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## ARTICLE I FO

ABSTRACT



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# 1. Introduction

\_\_\_\_ ., 1997; , **r r** \_\_ ■ A , 1999; H , 1996; H K K 2007). \_\_ 🖿 \_ 🖿 (A🕊 🖿 \_\_ ., 2003; B 🕊 , 2002; , , , 2008). A 2009: F II. **F** , 2002; **F** (**F** ., 2008) T. **F** ľ ., 2009; F , 2002; L \_\_\_\_\_, (E 2002; **Af f** 2005). \_ **r**\_ Н 1 C T. **1**983; A . 2005). fi 1983). C ., 1979), \_\_\_\_ Α , 2001; D (. ... \_\_\_\_\_, 1996; \_\_\_\_ ., 2008), 📫 ; B T, **I**, 1996; L 2009). Ľ. (H\_\_\_\_ Ľ, ), (... 📫 (L \_\_\_\_ ., 2004).\_ , 2006) **f**(\_\_\_ ., 2008). H \_ ., 2003; C (A ., 1990), **i**, 1988, 1991). E. C ) (K š \_\_ ., 1997). ., 2012). , 1991, 1996; (A ., 2013: , 2007; ., 2010; (... 🖿 K 2008). C 🔳 🔳 2000). A ۳, T. Ľ. **F í** (L \_\_\_\_\_., 2014). . (1988) 2009: ſ\_ſ \_ \_ **T** I. 🗂 . D **m**r ) 📫 ., 1988; \_\_ f ., 2004). С 📕 \_ fi ŧ۴. \_\_\_\_ **II** : \_\_\_\_ **II** \_\_\_ (C 📲 \_\_\_ ., 2011; ,1981; -D ., 2006). 👘 💕 н , 1998; L T, i î r r , 1990; L i î **T** (B 🔳 -D 1981). 🏼 **T** , 1998: **1 1** (H , 1981). G -D L fi , 1990; (B 🔳 , 1998; \_\_\_\_\_, 2006). 🏼 🗖 📕 📕 , 2011; H r r (B ▲ ,1990; C ▲ ,2011; H - T , 1998; ., 2006). 🔄 🖿 T.



# 2. Materials and methods

2.1. The study site



#### 2.2. The species



2.3. Experimental design





2.4. Measurements and data analysis









# 3. Results

3.1. Effects of clonal integration and defoliation on growth measures



3.2. Effects of clonal integration and defoliation on morphological measures



4. Discussion





Fig. 2. E

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(E; n = 8) (A)Fig. 3. E Iris \_\_\_ **I** . : **■** P > 0.05, \*P = 0.01-



#### Table 2

elavayi.\_\_\_\_ F P<0 ľ\_\_\_ -\_\_\_ A r r A Iris delavayi.\_\_ *P* < 0.05. r. D T. I D B (I) (D) F<sub>1,34</sub> Р  $F_{7,34}$  $F_{2,34}$ Р F<sub>2,34</sub> Р Р 6.0 0.020 6.2 0.005 1.6 0.221 1.0 0.463 Β \_\_\_ 0.521 2.2 0.129 0.333 1.1 0.359 0.4 1.1 02 0.669 **13.1** <**0.001** 0.9 0.426 2.5 0.033 /



## Acknowledgments



# References

- Α ., 1991. • . ſ\_\_\_ **f** Fragaria chiloensis. E 72, 69–80. , ., 1996. r \_\_ r ... \_ 📕 🔄 📲 📕 Fragaria chiloensis. J. E. 🔒 Α 84, 395–406. All I, . . ., A , D.D., 2001<u>, C</u> 💕 **.** rr. r r r **I**, . . ., \_\_\_ .E 84, 2905-2918. , , 1997. E **F**\_\_\_\_ r r ., B , J.-B., B **f** , A., 2009. .\_\_ 🖿 E . 201, 621–630. r r B 🛒 , J. ., 1990. L **■** *Carex*. <u>C</u> **■**. J. B . 68, 1441-1448. В , D.D., B 🛋, . ., \_ \_ 🖿 , ., 1996. C 👕 🗂 fl f f C4 f .... r <sup>13</sup>C **r** . 105, 151-159.
- \_C , L, L , .-L, H , F, E , H, ... , H.-L, , , .- ., 2011. A 22, 2822–2828. **1** É. 📽 . J. A . E
- 22, 2822-2828. C , .-., .-H, D , .-., L, F, H , .-., 2011. A *Carex brevicuspis* (C \_\_\_\_\_). F \_\_\_\_ 206, 347-350. C , ., D , J., B , .I., ..., 1990. A \_\_\_\_\_\_ *Indigofera spinosa* S 3, 546-552. D , J.K., D , ..., 1979. Routelous arracilis
- rr Ēr .
- r r \_\_\_\_ **r**. 41, 127-134. Ε.
- fi
- F\_\_\_\_, D. ., 98, 125–133. 1991 .A 📕 **""**, D., A , ., 1991.
- Fragaria chiloensis r r
- Fragaria chiloensis
   86, 76–80.

   G
   , , , A

   2016. C
   , , A. L

   , E
   . :// . . /10.1007/ 10682-016-9840-9.

H, , , A, L, 1999. C III I Nardus stricta L, I Calluna
vulgaris (L.) H 💠 🔤 🖬 🔄 🖬 📕 📕 👘 👘
🛄 📕 . J. E 🛛 . 87, 330–340.
Щ, , J. ,       📫, .C.D., 1996. Е
Trifolium repens L. AM. B . 78, 117–123.
Н., .Е., 1996. Н , Г Г Г Г Г Г Г Г
609–615.
H , L.D., , D.A., 1998. D
. J. E . 86, 854–865.
🖬 K 📲 🖷, ., 2000. C 💻 📲 📲 📲 Ranunculus reptans: -
■? J. E B 13, 237–248.
K., š, L, K., š, J, H 🛍 , 🦲 🛍 🖉 , J, 1997. C 💻 🚊 📖 🗧
, J.