

1 **Morphology and inheritance of wavy flower form in periwinkle [*Catharanthus***
2 ***roseus* (L.) G. Don]**

3
4 **Abstract**

5 Periwinkle [*Catharanthus roseus* (L.) G. Don] is renowned for its diverse colors and
6 resilience to harsh climates. Still, most commercial cultivars predominantly display flat
7 petals, lacking in ornamental variety. Diversifying flower forms could not only enhance
8 its aesthetic appeal but also potentially impact market dynamics. With this backdrop,
9 our study embarked on elucidating the inheritance patterns of wavy flower forms,
10 aiming to refine periwinkle breeding strategies. Using cultivars representing non-wavy,
11 medium-wavy, and extreme-wavy flower forms, we examined differences in both their
12 leaf and floral organs. Phenotypes of self-pollinated (S₁) and cross-pollinated (F₁, F₂)
13 populations further underscored their morphological distinctions. Specifically, the
14 extreme-wavy type displayed elliptical leaves, broader than the non-wavy type, with
15 pronounced pointy tips and a notably wrinkled surface. This type also bore intensely
16 wavy petal margins and exhibited a smaller flower diameter, with a notable absence of
17 a typical pistil, indicating female sterility. Insights gained allowed early differentiation
18 during the seedling period. Our findings suggest that the inheritance of these flower
19 forms is regulated by an allele *WAVY* (*Wv*), which exhibits incomplete dominance.
20 Specifically, the non-wavy form arises from a recessive homozygous expression (*wvwv*),
21 the extreme-wavy from a dominant homozygous expression (*WvWv*), and the medium-
22 wavy from a heterozygous expression (*Wvwv*). This study provides clarity on
23 inheritance patterns, facilitating strategic breeding of diverse flower forms in
24 periwinkle.