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Comprehensive characteristics and genetic diversity of the endemic Australian *Viola banksii* (section *Erpetion*, Violaceae)

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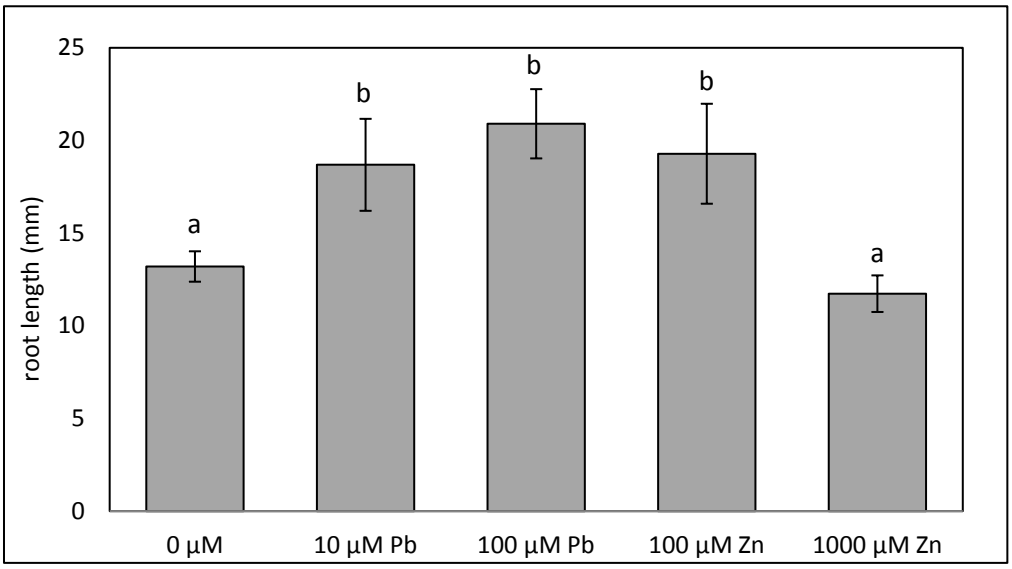
Supplementary figure

Fig. 1. The effect of different doses of Zn and Pb on the root length of *V. banksii* seedlings. Values followed by different letters are statistically significant at $P \leq 0.05$.



Supplementary Tables

Suppl. Table 1. Reproductive organ characteristics of *Viola banksii*

Character	Description
Flower	
chasmogamous flowers	present, nyctynastic (night-closing petal movement)
cleistogamous flowers	absent
sepal number, color	five, light green
petal number, color, fragrance	five, bicolored (violet and white), violet on 3/4 surface of lower petal, 1/2 of lateral petals, 1/4 of upper petals from the base, white the rest of petal surface, odorous
petal venation (lines, guides for insects)	deep violet, on lower petal clearly visible, main middle vein non-branching, lateral veins branched, scarce on upper and lateral petals on violet part of petal surface; on lower petal at the base, triangular, conspicuous, indurated green area with white margin, smaller on lateral petals
petal pubescence on abaxial side	white hairs on lateral petals, on ½ of inner petal surface at the base, sporadically on lower petal
spur	absent
number of pistils	one
pistil style and stigma	style thin, straight, stigma non-papillatae with stigmatic chamber, stigma receptivity (3 days) only during nyctinastic petal movement period
number and type of stamens	five, filamentless, anthers bordered by hairs
anther appendices, color	each anther develops orange appendix
nectaries	absent, two anthers forming characteristic whitish protuberance (gland-like) along anther connective
Anther tapetum, pollen, ovule, female gametophyte, embryo, endosperm, seed	
anther tapetum type	secretory
pollen viability, aperture numbers	highly viable (stainable) pollen, uniform in size in flowers from natural populations, drastically reduced pollen viability in cultivar (dwarf pollen grains, differing in size); 3-aperturate pollen in flowers from natural populations, 3-,4-,5-aperturate pollen in cultivar
ovule type, number in ovary	anatropous, crassinucellate, bitegmic, 20-39
number of female archespore cells	one in majority of ovules, sporadically two
parietal cells	present
number of meiocytes undergoing meiosis	one in majority of ovules, sporadically two
type of female gametophyte development	monosporic, Polygonum type, from chalazal megaspore, three megaspores of tetrad degenerate in majority of ovules, sporadically more than one megaspore stays viable
type of embryo	Asterad, suspensorless
type of endosperm	nuclear
type of fruit, color	capsule, dark green at maturation
seed color	dark brown to black
seed elaiosome	present, inconspicuous

Suppl. Table 2. Leaf characteristics of *Viola banksii*

Character	Description
Leaf morphology and anatomy	
leaf blade shape, color	very variable even within one population, reniform with cordate base and deep sinus, but also reniform with base differing in shape, bright green
venation pattern	palmate, radiate pattern of main veins from central part of the petiole, each main veins extends from the petiole to the margin, main veins branched
trichomes on epidermis	indumendum variable on abaxial and adaxial epidermis, even within one population e.g., 100% (70) of observed leaves of clone 2 glabrous; 100% (100) of observed leaves of clone 5 with trichomes on both leaf surfaces
stomata distribution, leaf type	on both sides of leaf blades, more abundant on abaxial epidermis, scarce, located close to veins on abaxial epidermis; leaf amphistomatic
stomata type	anisocitic, one small and two larger subsidiary cells
number of epidermis layers on both side of leaf blade	1
cuticle	covering upper and lower epidermis cells
leaf type based on the mesophyll parenchyma types	dorsiventral, palisade and spongy parenchyma
number of palisade parenchyma layers	1, large cells with chloroplasts
number of spongy parenchyma layers out of veins	3-4 layers with cells of different size, some very large, horizontally longitudinal
vascular bundle type	collateral, xylem on adaxial side
collenchyma layer(s) surrounding vascular bundle	absent, vascular bundle surrounded by large parenchymous cells
druses in leaf mesophyll	numerous

Suppl. Table 3. Vegetative organ characteristics of *Viola bansksii* - stem, petiole, pedicel

Character	Stem	Petiole	Pedicel	Primary root of seedling
plant habit	acaulescent	-	-	-
stem type	pseudostolon, aerial sympodial chain of lateral bibracteolate stems with a terminal rosette from which new lateral stems form in the axil of the lowermost leaf; vegetative propagation	-	-	-
shape (in cross section)	elliptic without wings	elliptic with two wings	elliptic with two small wings	elliptic
trichomes on epidermis	absent	absent or present	absent	root hairs on rhizodermis
number of epidermis layers	1	1	1	1 layer of rhizodermis
cuticle covering epidermis cell	present	present	present	absent
subepidermal collenchyma layer(s)	absent	absent	absent	absent
cortex parenchyma	isodiametric parenchyma cells of different size, small intercellular spaces	cells of different size and shape, smallest in sub-epidermal part, small intercellular spaces	isodiametric parenchyma cells of different size, small intercellular spaces	isodiametric parenchyma cells, small intercellular spaces
endodermis	absent	absent	absent	not detected at this stage of development
vascular tissue	central cylinder (arc) of **adaxial xylem** and **abaxial** pohlem and **parenchymatous pith** (between leaf rosettes)**, collateral bundles (at the node region)**	central cylinder (arc) of **adaxial xylem** and **abaxial** phloem, **parenchymatous pith; two small bundles in wings**	**4 collateral bundles**	actinostele, diarchic, 2 xylem strands and 2 phloem strands in radiating arrangement
collenchyma or sclerenchyma layer(s) surrounding vascular system	2-3 layers of collenchyma	2-3 layers of collenchyma	absent	absent
druses in cortex parenchyma	present	present	present	absent