ex Spreng

Before planting, the bulbs were exposed to a tanning treatment:

- The bulbs were immersed for 30 minutes in hot water (40° C) to which a 5% concentration of copper oxychloride was added.
- Afterwards, the bulbs were placed with the tips pointing downwards, in a properly sterilized dry sand, in a ventilated oven at 100° C for 24 hours.
- To facilitate the healing of the cuts, the bulbs were kept at 20° C and 40-50% relative humidity (R.H.) for two weeks.

16 experimental treatments were compared, using bulbs belonging to 4 size classes (1,2,3,4) which in turn were subjected to 4 cutting modes (C, TP, TS, SV).

Each experimental treatment was repeated three times (a, b and c).

A total of 48 pots were prepared, each of which contained 3 bulbs (144 bulbs in the whole trial).

Use of native geophytes of ornamental interest: the case study of *Sternbergia lutea* (L.) Ker. Gawl. Ex Spreng

The containers were placed in the open air, lying on a soil surface adequately mulched with black polyethylene (3 mm thick).

After the planting, the pots were irrigated manually and covered with a non-woven fabric sheet, until the plants began to emerge.

During the entire vegetative cycle, no fertilization or phytosanitary were used.

Moreover, weeds were removed with manual weeding operation.

Photo by F. Vairo

Photo by F. Vairo

From the emergence of the plants to their complete senescence, the main phenological and morphological parameters were measured on every plant in each pot.

IECPS 2021

Results and discussion

The morpho-phenological parameters of *S. lutea* are presented in Table 1. They varied significantly in the two years, also in relation to their bulb circumference size (calibre) and their cutting methods.

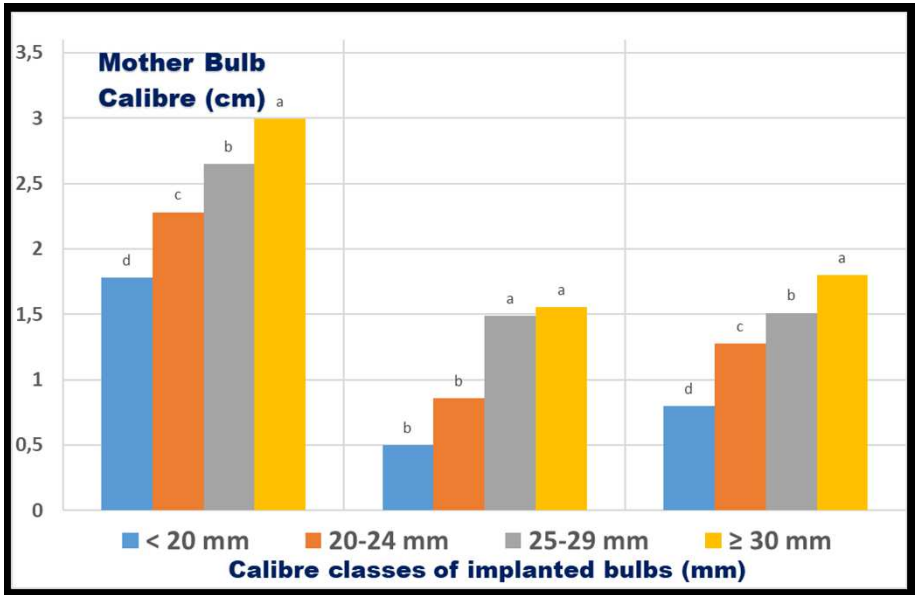
(all data reported in the paper)

Table 1 – Bulbs calibre and basal plate cutting method influence on some morpho-phenological traits of S. lutea in two years

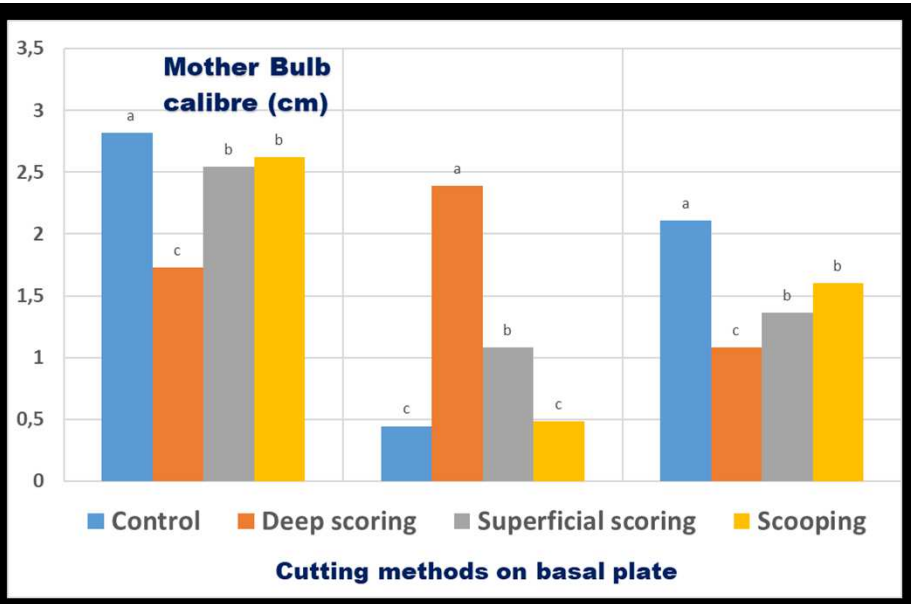
Variation source	Traits										
Years (Y)[1]											
2014-15	30,0	221,3	7,3	9,1	0,4	191,3	0,7	0,6	28,9	1,2	15,5
2015-16	34,8	215,8	4,9	5,4	0,4	181,0	0,4	0,3	19,6	1,0	13,2
Significance[2]	**	**	**	**	**	**	**	**	**	n.s.	*
Calibers (Cal)[1]											
1	45,7 a	219,1	3,5 d	6,1 b	0,3 b	173,4d	0,0 c	0,0 c	17,8 d	0,5 b	8,0 a
2	34,9 b	218,3	5,2 c	7,4 a	0,4 b	183,4c	0,4 b	0,3 b	22,8 c	0,9 b	12,8 b
3	27,7 c	218,1	6,7 b	7,6 a	0,4 ab	190,5b	0,6 b	0,5 b	26,5 b	1,5 a	15,1 b
4	21,3 d	218,6	8,9 a	8,0 a	0,5 a	197,4 a	1,2 a	1,0 a	30,0 a	1,6 a	18,0 c
Significance[2]	**	n.s.	**	*	**	**	**	**	**	**	**
Cuts (T)[1]											
C	21,3 c	216,8	7,8 a	9,3 a	0,4 a	195,5 a	0,7 a	0,6 a	28,2 a	0,4 c	21,1 c
TP	50,1 a	221,5	3,3 d	4,2 c	0,3 b	171,4c	0,2 b	0,2 b	17,3 c	2,4 a	10,8 a
TS	30,2 b	217,6	7,1 b	7,4 b	0,4 a	187,4b	0,7 a	0,6 a	25,4 b	1,1 b	13,6 b
SV	27,9 bC	218,3	6,2c	8,1 b	0,4 a	190,4ab	0,6 a	0,4 a	26,2 b	0,5 c	15,7 b
Significance[2]	**	ns	**	**	**	**	**	**	**	**	**
Interactions [2]											
A x Cal	**	**	n.s.	n.s.	n.s.	**	n.s.	*	**	n.s.	ns
A x T	**	n.s.	**	**	**	*	n.s.	*	**	**	ns
Cal x T	**	n.s.	**	*	n.s.	**	*	**	**	**	**
A x Cal x T	**	**	**	n.s.	n.s.	**	n.s.	n.s.	**	n.s.	ns

[1] Values in the columns not having any letters in common are significantly indifferent at 0.05P according to the Student-Newman-Keuls (SNK) test.

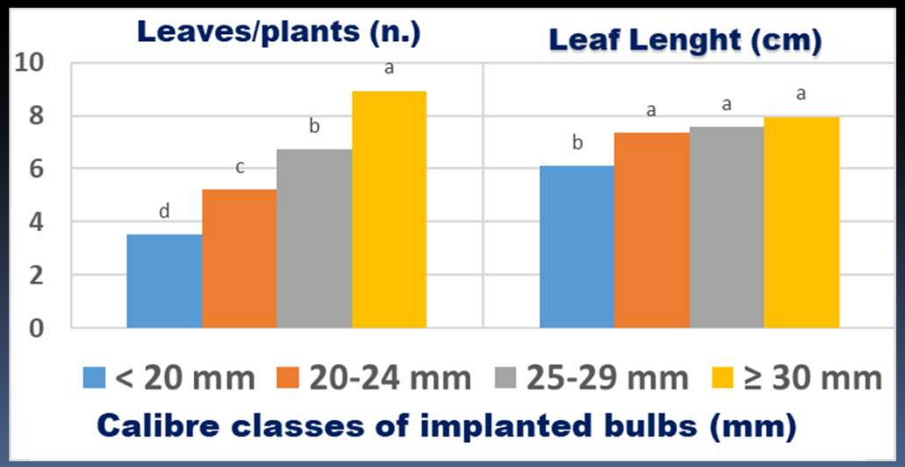
[2] *Significance at 0.95P **Significance at 0.01P n.s. = no significant differences.

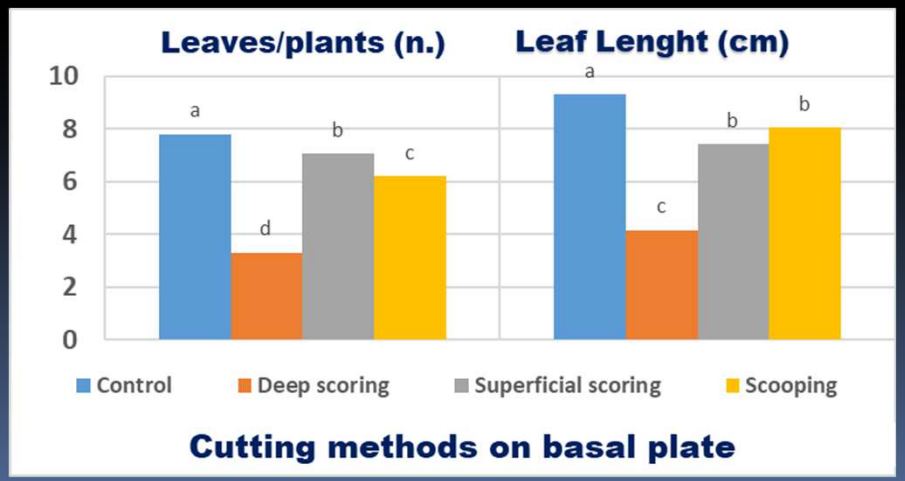


In particular, as the size of the bulbs increased, the average time for plant emergence was progressively reduced moving from the smallest bulbs (size 1) to the largest ones (size 4), there was an advance in emergence of more than 24 days.



The basal plate cutting method also resulted in significant variations for almost of all the morpho-phenological traits. Deep cutting one drastically reduced leaf development whose number/plant decreased by 4.5 units, compared to the control, and by 3.8 and 2.9 units, compared to the other two cutting modalities .



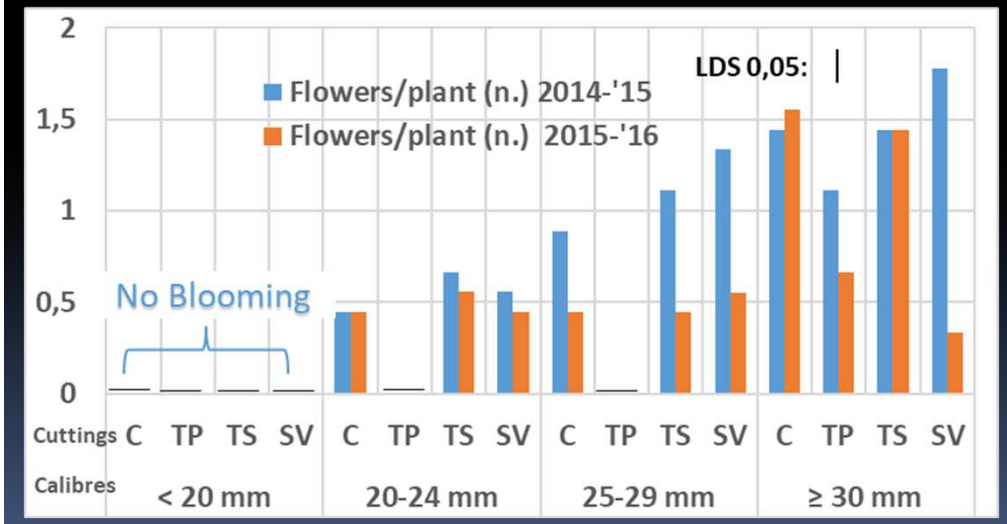


The biological cycle period was significantly reduced with deep cutting (by 24 days compared to the control),

finally, the senescence period remained statistically unvaried.

Variation source	Traits			
	anthesis (day from transplanting)	anthesis end (day from transplanting)	Post flowering (gg)	senescence (gg)
Calibres (Cal)[1]				
1	-	-	-	-
2	25,1	31,8	6	186,7
3	23,6	30,1	5,3	187,7
4	22,8	29,2	6	189,5
Significance[2]	n.s.	n.s.	n.s.	n.s.
Cuts (T)[1]				
C	22,9 ab	29,5	5,8 ab	186,6
TP	20,7 a	28,4	3,0 b	191,0
TS	24,1 ab	30,7	5,6 ab	185,7
SV	25,1 a	31,2	6,9 a	191,0
Significativity[2]	*	n.s.	*	n.s.

[1] Values in the columns not having any letters in common are significantly indifferent at 0.05P according to the Student-Newman-Keuls test.
[2] *Significance at 0.95P **Significance at 0.01P n.s. = no significant differences.



Considering the effect of the basal plate incisions, deep cutting induced a slight advance in the onset of flowering, and prolonged the emergence-flowering interval (pre-flowering phase).

CONCLUSIONS

The results obtained during the experimental trials allowed to acquire interesting data on the propagation of *S. lutea*.

In the experimental trial, the influence of calibre on the variation of the pheno-morphological trails was confirmed. In particular, larger bulbs had positive effects on flower stem formation. The plant flower was also significantly influenced by the cutting method. In particular, bulbs to deep incisions had the lowest values (-73 % compared to the control).

In order to exploit the results obtained in the best way possible, it would be advisable to further extend the investigations in the future, considering other cutting methods and other autochthonous geophytes .

Thanks for your attention!!!

IECPS 2021