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Interactive comment on "Colonization of an empty island: how does a plant with a plastic gender system respond?" *by* M. Philipp and H. Adsersen

Anonymous Referee #3

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General comments This is a very well written piece of research that addresses some interesting questions on gender dimorphism. The study presents very exciting new data to understand the evolution of reproductive systems in new emerging habitats. To my knowledge such study, with a dimorphic plant species, have no or rarely addressed. I think that the authors have very well take advantage of an exceptional opportunity to make such study and they have to be congratulated for that. The ecosystem studied and the process of colonization of a new habitat increases very much the appeal of the study. The introduction justifies very much the study, the methods are appropriate (although sometimes sample size may limit the scope of the conclusions) and carefully described. The results are well structured and the discussion critically evaluates the results. Therefore, I consider that this manuscript is a significant contribution to the existing literature on sexual dimorphism.

Specific comments:

Page 16048, lines 23-24: Authors emphasized the importance of seeds dispersed by sea water in the process of colonization. However, I wonder whether the main mechanism of spread may be through clonal growth rather than by seed. Some literature point to this possibility (see some of these references below). Harris, D. and Davy, A. J. 1986. Regenerative potential of Elymus farctus from rhizome fragments and seed. – J. Ecol. 74: 1057 – 1067. Huiskes, A. H. L. 1979. The demography of leaves and tillers of Ammophila arenaria in a dune sere. – Oecol. Plantarum 14: 435-446.

Page 10650, lines 1-2: Considering that H. peploides is a perennial hemicryptophyte whose shoots disappear during most of the year to sprout each spring from buds on buried rhizomes I wonder how individuals can be marked with a number throughout many years and so to age the individuals.

Page 10651, lines 10-11: Authors stated that they "had no problem in identifying single individuals". However, I consider that this is a very difficult task because what it is considered an individual ("...most individuals consist of rounded pillows or mats up to 6m in diameter...") may consists of different genotypes (see Sanchez-Vilas, Philipp & R. Retuerto, 2009).

Page 10652, lines 3-7: Authors stated: " In each population we selected a central point and recorded flowering plants within a circle including at least 30 individuals...." As I argued above I do not think it can be said that. How can they be sure of what is an individual. Most likely authors could be resampled the same individuals. It is quite probable that they recorded as different individuals (genets) what is a single genetic individual. This could introduce bias at the time of computing sex ratios or sex proportions.

Page 10653, line 17: I would better say that this difference is non-significant (Âň2-test, P = 0.097).

Page 10653, line 22: Authors said: "From 12 hermaphrodite individuals in total..." .

However, on Table 2 appears n=13.

Page 10656, lines 4-11: Authors may consider to cite a paper that may be relevant to the point they made Sanchez-Vilas, J., Bermudez, R., Retuerto, R. 2012. Soil water content and patterns of allocation to below- and above-ground biomass in the sexes of the subdioecious plant Honckenya peploides. Annals of Botany 110: 839–848.

Page 10656, lines 25-26: Authors stated: "...We conclude that below soil surface intraspecific competition occurs and that ...". I consider that the conclusion of the authors goes beyond their results. I would suggest to moderate this conclusion as they only have indirect evidence (based on the dispersion spatial pattern) on the existence of intraspecific competition.

Page 10656 Lines 21-23 "...In the only population where we measured the areas of each individual ..." Again, I have some concern on this statement. How can the authors be sure that they were measuring individuals?.

Page16660 lines 23-24 I think that authors should also consider that plants may have established from clonal fragments from abroad, dispersed by sea water, and not exclusively germinated from seeds from abroad.

Interactive comment on Biogeosciences Discuss., 11, 10647, 2014.