

# Distribution patterns and long-term changes in vascular plants of non-littoral areas in the SW archipelago of Finland. Part II. Pinaceae, Cupressaceae, Nymphaeaceae, Ranunculaceae, Papaveraceae, Ulmaceae, Cannabaceae, Urticaceae, Fagaceae, Betulaceae, Myricaceae, Caryophyllaceae, Chenopodiaceae, Polygonaceae

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*Received 11 Nov. 2016, final version received 31 Aug. 2017, accepted 1 Sep. 2017*

von Numers M. 2017: Distribution patterns and long-term changes in vascular plants of non-littoral areas in the SW archipelago of Finland. Part II. Pinaceae, Cupressaceae, Nymphaeaceae, Ranunculaceae, Papaveraceae, Ulmaceae, Cannabaceae, Urticaceae, Fagaceae, Betulaceae, Myricaceae, Caryophyllaceae, Chenopodiaceae, Polygonaceae. — *Ann. Bot. Fennici* 54: 317–344.

Historical (mainly 1930s) and contemporary records of 482 vascular plant species or genus of non-littoral areas of 464 islands in the archipelago of SW Finland are compared to visualise changes in distribution patterns, and to identify environmental variables that exert an influence on the distribution of the species. The environmental variables were measured in a GIS. Logistic regression analysis was used to find variables that exert an influence on the probability of species occurrences. In this second part of a series of papers results, including distribution maps, are presented for species of Pinaceae, Cupressaceae, Nymphaeaceae, Ranunculaceae, Papaveraceae, Ulmaceae, Cannabaceae, Urticaceae, Fagaceae, Betulaceae, Myricaceae, Caryophyllaceae, Chenopodiaceae and Polygonaceae. A synthesis of the study will be presented in the last part of this article series.

## Introduction

In this second part of the article series, results on Pinaceae, Cupressaceae, Nymphaeaceae, Ranunculaceae, Papaveraceae, Ulmaceae, Cannabaceae, Urticaceae, Fagaceae, Betulaceae, Myricaceae, Caryophyllaceae, Chenopodiaceae and Polygonaceae are presented. For study concepts,

study area, island data and statistical methods, see von Numers (2017).

The results of the logistic regression analyses are presented in a simplified form in Table 1 and in full in Appendix 1. The turnover rate and other central statistics for the individual species are in Table 2. The distribution maps (1–68) show absences, extinctions, colonizations and pres-

ences. The individual species are treated in the following.

## Results

Part II presents the results on Pinaceae (Figs. 1 and 2), Cupressaceae (Fig. 3), Nymphaeaceae

(Fig. 4), Ranunculaceae (Figs. 5–21), Papavera-  
ceae (Fig. 22), Ulmaceae (Fig. 23), Cannabaceae  
(Fig. 24), Urticaceae (Figs. 25 and 26), Faga-  
ceae (Fig. 27), Betulaceae (Figs. 28–31), Myri-  
caceae (Fig. 32), Caryophyllaceae (Figs. 33–54),  
Chenopodiaceae (Fig. 55), and Polygonaceae  
(Figs. 56–68).

**Table 1.** Predictors that contribute significantly to the logistic regression models. + = increase the probability of occurrence, – = decrease the probability of occurrence. The most contributing predictor in the two categories has a ++ or -- sign. The table contains the families Pinaceae, Cupressaceae, Nymphaeaceae, Ranunculaceae, Papavera-  
ceae, Ulmaceae, Cannabaceae, Urticaceae, Fagaceae, Betulaceae, Myricaceae, Caryophyllaceae, Chenopodia-  
ceae, and Polygonaceae.

| Species  | Geographical predictors |                                |           |             |             | Land-cover predictors |             |                      |                  |                   |              |           |           |              |
|--|-------------------------|--------------------------------|-----------|-------------|-------------|-----------------------|-------------|----------------------|------------------|-------------------|--------------|-----------|-----------|--------------|
|  | Area                    | Island topographical diversity | Limestone | Position SN | Position WE | Isolation             | Settlements | Meadows and pastures | Deciduous forest | Coniferous forest | Mixed forest | Scrubland | Open sand | Rocky ground |
| <i>Picea abies</i>                               | +                       | +                              |           | +           | ++          | -                     |             | +                    | +                | ++                |              | +         |           | -            |
| <i>Pinus silvestris</i>                          | +                       | +                              |           | ++          | +           | -                     |             |                      |                  | ++                |              |           |           |              |
| <i>Actaea spicata</i>                            |                         | ++                             |           |             | -           |                       |             | ++                   |                  | +                 |              | +         |           |              |
| <i>Caltha palustris</i>                          | +                       | +                              | +         | -           | --          |                       | +           | +                    |                  |                   |              |           |           | ++           |
| <i>Anemone nemorosa</i>                          | +                       | +                              |           | +           | +           | --                    |             | +                    |                  | +                 | +            |           |           | --           |
| <i>Hepatica nobilis</i>                          |                         | +                              | +         |             |             | --                    | +           | +                    | ++               | +                 |              |           | -         | -            |
| <i>Ranunculus polyanthemos</i>                   | ++                      | +                              |           | +           | -           | -                     |             | ++                   | +                | +                 | +            |           |           |              |
| <i>Ranunculus repens</i>                         | +                       | +                              | +         | +           |             | --                    | +           | +                    | ++               |                   |              |           | -         | -            |
| <i>Ranunculus acris</i>                          | ++                      |                                | +         |             |             | -                     | +           | ++                   | +                | +                 |              | +         |           | -            |
| <i>Ranunculus auricomus</i>                      | ++                      |                                | +         | +           | +           | -                     |             | +                    | +                |                   | ++           |           |           |              |
| <i>Ranunculus flammula</i>                       | ++                      |                                | +         |             |             | -                     | +           | +                    | +                | ++                |              | +         | -         |              |
| <i>Myosurus minimus</i>                          | +                       |                                |           |             | --          | +                     |             |                      |                  |                   |              |           |           | +            |
| <i>Thalictrum flavum</i>                         | ++                      |                                |           | -           | -           |                       |             | +                    |                  |                   |              | ++        |           |              |
| <i>Urtica dioica</i>                             | ++                      |                                |           |             | -           |                       | +           |                      |                  |                   | ++           | +         |           |              |
| <i>Quercus robur</i>                             |                         | ++                             |           |             |             | -                     |             |                      |                  |                   |              |           |           |              |
| <i>Betula verrucosa</i>                          |                         | +                              | +         | +           | ++          | -                     |             |                      |                  | ++                |              |           |           | -            |
| <i>Betula pubescens</i>                          | ++                      | +                              |           | +           | -           | -                     | +           | +                    |                  |                   | +            | ++        | -         | -            |
| <i>Alnus glutinosa</i>                           | ++                      |                                |           | +           | +           | -                     |             | +                    |                  | ++                |              | +         | -         |              |
| <i>Corylus avellana</i>                          | +                       | +                              | +         | +           |             | --                    | +           |                      | ++               |                   | +            | +         | -         | -            |
| <i>Arenaria serpyllifolia</i>                    | +                       |                                | ++        | -           | +           | -                     | ++          |                      | +                |                   |              |           |           |              |
| <i>Moehringia trinervia</i>                      | +                       | +                              |           | +           |             | --                    |             | +                    | +                | +                 |              | ++        | -         | -            |
| <i>Cerastium fontanum</i><br>ssp. <i>vulgare</i> | ++                      |                                | +         |             | -           | -                     |             |                      | +                | ++                |              |           |           | +            |
| <i>Cerastium semidecandrum</i>                   | +                       |                                | ++        |             |             |                       |             | +                    |                  |                   | ++           |           |           |              |
| <i>Cerastium glutinosum</i>                      | +                       |                                |           | -           | --          | +                     |             |                      |                  |                   |              |           |           | +            |
| <i>Sagina nodosa</i>                             | +                       |                                | ++        |             |             | -                     |             | ++                   |                  |                   |              |           |           | +            |
| <i>Scleranthus annuus</i>                        | +                       | +                              |           | -           |             | --                    |             | +                    | +                | ++                |              |           |           |              |
| <i>Spergula arvensis</i>                         | ++                      |                                |           |             | -           | -                     | +           |                      | +                |                   |              |           |           |              |
| <i>Spergula morisonii</i>                        | +                       | ++                             |           |             | +           | -                     |             |                      |                  | +                 |              |           |           |              |

continued

Table 1. Continued

| Species  | Geographical predictors |                                |           |             |             | Land-cover predictors |             |                      |                  |                   |              |           |           |              |
|--|-------------------------|--------------------------------|-----------|-------------|-------------|-----------------------|-------------|----------------------|------------------|-------------------|--------------|-----------|-----------|--------------|
|  | Area                    | Island topographical diversity | Limestone | Position SN | Position WE | Isolation             | Settlements | Meadows and pastures | Deciduous forest | Coniferous forest | Mixed forest | Scrubland | Open sand | Rocky ground |
| <i>Lychnis flos-cuculi</i>                                 | +                       |                                |           | -           | --          |                       |             |                      |                  | +                 |              | -         |           | ++           |
| <i>Lychnis viscaria</i>                                    | +                       |                                | +         |             | +           | --                    |             |                      | ++               |                   | +            |           |           | -            |
| <i>Silene nutans</i>                                       | +                       | +                              | +         | -           | --          | --                    | +           | ++                   | +                |                   | -            |           |           | -            |
| <i>Silene viscosa</i>                                      |                         |                                |           | --          | -           | +                     |             |                      |                  | -                 |              |           | ++        | +            |
| <i>Silene dioica</i>                                       | +                       | +                              | +         | +           |             | --                    |             | +                    | +                |                   | ++           | +         | -         | -            |
| <i>Dianthus deltoides</i>                                  | +                       | +                              |           | -           | -           | --                    | +           | +                    | ++               | +                 |              |           |           |              |
| <i>Chenopodium album</i>                                   | +                       |                                |           | -           |             | --                    | ++          |                      | +                |                   |              |           |           |              |
| <i>Persicaria minor</i>                                    |                         |                                |           |             |             | +                     |             |                      |                  |                   |              | -         | +         | ++           |
| <i>Persicaria lapathifolia</i><br>ssp. <i>lapathifolia</i> | ++                      |                                |           | -           |             | -                     | +           | ++                   |                  |                   |              | +         |           |              |
| <i>Fallopia convolvulus</i>                                | +                       | +                              |           |             |             | --                    | +           |                      | ++               |                   |              |           |           |              |
| <i>Fallopia dumetorum</i>                                  | +                       | +                              |           | ++          | +           | -                     |             |                      |                  | ++                | +            | +         |           | -            |
| <i>Rumex acetosa</i>                                       | ++                      |                                | +         |             | -           | -                     |             | +                    |                  |                   | +            | ++        | -         |              |
| <i>Rumex acetosella</i>                                    | +                       | ++                             |           | +           |             |                       |             | +                    |                  | +                 |              | +         | -         | ++           |

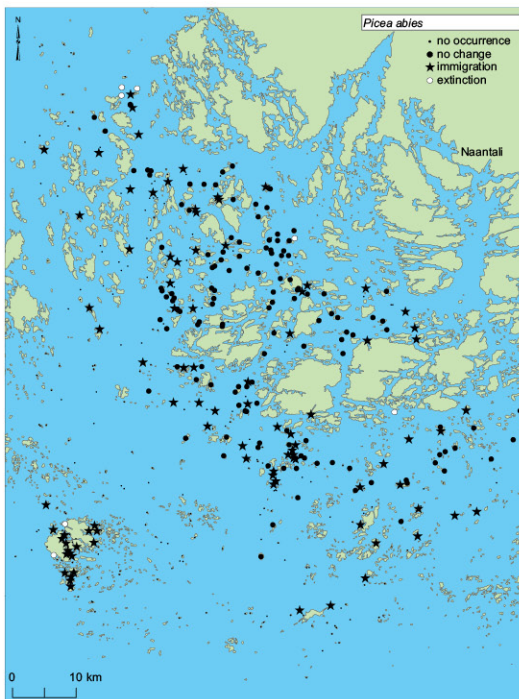


Fig. 1. *Picea abies*. Common. Clearly increased and spread towards maritime areas. For the results of logistic regression analysis see Appendix.

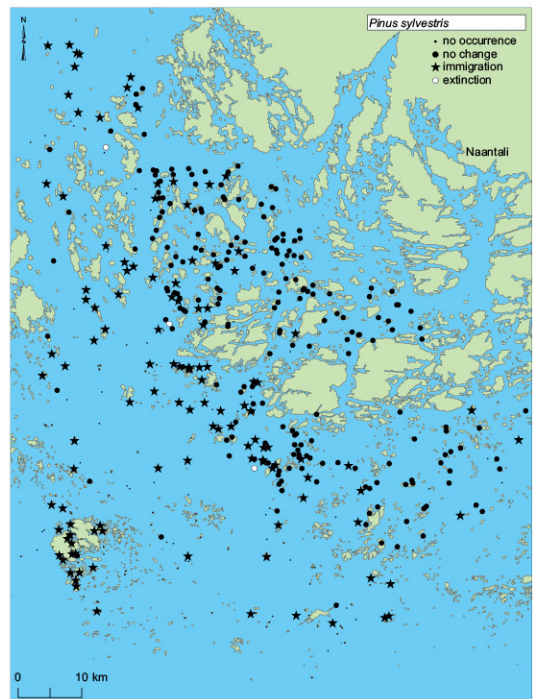


Fig. 2. *Pinus sylvestris*. Very common. Increased and spread towards maritime areas. For the results of logistic regression analysis see Appendix.

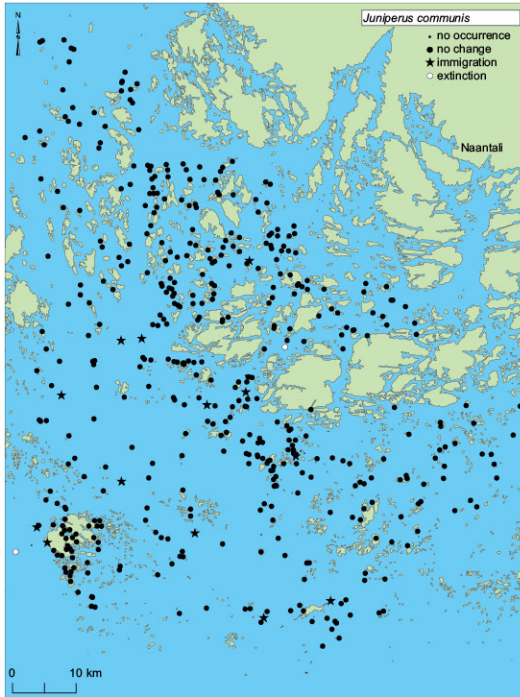
**Table 2.** Summary data on the families Pinaceae, Cupressaceae, Nymphaeaceae, Ranunculaceae, Papaveraceae, Ulmaceae, Cannabaceae, Urticaceae, Fagaceae, Betulaceae, Myricaceae, Caryophyllaceae, Chenopodiaceae, and Polygonaceae on the 464 islands.

| Species                        | Extinctions | Preserved | Colonizations | Total      |         | Change | Turnover (%) | Percentage of islands |         | Change (%) |
|--------------------------------|-------------|-----------|---------------|------------|---------|--------|--------------|-----------------------|---------|------------|
|                                |             |           |               | historical | current |        |              | historical            | current |            |
| <i>Picea abies</i>             | 7           | 132       | 91            | 139        | 223     | 84     | 27.07        | 30.0                  | 48.1    | 60.4       |
| <i>Pinus silvestris</i>        | 3           | 212       | 119           | 215        | 331     | 116    | 22.34        | 46.3                  | 71.3    | 54.0       |
| <i>Juniperus communis</i>      | 2           | 441       | 13            | 443        | 454     | 11     | 1.67         | 95.5                  | 97.8    | 2.5        |
| <i>Nymphaea candida</i>        | 2           | 3         | 0             | 5          | 3       | -2     | 25.00        | 1.1                   | 0.6     | -40.0      |
| <i>Actaea spicata</i>          | 3           | 12        | 11            | 15         | 23      | 8      | 36.84        | 3.2                   | 5.0     | 53.3       |
| <i>Caltha palustris</i>        | 11          | 21        | 15            | 32         | 36      | 4      | 38.24        | 6.9                   | 7.8     | 12.5       |
| <i>Anemone nemorosa</i>        | 7           | 23        | 10            | 30         | 33      | 3      | 26.98        | 6.5                   | 7.1     | 10.0       |
| <i>Hepatica nobilis</i>        | 0           | 26        | 9             | 26         | 35      | 9      | 14.75        | 5.6                   | 7.5     | 34.6       |
| <i>Ranunculus polyanthemus</i> | 18          | 13        | 6             | 31         | 19      | -12    | 48.00        | 6.7                   | 4.1     | -38.7      |
| <i>Ranunculus repens</i>       | 9           | 18        | 29            | 27         | 47      | 20     | 51.35        | 5.8                   | 10.1    | 74.1       |
| <i>Ranunculus acris</i>        | 99          | 125       | 12            | 224        | 137     | -87    | 30.75        | 48.3                  | 29.5    | -38.8      |
| <i>Ranunculus bulbosus</i>     | 3           | 7         | 6             | 10         | 13      | 3      | 39.13        | 2.2                   | 2.8     | 30.0       |
| <i>Ranunculus auricomus</i>    | 42          | 55        | 12            | 97         | 67      | -30    | 32.93        | 20.9                  | 14.4    | -30.9      |
| <i>Ranunculus cassubicus</i>   | 0           | 1         | 0             | 1          | 1       | 0      | 0.00         | 0.2                   | 0.2     | 0.0        |
| <i>Ranunculus sceleratus</i>   | 2           | 2         | 3             | 4          | 5       | 1      | 55.56        | 0.9                   | 1.1     | 25.0       |
| <i>Ranunculus flammula</i>     | 44          | 66        | 20            | 110        | 86      | -24    | 32.65        | 23.7                  | 18.5    | -21.8      |
| <i>Ranunculus reptans</i>      | 0           | 0         | 1             | 0          | 1       | 1      | 100.00       | 0.0                   | 0.2     | 0.0        |
| <i>Ranunculus ficaria</i>      | 9           | 9         | 11            | 18         | 20      | 2      | 52.63        | 3.9                   | 4.3     | 11.1       |
| <i>Myosurus minimus</i>        | 78          | 11        | 6             | 89         | 17      | -72    | 79.25        | 19.2                  | 3.7     | -80.9      |
| <i>Thalictrum simplex</i>      | 2           | 0         | 0             | 2          | 0       | -2     | 100.00       | 0.4                   | 0.0     | -100.0     |
| <i>Thalictrum flavum</i>       | 4           | 3         | 11            | 7          | 14      | 7      | 71.43        | 1.5                   | 3.0     | 100.0      |
| <i>Chelidonium majus</i>       | 1           | 2         | 6             | 3          | 8       | 5      | 63.64        | 0.6                   | 1.7     | 166.7      |
| <i>Ulmus glabra</i>            | 0           | 0         | 1             | 0          | 1       | 1      | 100.00       | 0.0                   | 0.2     | 0.0        |
| <i>Humulus lupulus</i>         | 2           | 1         | 4             | 3          | 5       | 2      | 75.00        | 0.6                   | 1.1     | 66.7       |
| <i>Urtica dioica</i>           | 29          | 274       | 48            | 303        | 322     | 19     | 12.32        | 65.3                  | 69.4    | 6.3        |
| <i>Urtica urens</i>            | 4           | 0         | 1             | 4          | 1       | -3     | 100.00       | 0.9                   | 0.2     | -75.0      |
| <i>Quercus robur</i>           | 0           | 2         | 13            | 2          | 15      | 13     | 76.47        | 0.4                   | 3.2     | 650.0      |
| <i>Betula verrucosa</i>        | 2           | 19        | 53            | 21         | 72      | 51     | 59.14        | 4.5                   | 15.5    | 242.9      |
| <i>Betula pubescens</i>        | 10          | 174       | 101           | 184        | 275     | 91     | 24.18        | 39.7                  | 59.3    | 49.5       |
| <i>Alnus glutinosa</i>         | 0           | 334       | 49            | 334        | 383     | 49     | 6.83         | 72.0                  | 82.5    | 14.7       |
| <i>Corylus avellana</i>        | 0           | 27        | 22            | 27         | 49      | 22     | 28.95        | 5.8                   | 10.6    | 81.5       |
| <i>Myrica gale</i>             | 0           | 0         | 3             | 0          | 3       | 3      | 100.00       | 0.0                   | 0.6     | 0.0        |
| <i>Arenaria serpyllifolia</i>  | 34          | 47        | 21            | 81         | 68      | -13    | 36.91        | 17.5                  | 14.7    | -16.0      |

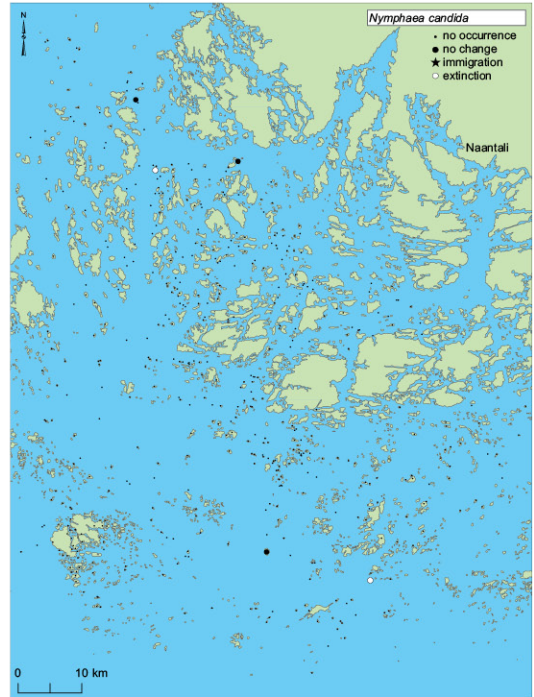
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Table 2. Continued.

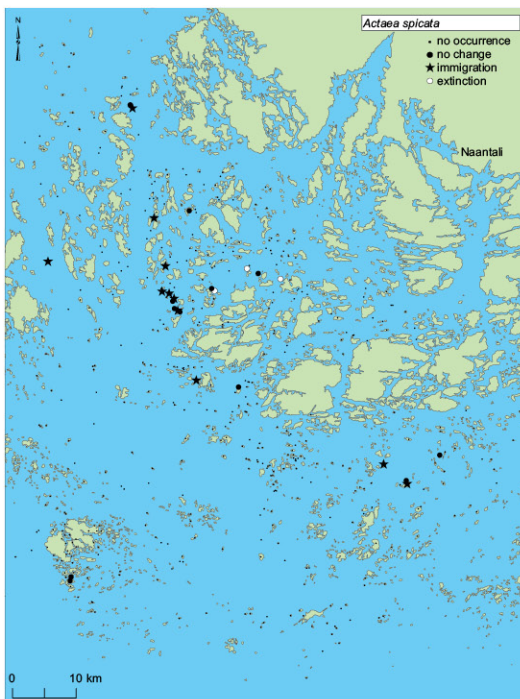
| Species                             | Extinctions | Preserved | Colonizations | Total      |         | Change | Turnover (%) | Percentage of islands |         | Change (%) |
|-------------------------------------|-------------|-----------|---------------|------------|---------|--------|--------------|-----------------------|---------|------------|
|                                     |             |           |               | historical | current |        |              | historical            | current |            |
| <i>Moehringia trinervia</i>         | 7           | 154       | 104           | 161        | 258     | 97     | 26.49        | 34.7                  | 55.6    | 60.2       |
| <i>Stellaria media</i>              | 85          | 54        | 44            | 139        | 98      | -41    | 54.43        | 30.0                  | 21.1    | -29.5      |
| <i>Stellaria holostea</i>           | 0           | 3         | 2             | 3          | 5       | 2      | 25.00        | 0.6                   | 1.1     | 66.7       |
| <i>Stellaria graminea</i>           | 9           | 428       | 16            | 437        | 444     | 7      | 2.84         | 94.2                  | 95.7    | 1.6        |
| <i>Cerastium arvense</i>            | 0           | 0         | 1             | 0          | 1       | 1      | 100.00       | 0.0                   | 0.2     |            |
| <i>Cerastium fontanum</i>           | 55          | 303       | 23            | 358        | 326     | -32    | 11.40        | 77.2                  | 70.3    | -8.9       |
| <i>Cerastium semidecandrum</i>      | 64          | 32        | 6             | 96         | 38      | -58    | 52.24        | 20.7                  | 8.2     | -60.4      |
| <i>Cerastium glutinosum</i>         | 30          | 23        | 11            | 53         | 34      | -19    | 47.13        | 11.4                  | 7.3     | -35.8      |
| <i>Sagina nodosa</i>                | 36          | 40        | 30            | 76         | 70      | -6     | 45.21        | 16.4                  | 15.1    | -7.9       |
| <i>Sagina procumbens</i>            | 14          | 434       | 9             | 448        | 443     | -5     | 2.58         | 96.6                  | 95.5    | -1.1       |
| <i>Scleranthus annuus</i>           | 8           | 10        | 4             | 18         | 14      | -4     | 37.50        | 3.9                   | 3.0     | -22.2      |
| <i>Spergula arvensis</i>            | 6           | 1         | 6             | 7          | 7       | 0      | 85.71        | 1.5                   | 1.5     | 0.0        |
| <i>Spergula morisonii</i>           | 4           | 8         | 11            | 12         | 19      | 7      | 48.39        | 2.6                   | 4.1     | 58.3       |
| <i>Spergularia rubra</i>            | 5           | 0         | 0             | 5          | 0       | -5     | 100.00       | 1.1                   | 0.0     | -100.0     |
| <i>Lychnis flos-cuculi</i>          | 3           | 2         | 15            | 5          | 17      | 12     | 81.82        | 1.1                   | 3.7     | 240.0      |
| <i>Lychnis viscaria</i>             | 17          | 20        | 9             | 37         | 29      | -8     | 39.39        | 8.0                   | 6.3     | -21.6      |
| <i>Silene nutans</i>                | 4           | 17        | 10            | 21         | 27      | 6      | 29.17        | 4.5                   | 5.8     | 28.6       |
| <i>Silene viscosa</i>               | 8           | 26        | 12            | 34         | 38      | 4      | 27.78        | 7.3                   | 8.2     | 11.8       |
| <i>Silene dioica</i>                | 19          | 108       | 28            | 127        | 136     | 9      | 17.87        | 27.4                  | 29.3    | 7.1        |
| <i>Dianthus deltoides</i>           | 14          | 10        | 20            | 24         | 30      | 6      | 62.96        | 5.2                   | 6.5     | 25.0       |
| <i>Chenopodium album</i>            | 10          | 7         | 14            | 17         | 21      | 4      | 63.16        | 3.7                   | 4.5     | 23.5       |
| <i>Polygonum aviculare</i>          | 2           | 9         | 7             | 11         | 16      | 5      | 33.33        | 2.4                   | 3.4     | 45.5       |
| <i>Atriplex patula</i>              | 6           | 2         | 1             | 8          | 3       | -5     | 63.64        | 1.7                   | 0.6     | -62.5      |
| <i>Persicaria minor</i>             | 15          | 12        | 12            | 27         | 24      | -3     | 52.94        | 5.8                   | 5.2     | -11.1      |
| <i>Persicaria hydropiper</i>        | 4           | 1         | 1             | 5          | 2       | -3     | 71.43        | 1.1                   | 0.4     | -60.0      |
| <i>Persicaria lapathifolia</i> lap. | 9           | 12        | 14            | 21         | 26      | 5      | 48.94        | 4.5                   | 5.6     | 23.8       |
| <i>Persicaria amphibia</i>          | 2           | 5         | 5             | 7          | 10      | 3      | 41.18        | 1.5                   | 2.2     | 42.9       |
| <i>Bistorta vivipara</i>            | 1           | 0         | 0             | 1          | 0       | -1     | 100.00       | 0.2                   | 0.0     | -100.0     |
| <i>Fallopia convolvulus</i>         | 3           | 7         | 28            | 10         | 35      | 25     | 68.89        | 2.2                   | 7.5     | 250.0      |
| <i>Fallopia dumetorum</i>           | 19          | 83        | 88            | 102        | 171     | 69     | 39.19        | 22.0                  | 36.9    | 67.6       |
| <i>Rumex longifolius</i>            | 6           | 7         | 9             | 13         | 16      | 3      | 51.72        | 2.8                   | 3.4     | 23.1       |
| <i>Rumex acetosa</i>                | 53          | 289       | 27            | 342        | 316     | -26    | 12.16        | 73.7                  | 68.1    | -7.6       |
| <i>Rumex thyrsiflorus</i>           | 4           | 1         | 1             | 5          | 2       | -3     | 71.43        | 1.1                   | 0.4     | -60.0      |
| <i>Rumex acetosella</i>             | 12          | 420       | 14            | 432        | 434     | 2      | 3.00         | 93.1                  | 93.5    | 0.5        |



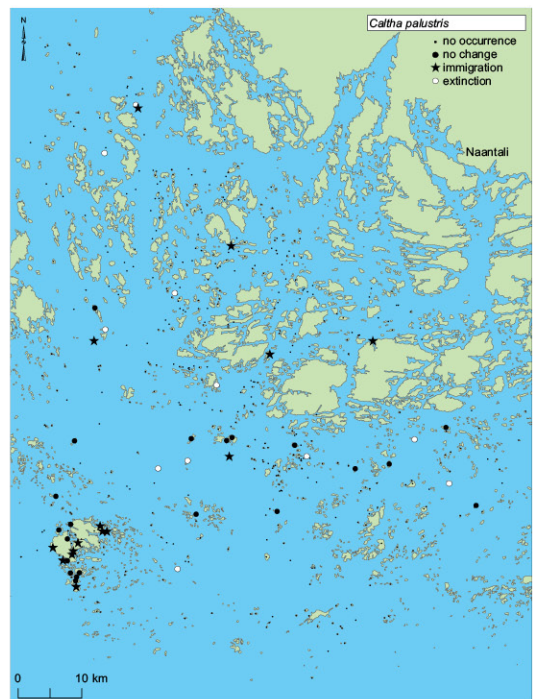
**Fig. 3.** *Juniperus communis*. Very common on almost all islands. No change.



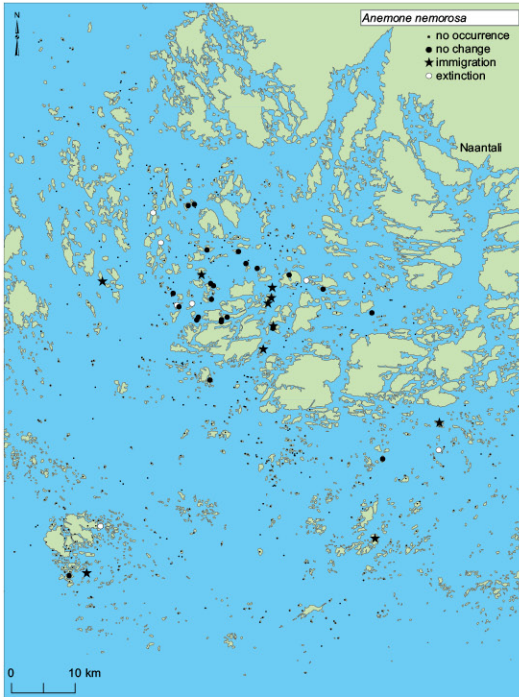
**Fig. 4.** *Nymphaea candida*. Very rare in ponds with just three contemporary localities.



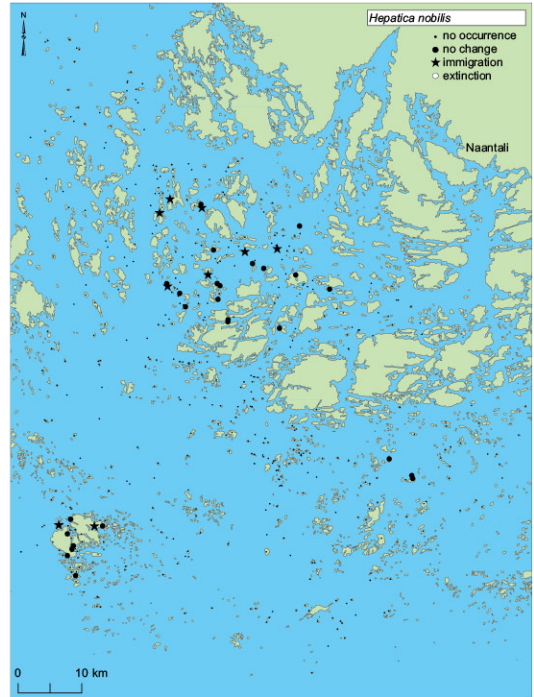
**Fig. 5.** *Actaea spicata*. Rare on islands with a grove-like environment. Increased. For the results of logistic regression analysis see Appendix.



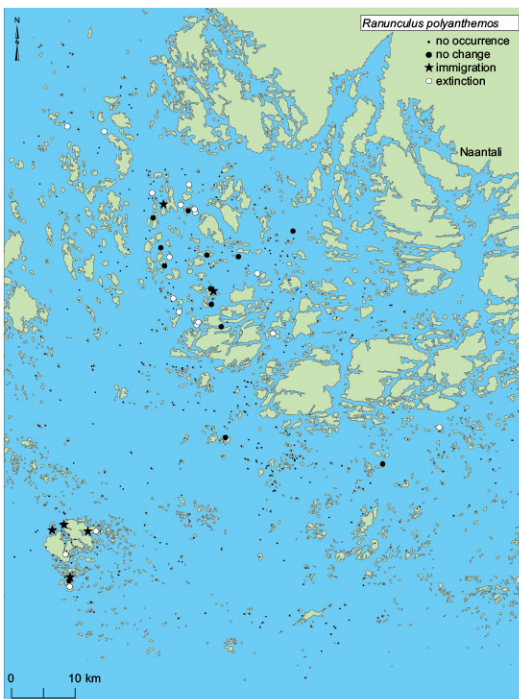
**Fig. 6.** *Caltha palustris*. Quite rare and with a scattered distribution. Somewhat increased. For the results of logistic regression analysis see Appendix.



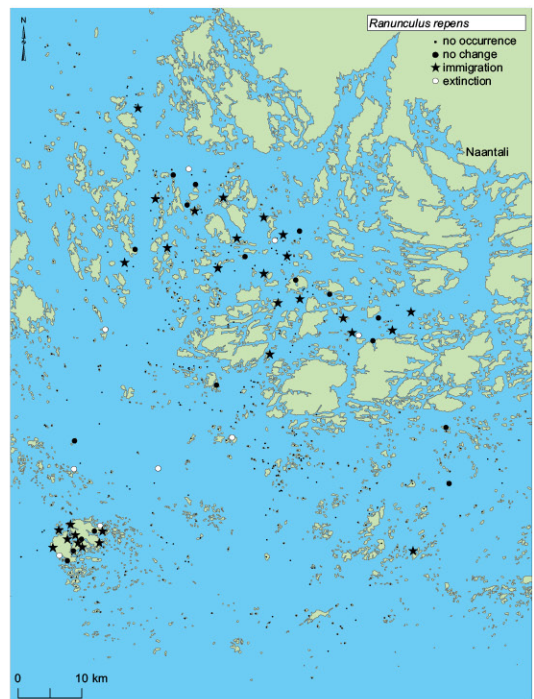
**Fig. 7.** *Anemone nemorosa*. Quite rare. The distribution is similar to that of *Hepatica nobilis*. No change. For the results of logistic regression analysis see Appendix.



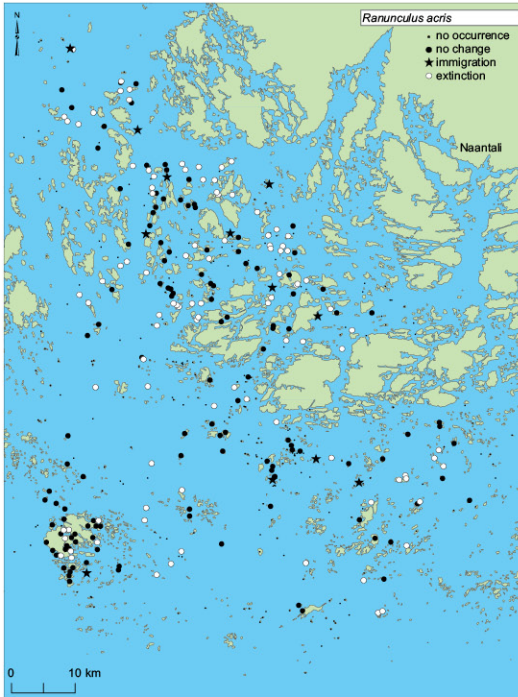
**Fig. 8.** *Hepatica nobilis*. Quite rare. The distribution is disjunct. Increased. For the results of logistic regression analysis see Appendix.



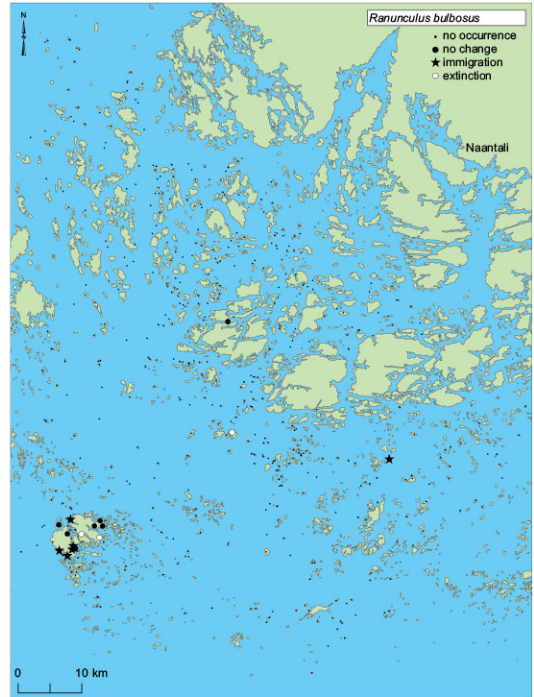
**Fig. 9.** *Ranunculus polyanthemus*. Rare in meadows. Clearly decreased. For the results of logistic regression analysis see Appendix.



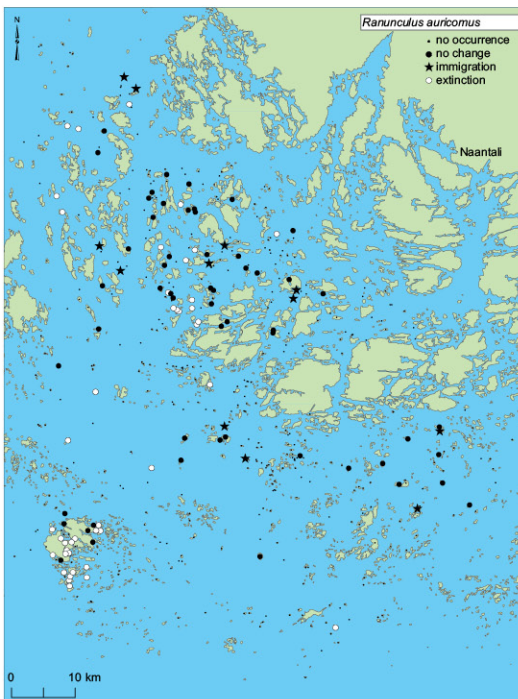
**Fig. 10.** *Ranunculus repens*. Quite rare. Clearly increased. For the results of logistic regression analysis see Appendix.



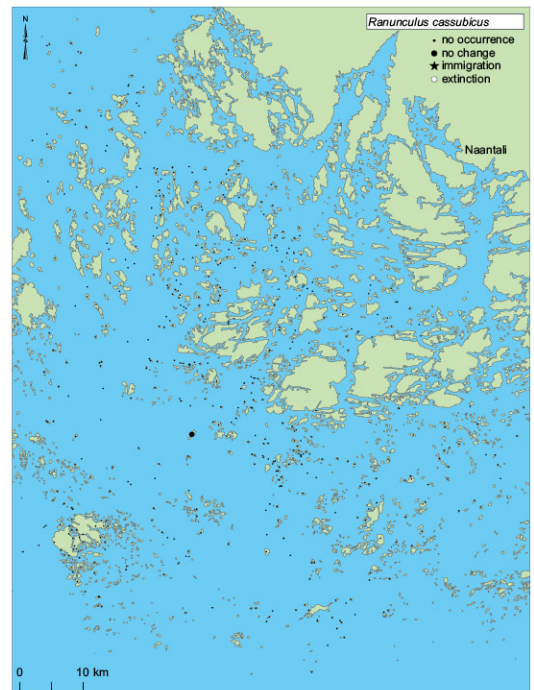
**Fig. 11.** *Ranunculus acris*. Still quite common in meadows in most parts of the area, but clearly decreased. For the results of logistic regression analysis see Appendix.



**Fig. 12.** *Ranunculus bulbosus*. Rare. Most localities are in Kökar.

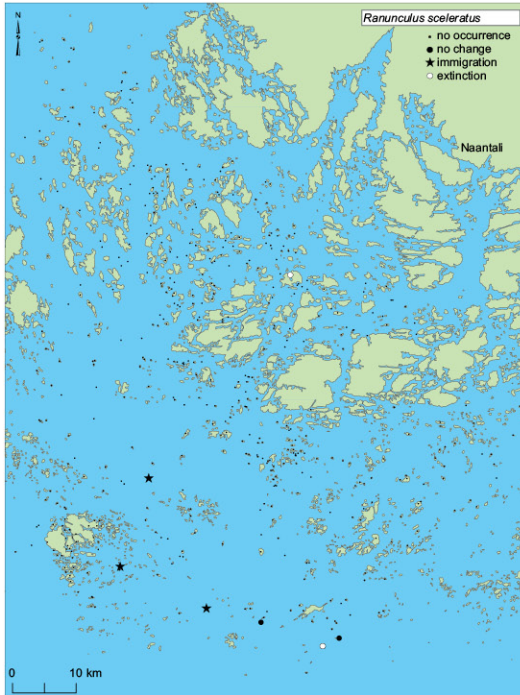


**Fig. 13.** *Ranunculus auricomus coll.* Quite rare. Clearly decreased. For the results of logistic regression analysis see Appendix.

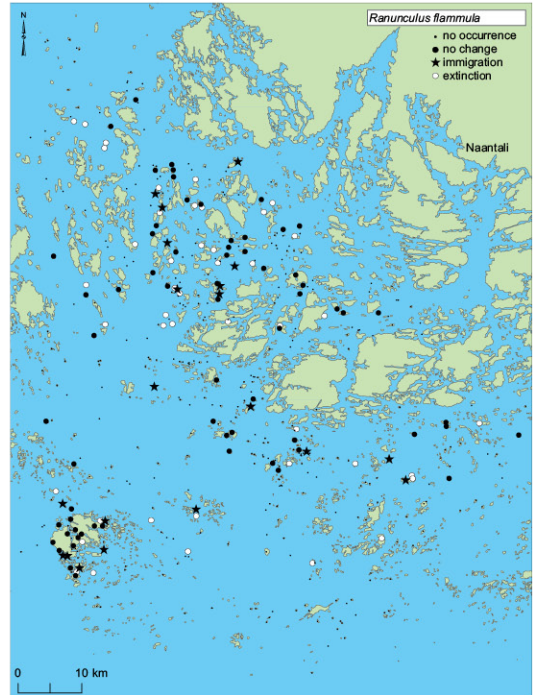


**Fig. 14.** *Ranunculus cassubicus*. One preserved locality.

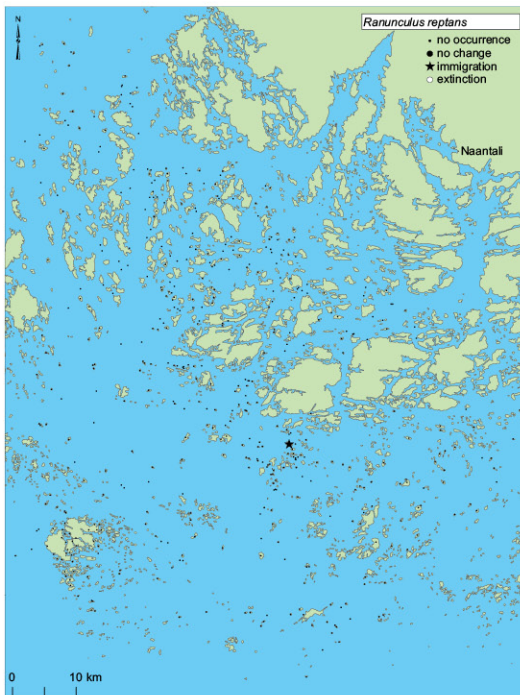




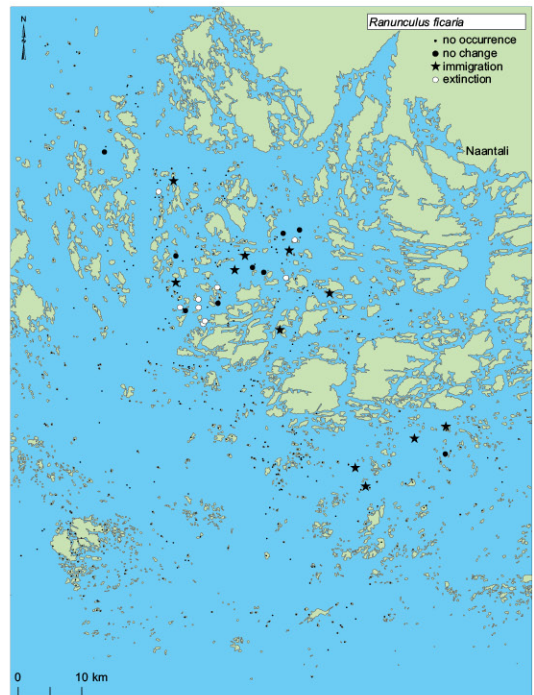
**Fig. 15.** *Ranunculus sceleratus*. Very rare on islets in the outer southern area. No change.



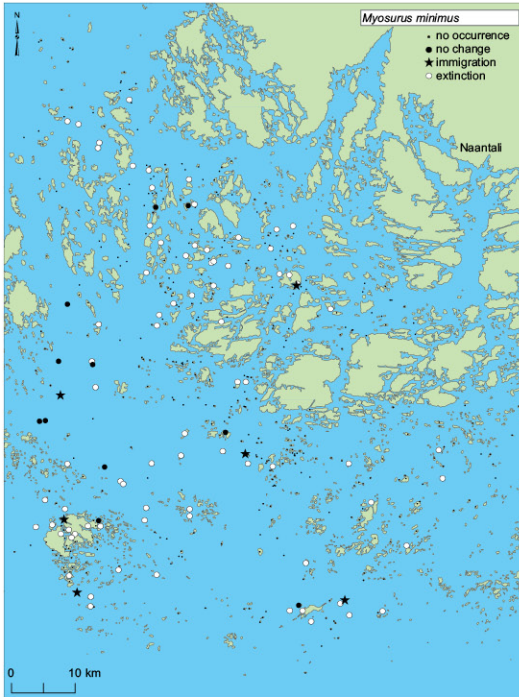
**Fig. 16.** *Ranunculus flammula*. Quite common. Decreased. For the results of logistic regression analysis see Appendix.



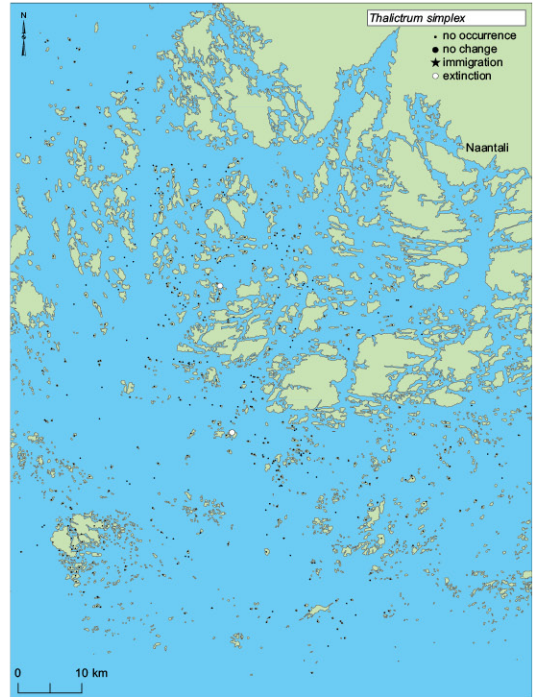
**Fig. 17.** *Ranunculus reptans*. Very rare. One contemporary locality.



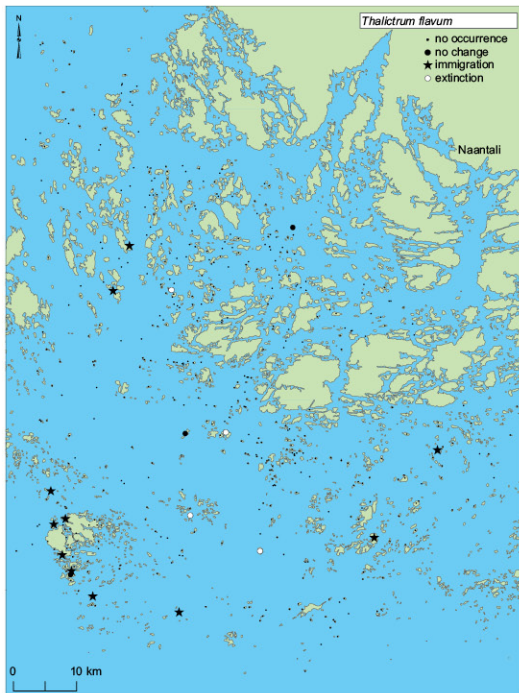
**Fig. 18.** *Ranunculus ficaria*. Rare. Probably often overlooked later in the summer.



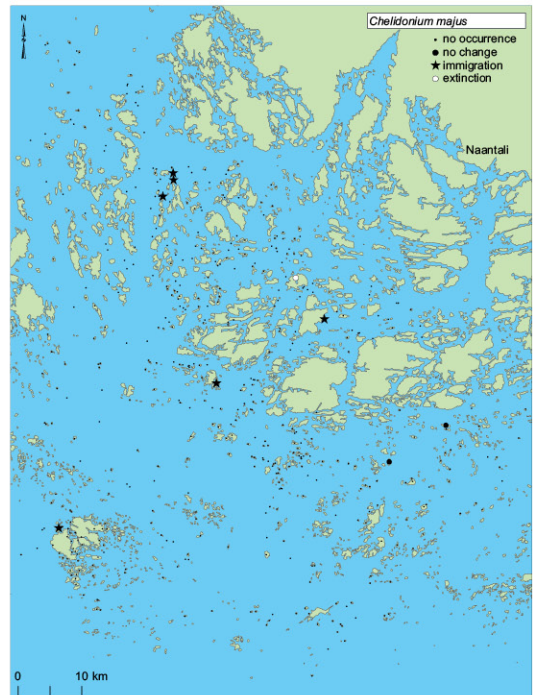
**Fig. 19.** *Myosurus minimus*. Rare. Currently found only on exposed islands with an open soil layer. Markedly decreased. For the results of logistic regression analysis see Appendix.



**Fig. 20.** *Thalictrum simplex*. Two historical records. Not found.



**Fig. 21.** *Thalictrum flavum*. Irregularly distributed and rare on large islands. Increased. For the results of logistic regression analysis see Appendix.



**Fig. 22.** *Chelidonium majus*. Irregularly distributed and rare. Probably increased.

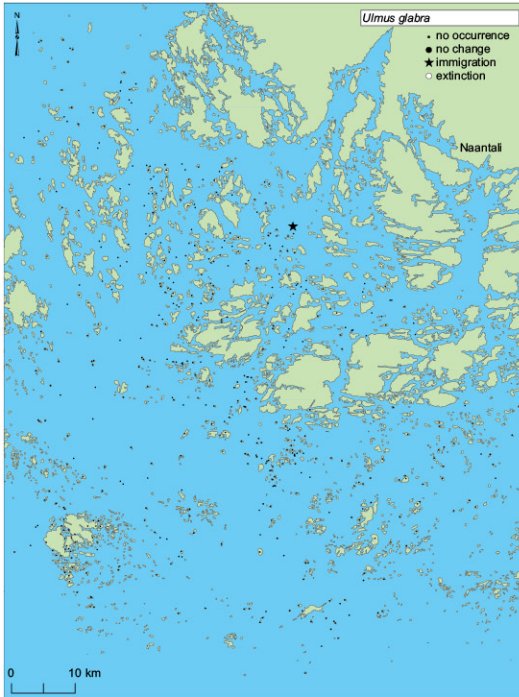


Fig. 23. *Ulmus glabra*. Very rare. One contemporary locality.

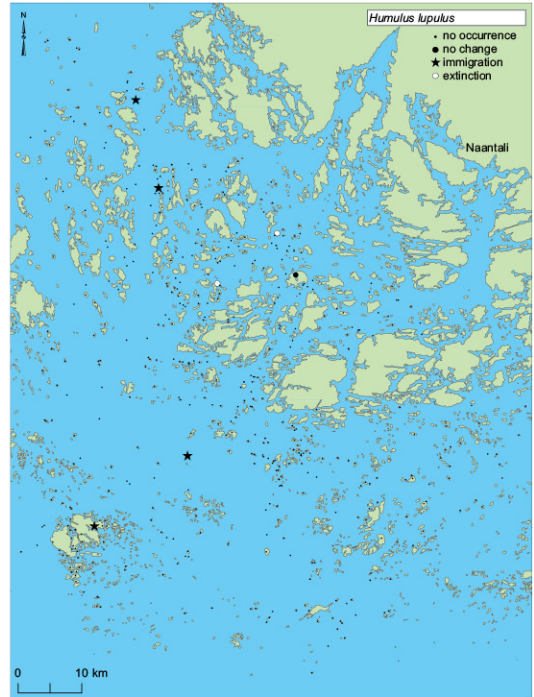


Fig. 24. *Humulus lupulus*. Very rare and unevenly distributed. Usually found in thickets near the shore.

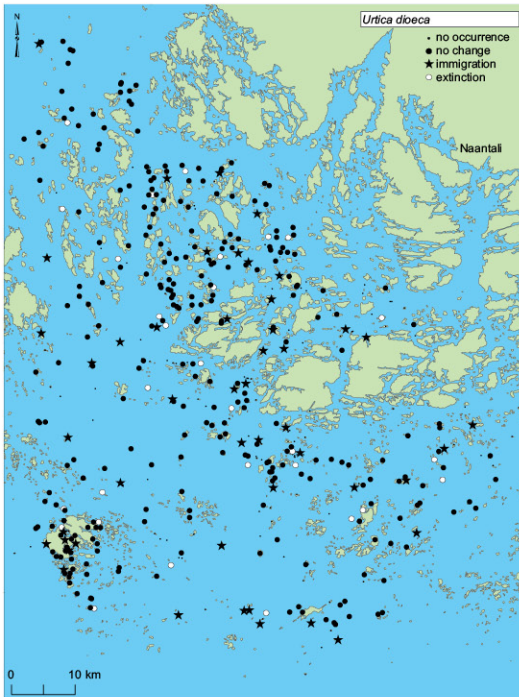


Fig. 25. *Urtica dioica*. Very common in the whole study area. Usually found among washed up seaweed etc. Increased slightly. For the results of logistic regression analysis see Appendix.

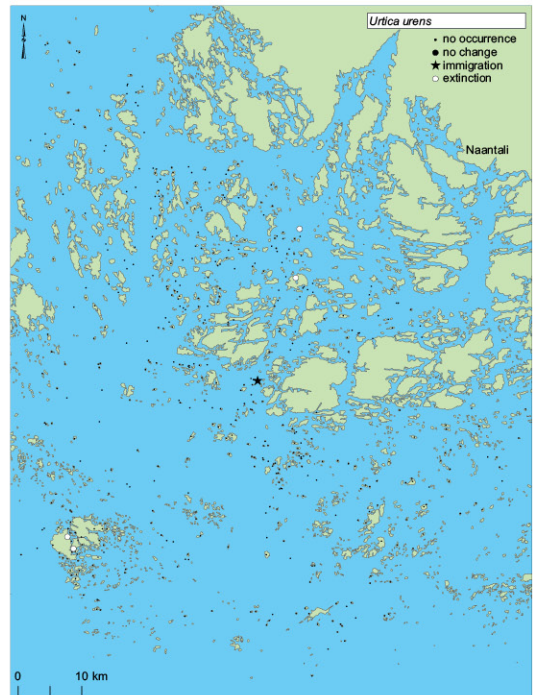
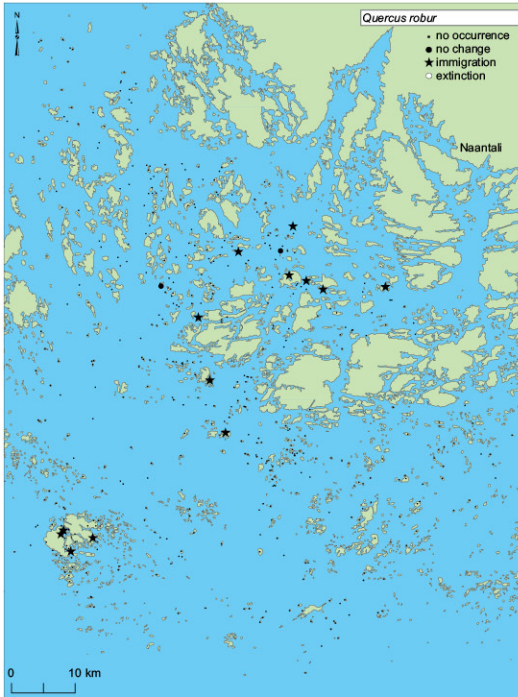
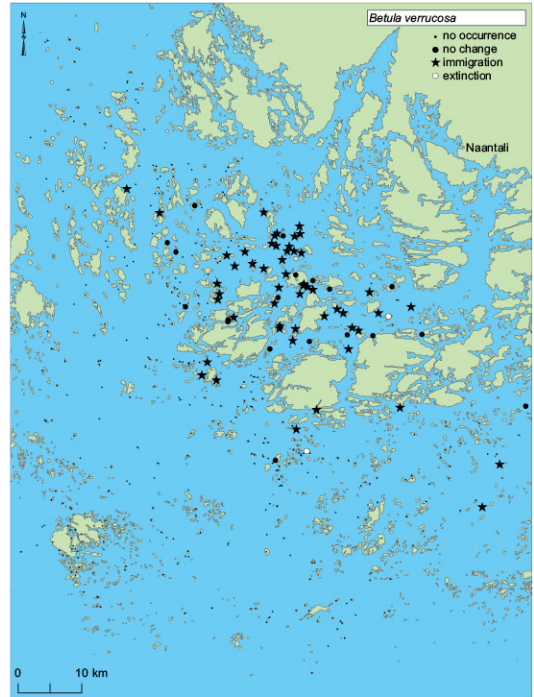


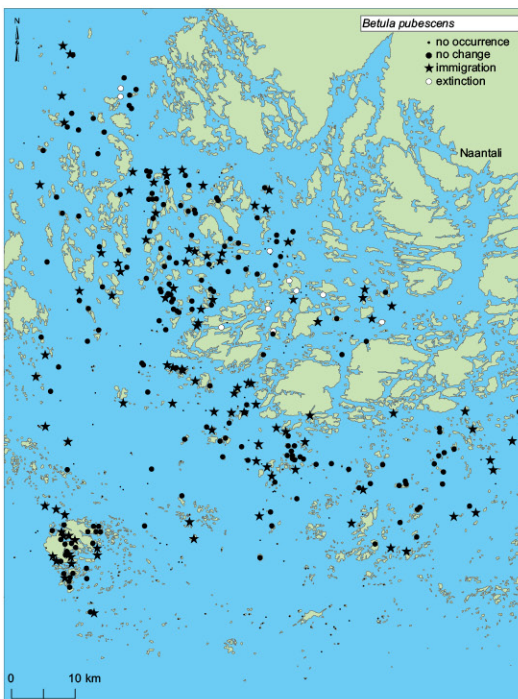
Fig. 26. *Urtica urens*. A very rare anthropochorous species. Probably decreased.



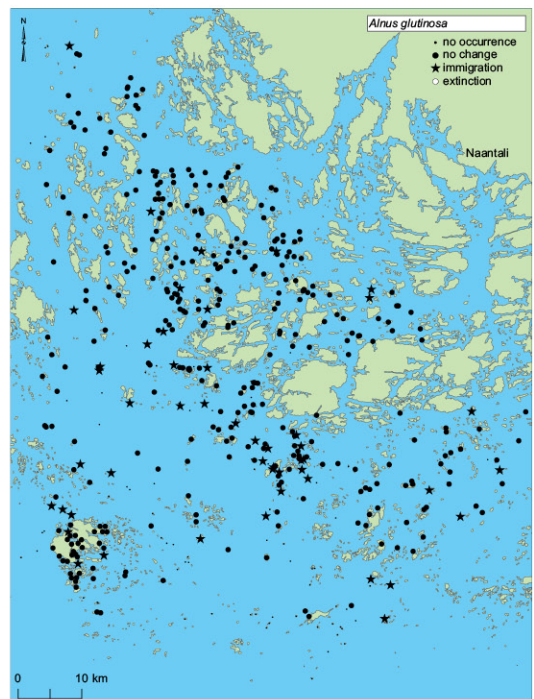
**Fig. 27.** *Quercus robur*. Rare on topographically diverse islands. The distribution is scattered. Increased. For the results of logistic regression analysis see Appendix.



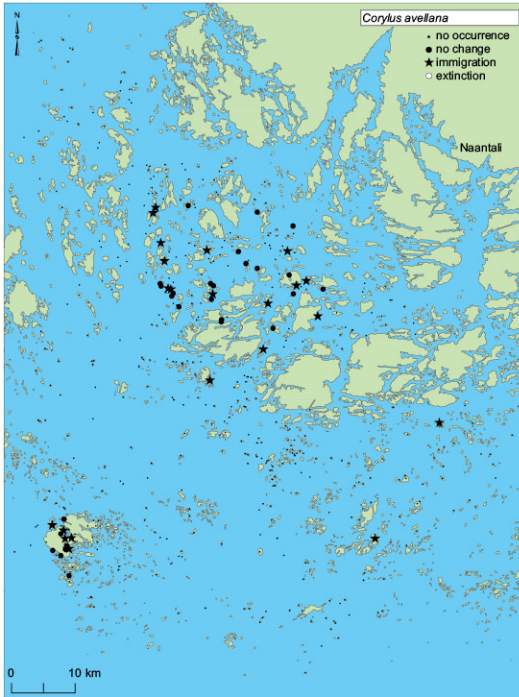
**Fig. 28.** *Betula verrucosa*. Quite rare with an easterly distribution. Clearly increased. For the results of logistic regression analysis see Appendix.



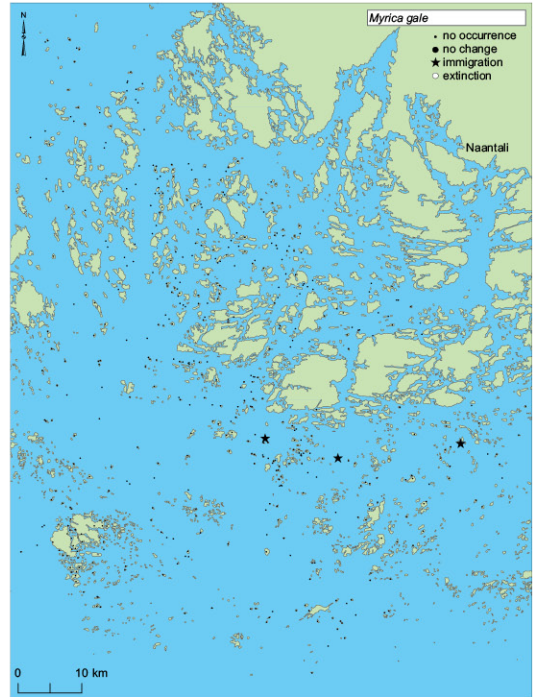
**Fig. 29.** *Betula pubescens*. Common in most parts of the area. Clearly increased. For the results of logistic regression analysis see Appendix.



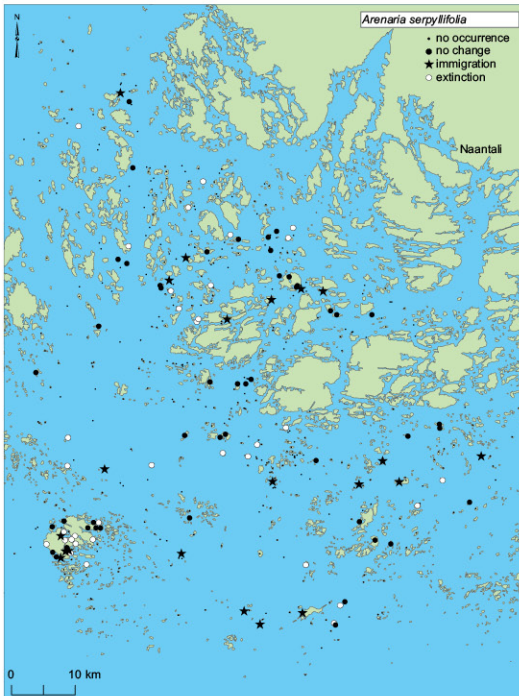
**Fig. 30.** *Alnus glutinosa*. Very common in the whole area. No extinctions but 49 colonizations. For the results of logistic regression analysis see Appendix.



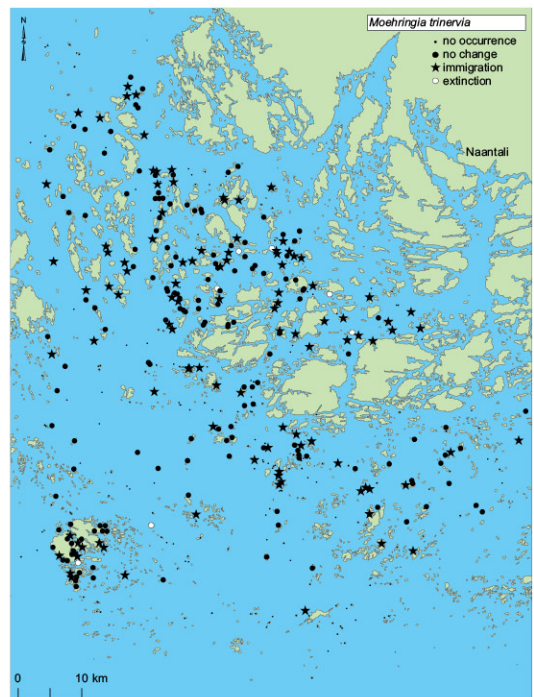
**Fig. 31.** *Corylus avellana*. Has a disjointed distribution. Markedly increased. For the results of logistic regression analysis see Appendix.



**Fig. 32.** *Myrica gale*. Very rare. With three contemporary localities a new species on the studied islands.



**Fig. 33.** *Arenaria serpyllifolia*. Quite rare. Typically found on limestone or near settlements. Slightly decreased. For the results of logistic regression analysis see Appendix.



**Fig. 34.** *Moehringia trinervia*. Common. Clearly increased. For the results of logistic regression analysis see Appendix.

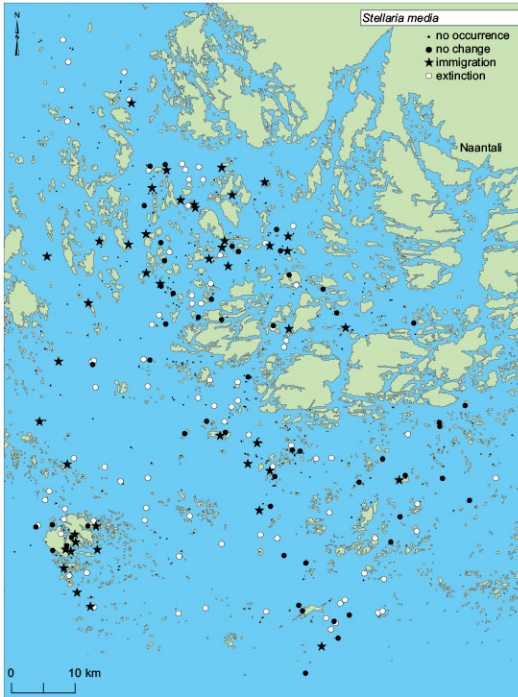


Fig. 35. *Stellaria media*. Quite common, but decreased.

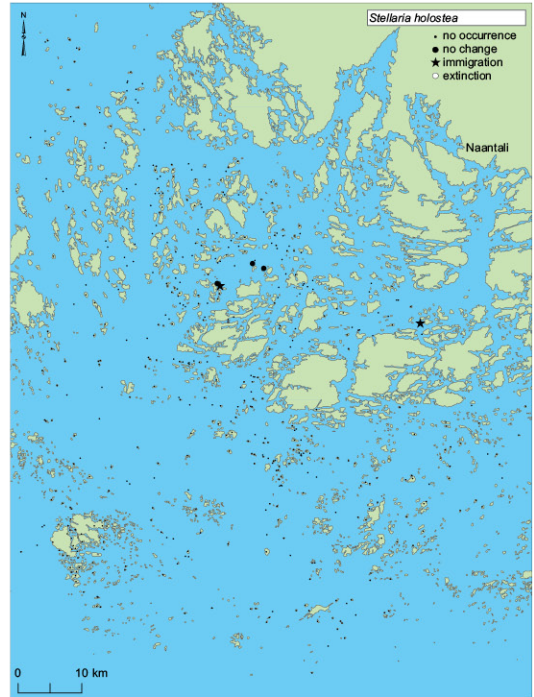


Fig. 36. *Stellaria holostea*. Very rare. Locally common in the Houtskär area. For the results of logistic regression analysis see Appendix.

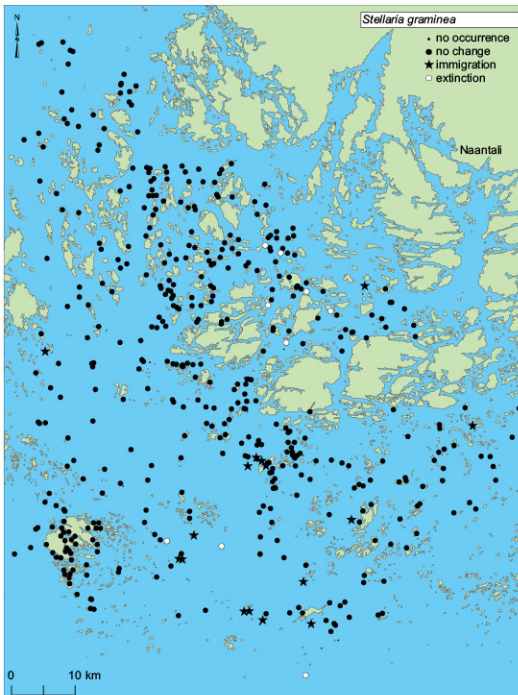


Fig. 37. *Stellaria graminea*. Very common on most of the islands. No change.

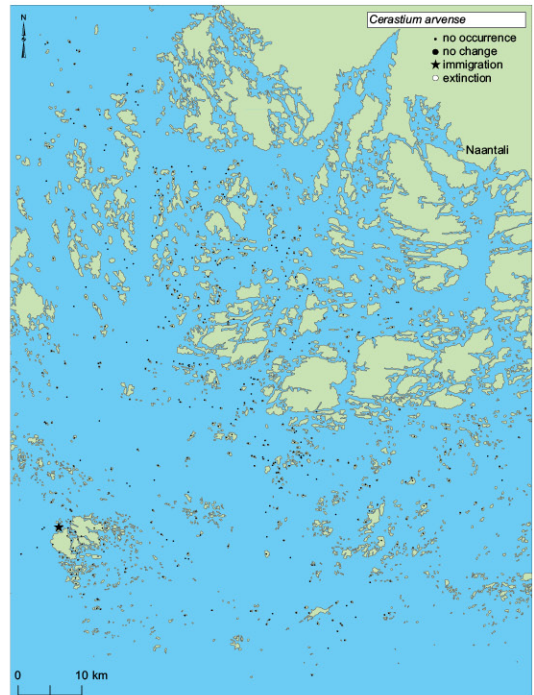
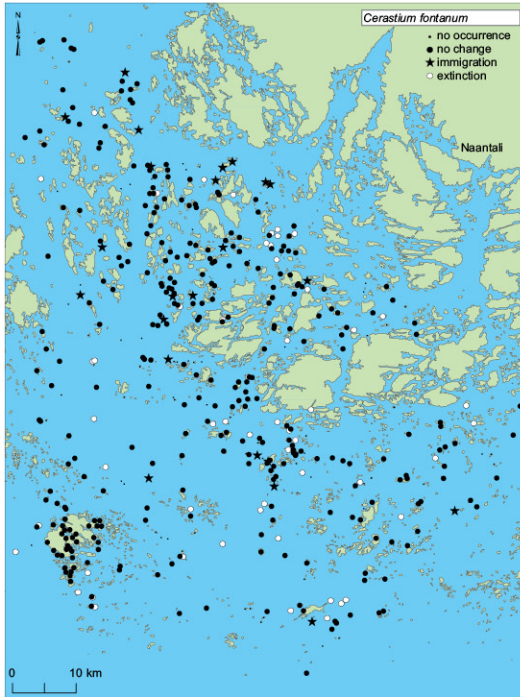
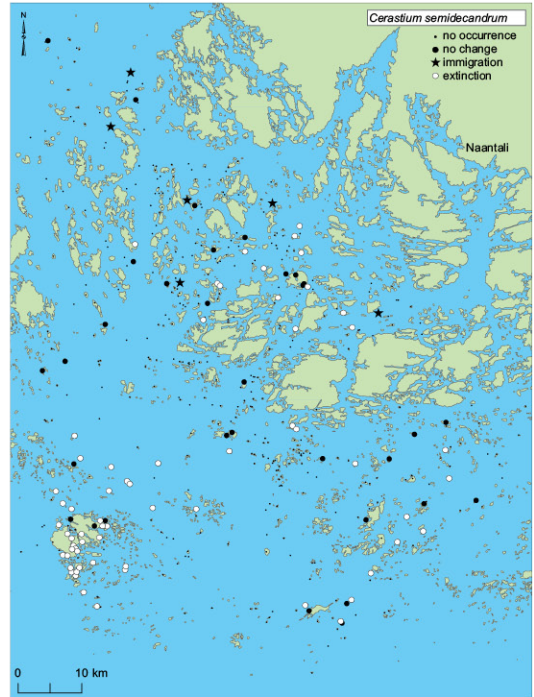


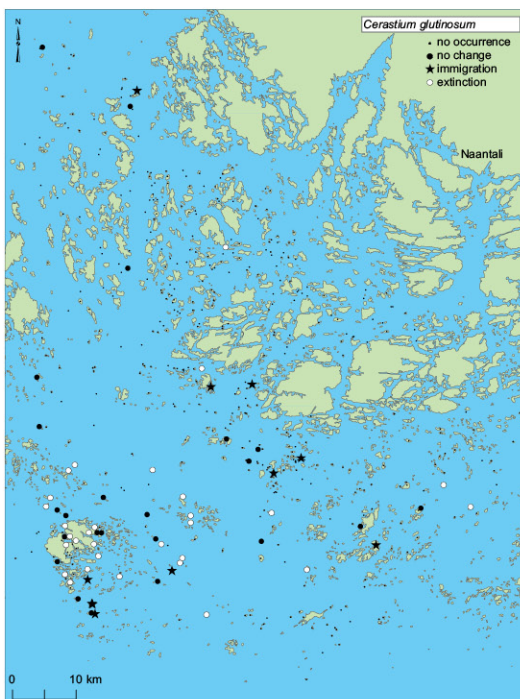
Fig. 38. *Cerastium arvense*. One contemporary locality in Kökar.



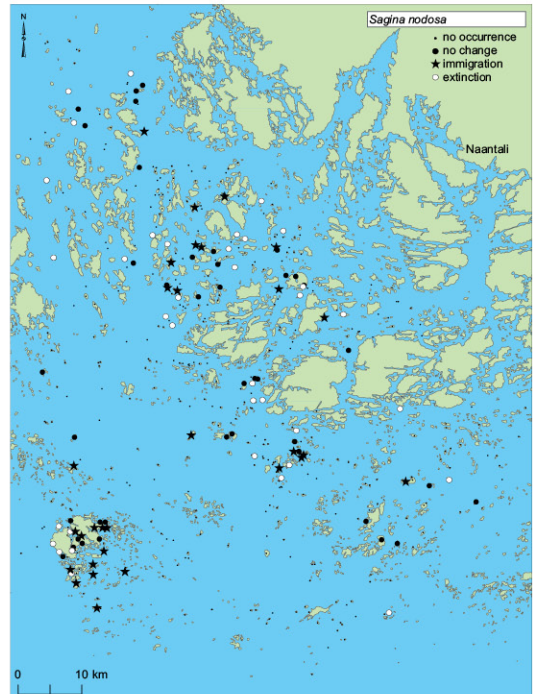
**Fig. 39.** *Cerastium fontanum*. Very common in the whole area. Slightly decreased. For the results of logistic regression analysis see Appendix.



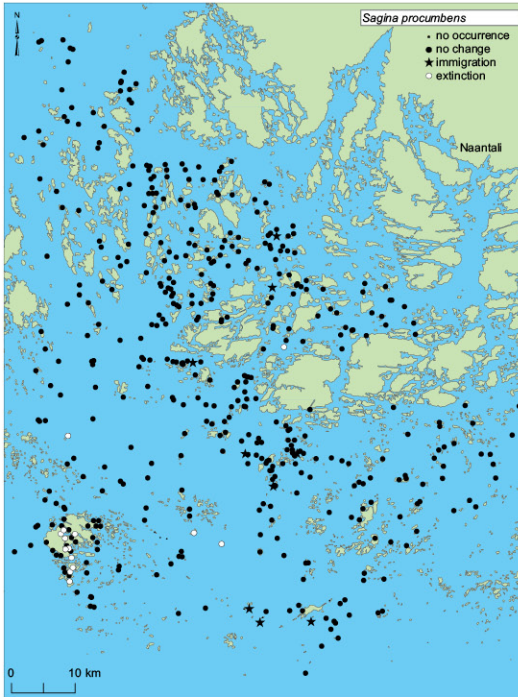
**Fig. 40.** *Cerastium semidecandrum*. Quite rare. Markedly decreased. For the results of logistic regression analysis see Appendix.



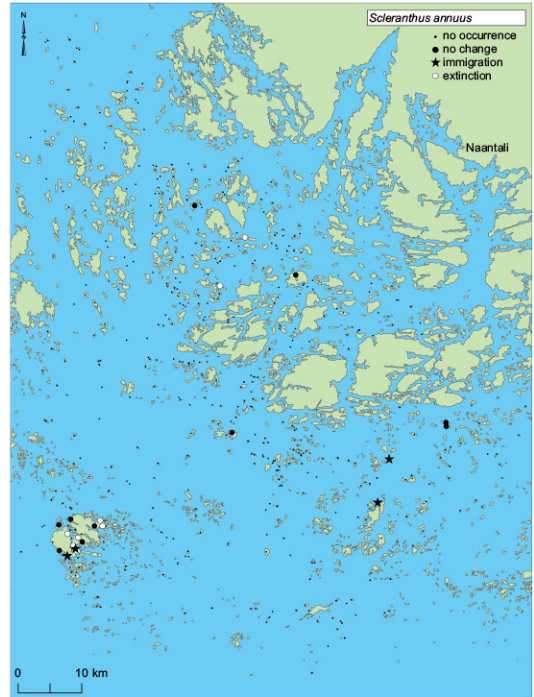
**Fig. 41.** *Cerastium glutinosum*. Quite rare with a south-western distribution. Decreased. For the results of logistic regression analysis see Appendix.



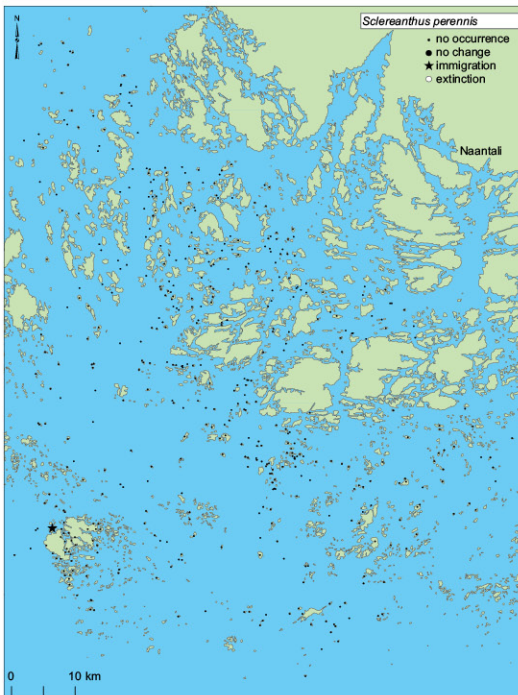
**Fig. 42.** *Sagina nodosa*. Quite rare. Usually found on limestone. High turnover. Slightly decreased in frequency. For the results of logistic regression analysis see Appendix.



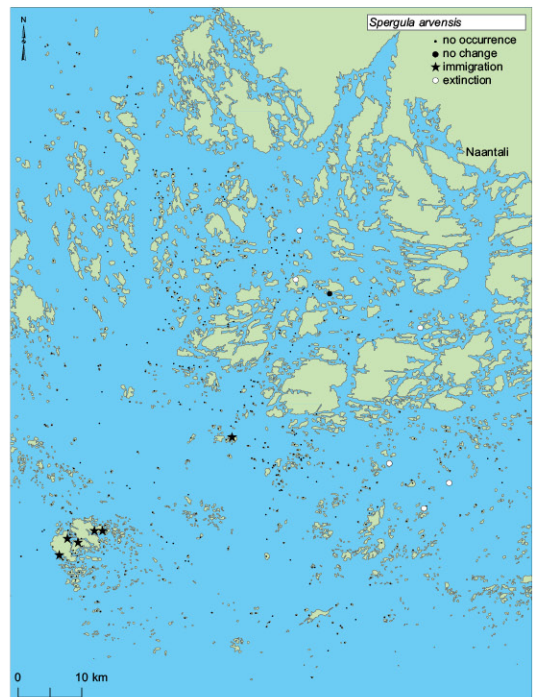
**Fig. 43.** *Sagina procumbens*. Very common in the whole area. No change.



**Fig. 44.** *Scleranthus annuus*. A rare antropochorous species usually found on dry sandy soil. Decreased. For the results of logistic regression analysis see Appendix.

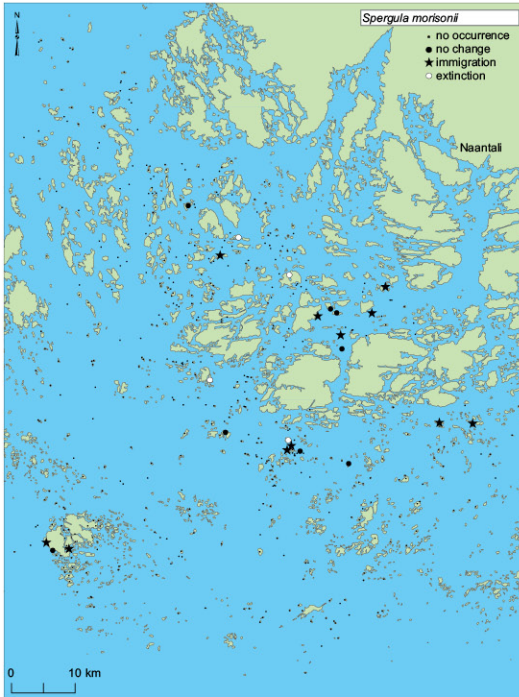


**Fig. 45.** *Scleranthus perennis*. One contemporary locality in Kökar. No historical records.

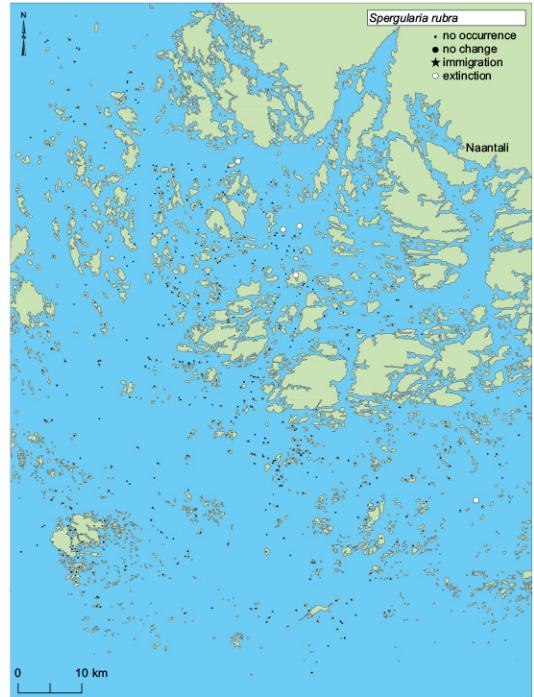


**Fig. 46.** *Spargula arvensis*. Rare on islands with human settlement. No change. For the results of logistic regression analysis see Appendix.

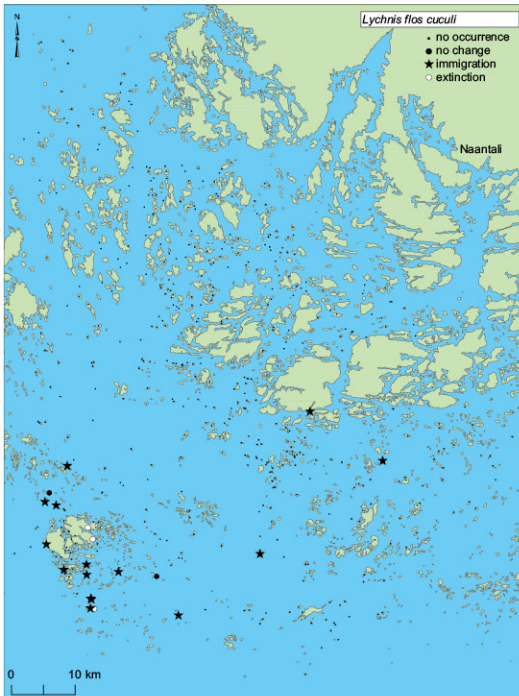




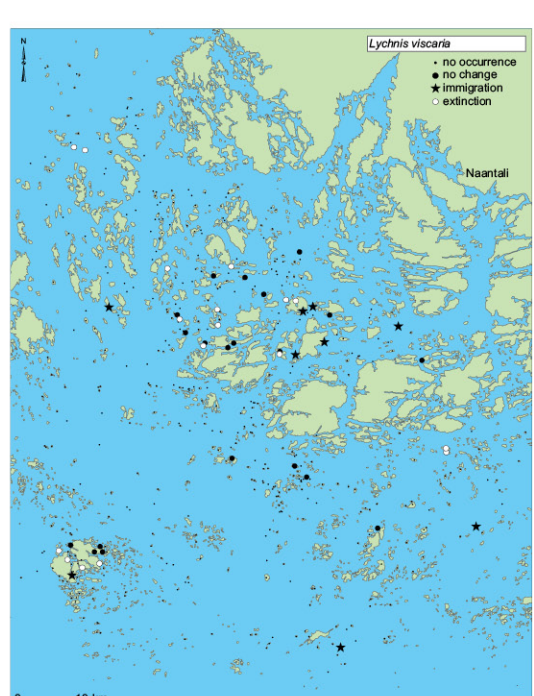
**Fig. 47.** *Spargula morisonii*. Rare on bedrock in pine forest. Increased. For the results of logistic regression analysis see Appendix.



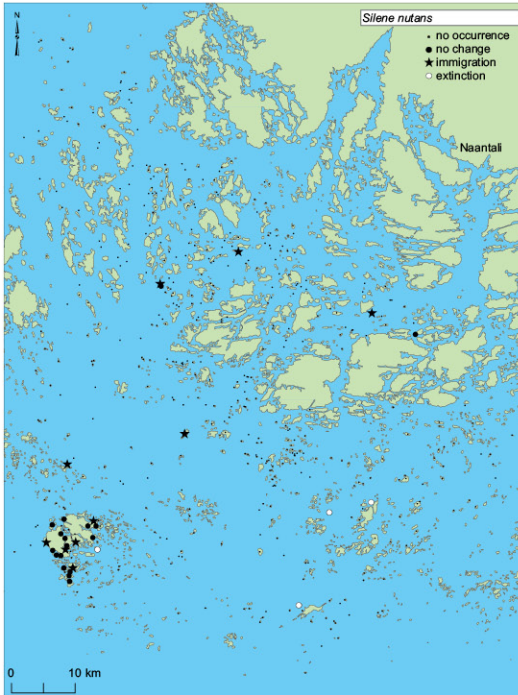
**Fig. 48.** *Spargularia rubra*. Five historical localities. Not found.



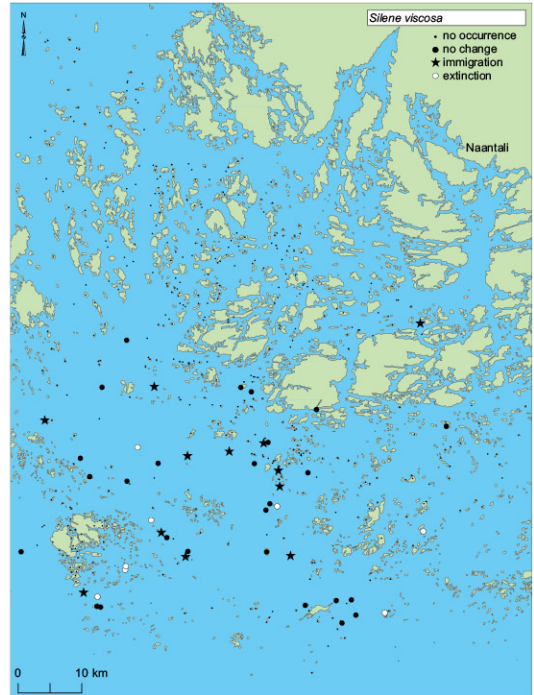
**Fig. 49.** *Lychnis flos-cuculi*. Rare but markedly increased. The distribution is limited to the southwestern part of the study area. For the results of logistic regression analysis see Appendix.



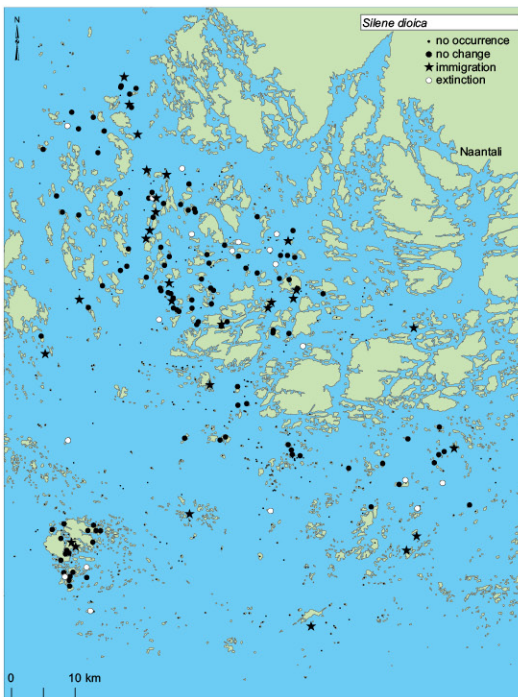
**Fig. 50.** *Lychnis viscaria*. Rare on rocky slopes etc. Decreased. For the results of logistic regression analysis see Appendix.



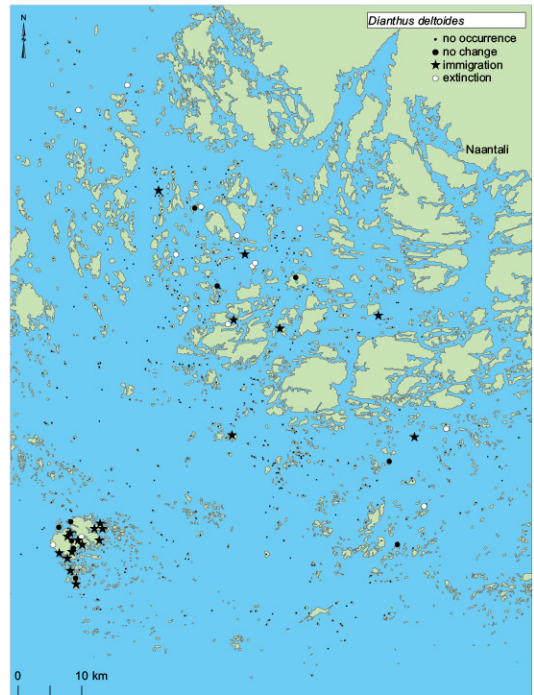
**Fig. 51.** *Silene nutans*. Rare on dry soil or sand. Scattered distribution. Most of the localities are in Kökar. Increased. For the results of logistic regression analysis see Appendix.



**Fig. 52.** *Silene viscosa*. Quite rare on exposed islands in the southern part of the area. Occurrence positively related to sand and isolation. Increased slightly. For the results of logistic regression analysis see Appendix.



**Fig. 53.** *Silene dioica*. Quite common except in the maritime parts of the area. No change. For the results of logistic regression analysis see Appendix.



**Fig. 54.** *Dianthus deltooides*. Rare on dry meadows. Increased in Kökar, otherwise decreased. Many extinctions in the northern part of the area. For the results of logistic regression analysis see Appendix.

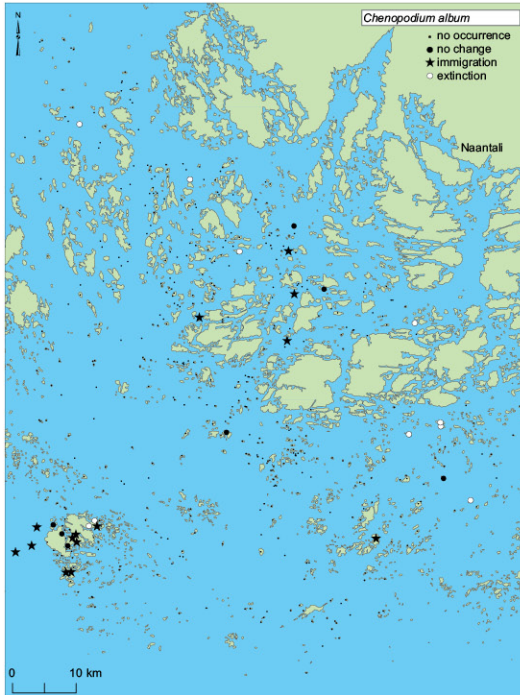


Fig. 55. *Chenopodium album*. Rare. Somewhat increased.

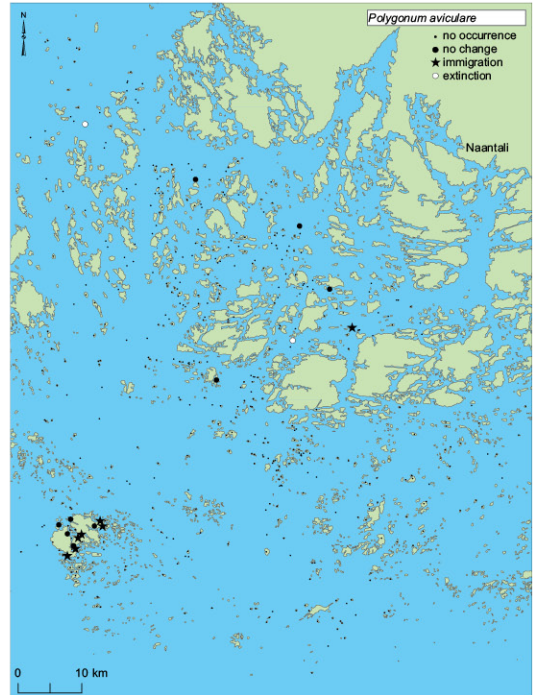


Fig. 56. *Polygonum aviculare*. Rare but increased. For the littoral variety (var. *litorale*), see von Numers (2011).

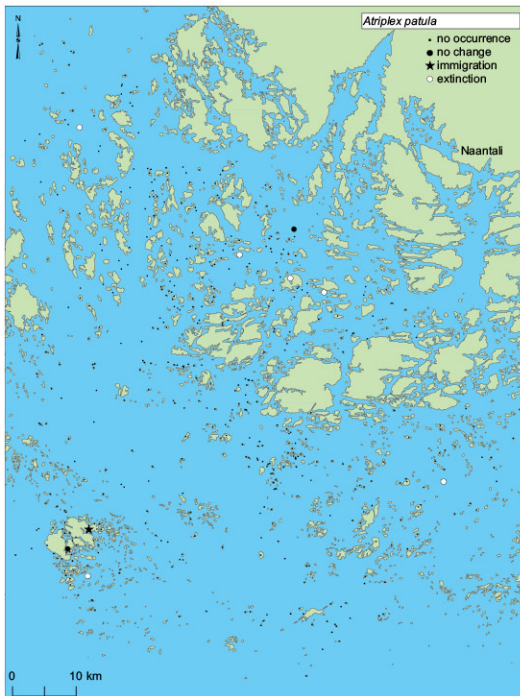


Fig. 57. *Atriplex patula*. Very rare. Decreased.

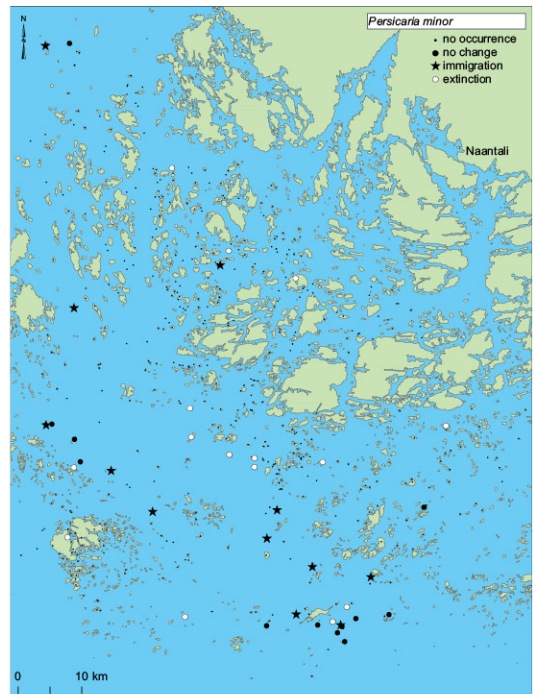


Fig. 58. *Persicaria minor*. Rare. Occurs mainly in rock pools on exposed small islets. Somewhat decreased. For the results of logistic regression analysis see Appendix.

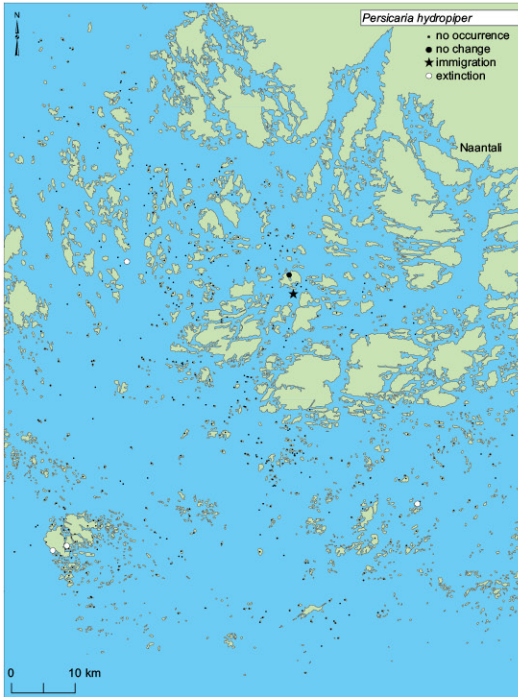


Fig. 59. *Pericaria hydropiper*. Very rare.

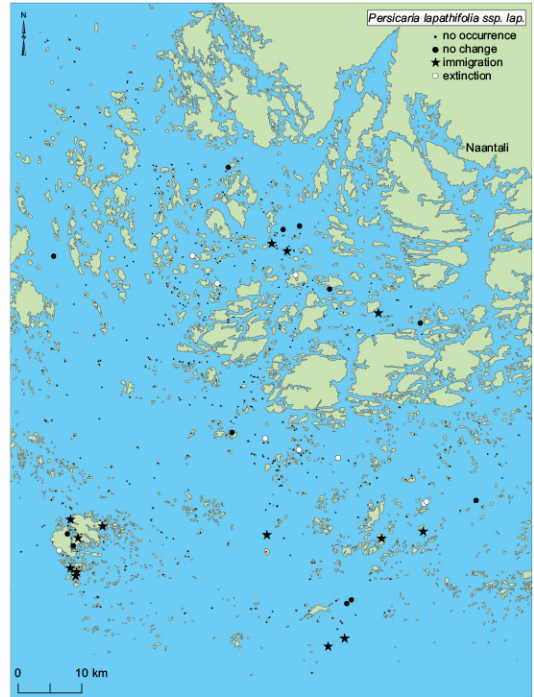


Fig. 60. *Pericaria lapathifolia* ssp. *lapathifolia*. Rare and with a scattered distribution. Increased. For the results of logistic regression analysis see Appendix.

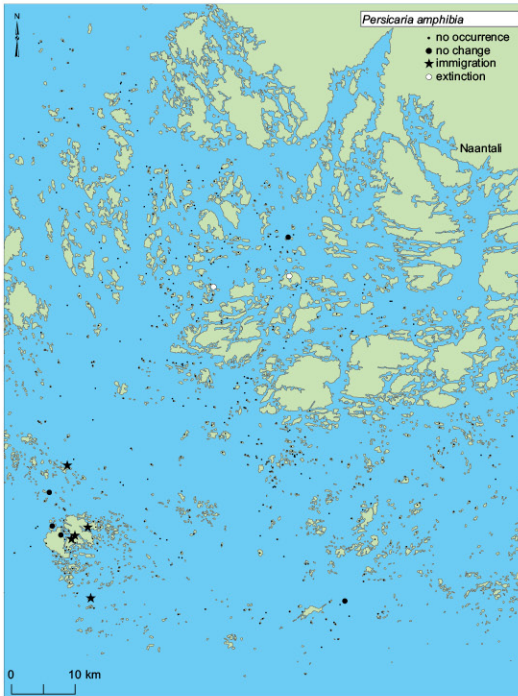


Fig. 61. *Pericaria amphibia*. Rare. Found mainly in the southwestern part of the area. Only the land form included.

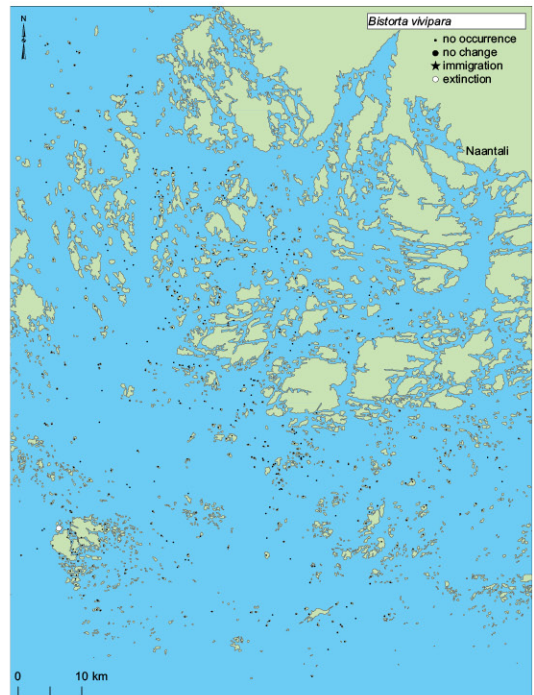
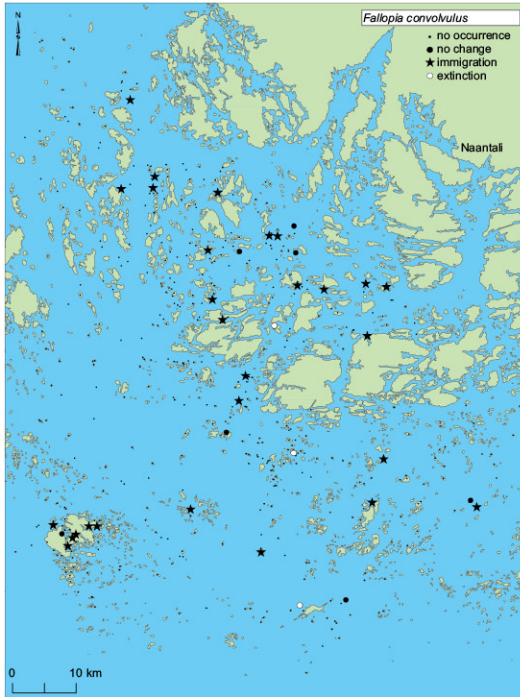
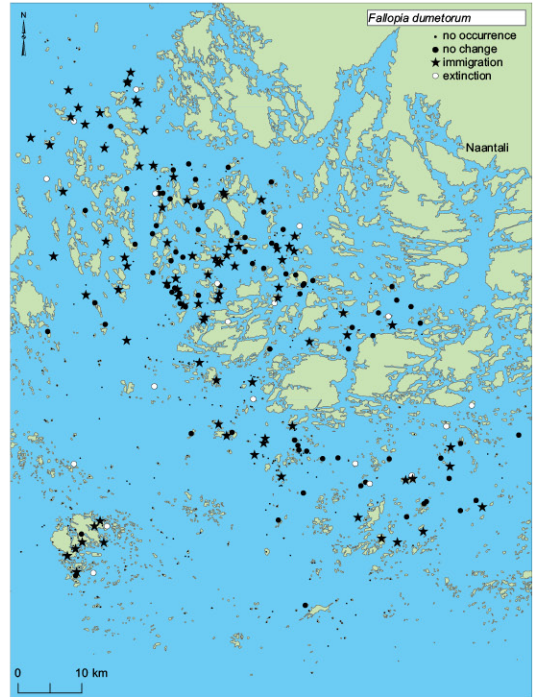


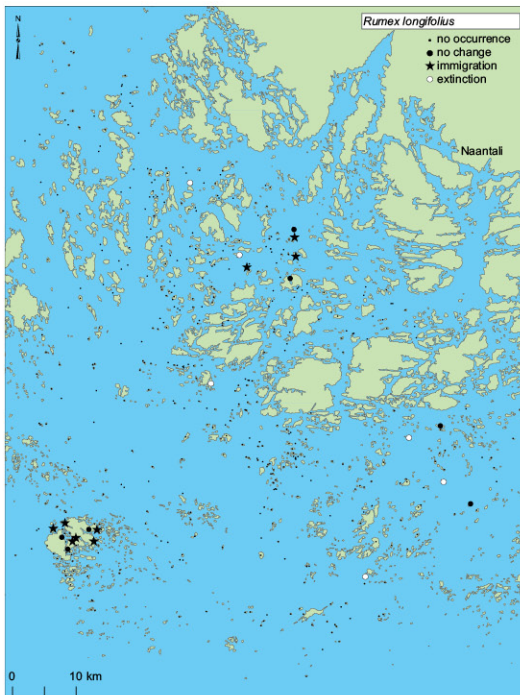
Fig. 62. *Bistorta vivipara*. One historical record. Not found.



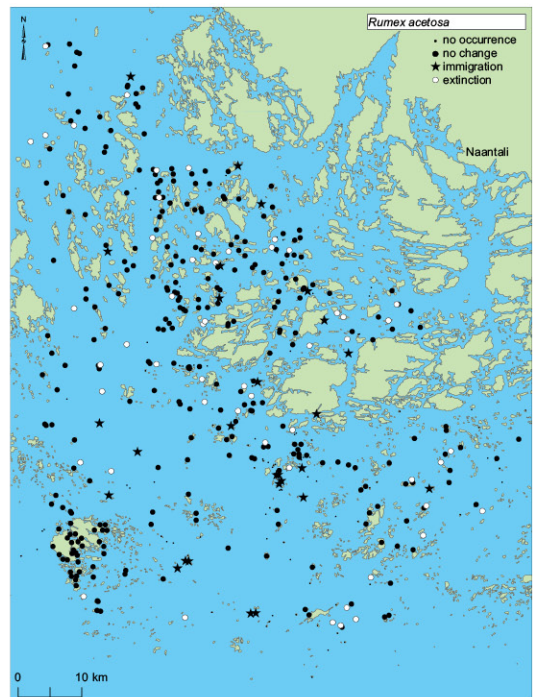
**Fig. 63.** *Fallopia convolvulus*. Quite rare and originally probably an antropochore (Eklund 1958). Rarer than *Fallopia dumetorum*. Increased. For the results of logistic regression analysis see Appendix.



**Fig. 64.** *Fallopia dumetorum*. Common and clearly increased. For the results of logistic regression analysis see Appendix.



**Fig. 65.** *Rumex longifolius*. A rare anthropochore. No change.



**Fig. 66.** *Rumex acetosa*. Common in the whole study area. Somewhat decreased. For the results of logistic regression analysis see Appendix.

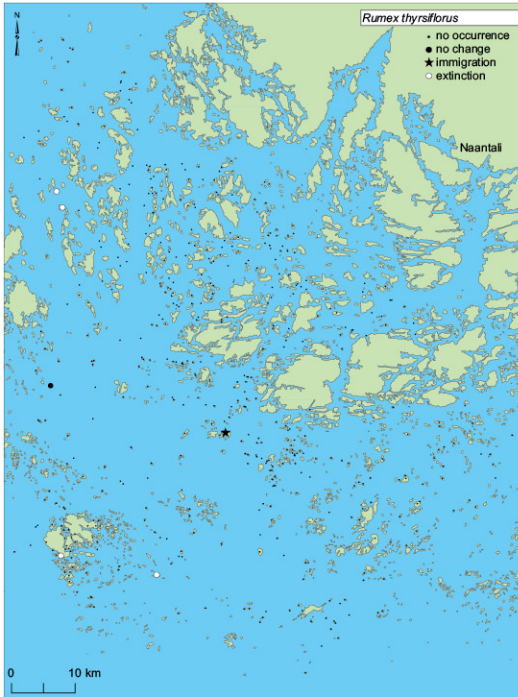


Fig. 67. *Rumex thyrsiflorus*. Very rare. Decreased.

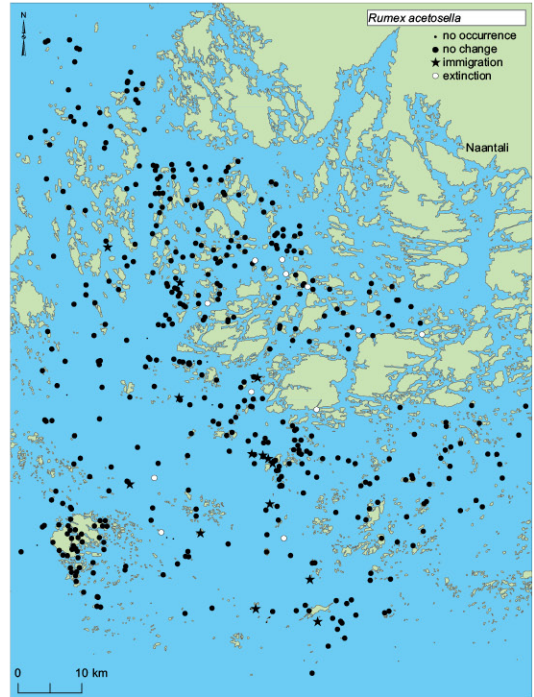


Fig. 68. *Rumex acetosella*. Very common in the whole study area. No change. For the results of logistic regression analysis see Appendix.

## References

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- von Numers M. 2011: Sea shore plants of the SW archi-

- pelago of Finland — distribution patterns and long term changes during the 20th century. — *Annales Botanici Fennici* 48 (Supplement A): 1–46.
- von Numers M. 2017: Distribution patterns and long-term changes in vascular plants of non-littoral areas in the SW archipelago of Finland. Part I. Study concept and Pteridophyta. — *Annales Botanici Fennici* 54: 245–262.

**Appendix.** Results of the logistic regression analysis for the species found in the present study.

|                                | <i>B</i> | SE    | Wald   | df | <i>p</i> | Exp( <i>B</i> ) |
|--------------------------------|----------|-------|--------|----|----------|-----------------|
| <i>Picea abies</i>             |          |       |        |    |          |                 |
| Area                           | 0.065    | 0.016 | 17.272 | 1  | < 0.0001 | 1.068           |
| Position WE                    | 0.673    | 0.092 | 53.200 | 1  | < 0.0001 | 1.960           |
| Position SN                    | 2.266    | 0.570 | 15.797 | 1  | 0.0001   | 9.637           |
| Island topographical diversity | 0.059    | 0.011 | 27.464 | 1  | < 0.0001 | 1.061           |
| Isolation                      | 0.111    | 0.016 | 50.362 | 1  | < 0.0001 | 1.117           |
| Meadows and pastures           | 0.042    | 0.025 | 2.746  | 1  | 0.0975   | 1.043           |
| Deciduous forest               | 0.300    | 0.170 | 3.130  | 1  | 0.0769   | 1.350           |
| Coniferous forest              | 0.444    | 0.073 | 37.033 | 1  | < 0.0001 | 1.559           |
| Scrubland                      | 0.158    | 0.074 | 4.633  | 1  | 0.0314   | 1.172           |
| Rocky ground                   | -0.119   | 0.056 | 4.577  | 1  | 0.0324   | 0.888           |
| <i>Pinus silvestris</i>        |          |       |        |    |          |                 |
| Area                           | 0.078    | 0.022 | 11.939 | 1  | 0.0005   | 1.081           |
| Position WE                    | 0.689    | 0.097 | 50.521 | 1  | < 0.0001 | 1.992           |
| Position SN                    | 4.651    | 0.646 | 51.765 | 1  | < 0.0001 | 104.718         |
| Island topographical diversity | 0.047    | 0.012 | 14.248 | 1  | 0.0002   | 1.048           |
| Isolation                      | 0.049    | 0.015 | 10.583 | 1  | 0.0011   | 1.050           |
| Coniferous forest              | 2.546    | 0.432 | 34.791 | 1  | < 0.0001 | 12.752          |
| <i>Actaea spicata</i>          |          |       |        |    |          |                 |
| Position WE                    | -0.265   | 0.146 | 3.313  | 1  | 0.0687   | 0.767           |
| Island topographical diversity | 0.070    | 0.015 | 23.032 | 1  | < 0.0001 | 1.072           |
| Meadows and pastures           | 0.074    | 0.027 | 7.781  | 1  | 0.0053   | 1.077           |
| Coniferous forest              | 0.062    | 0.026 | 5.755  | 1  | 0.0164   | 1.064           |
| Scrubland                      | 0.123    | 0.053 | 5.290  | 1  | 0.0214   | 1.130           |
| <i>Caltha palustris</i>        |          |       |        |    |          |                 |
| Area                           | 0.026    | 0.010 | 6.678  | 1  | 0.0098   | 1.026           |
| Position WE                    | -0.476   | 0.128 | 13.884 | 1  | 0.0002   | 0.621           |
| Position SN                    | -3.570   | 1.069 | 11.154 | 1  | 0.0008   | 0.028           |
| Island topographical diversity | 0.039    | 0.014 | 7.802  | 1  | 0.0052   | 1.040           |
| Limestone                      | 1.148    | 0.427 | 7.224  | 1  | 0.0072   | 3.153           |
| <i>Anemone nemorosa</i>        |          |       |        |    |          |                 |
| Area                           | 0.037    | 0.013 | 7.572  | 1  | 0.0059   | 1.037           |
| Position WE                    | 0.231    | 0.133 | 3.036  | 1  | 0.0814   | 1.260           |
| Position SN                    | 3.114    | 1.209 | 6.636  | 1  | 0.0100   | 22.509          |
| Island topographical diversity | 0.036    | 0.013 | 7.402  | 1  | 0.0065   | 1.037           |
| Isolation                      | 0.146    | 0.025 | 32.963 | 1  | < 0.0001 | 1.157           |
| <i>Hepatica nobilis</i>        |          |       |        |    |          |                 |
| Island topographical diversity | 0.043    | 0.011 | 15.960 | 1  | 0.0001   | 1.044           |
| Isolation                      | 0.094    | 0.020 | 22.741 | 1  | < 0.0001 | 1.099           |
| Limestone                      | 1.062    | 0.396 | 7.189  | 1  | 0.0073   | 2.891           |
| Settlements                    | 1.293    | 0.655 | 3.890  | 1  | 0.0486   | 3.643           |
| Meadows and pastures           | 0.051    | 0.026 | 3.677  | 1  | 0.0552   | 1.052           |
| Deciduous forest               | 0.486    | 0.166 | 8.529  | 1  | 0.0035   | 1.625           |
| Coniferous forest              | 0.080    | 0.027 | 8.490  | 1  | 0.0036   | 1.083           |
| Open sand                      | -1.788   | 0.840 | 4.533  | 1  | 0.0333   | 0.167           |
| Rocky ground                   | -0.143   | 0.078 | 3.330  | 1  | 0.0680   | 0.867           |
| <i>Ranunculus polyanthemos</i> |          |       |        |    |          |                 |
| Area                           | 0.037    | 0.012 | 10.105 | 1  | 0.0015   | 1.037           |
| Position WE                    | -0.345   | 0.176 | 3.834  | 1  | 0.0502   | 0.708           |
| Position SN                    | 2.555    | 1.308 | 3.817  | 1  | 0.0507   | 12.870          |
| Island topographical diversity | 0.048    | 0.017 | 7.523  | 1  | 0.0061   | 1.049           |
| Isolation                      | 0.090    | 0.030 | 8.972  | 1  | 0.0027   | 1.094           |
| Meadows and pastures           | 0.147    | 0.039 | 14.231 | 1  | 0.0002   | 1.158           |
| Deciduous forest               | 0.395    | 0.164 | 5.778  | 1  | 0.0162   | 1.485           |
| Coniferous forest              | 0.100    | 0.036 | 7.886  | 1  | 0.0050   | 1.105           |
| Mixed forest                   | 0.448    | 0.171 | 6.877  | 1  | 0.0087   | 1.566           |

continued

## Appendix. Continued.

|                                | <i>B</i> | SE     | Wald   | df | <i>p</i> | Exp( <i>B</i> ) |
|--------------------------------|----------|--------|--------|----|----------|-----------------|
| <i>Ranunculus repens</i>       |          |        |        |    |          |                 |
| Area                           | 0.019    | 0.009  | 4.101  | 1  | 0.0429   | 1.019           |
| Position SN                    | 1.505    | 0.867  | 3.014  | 1  | 0.0825   | 4.502           |
| Island topographical diversity | 0.038    | 0.011  | 12.479 | 1  | 0.0004   | 1.039           |
| Isolation                      | 0.110    | 0.019  | 33.542 | 1  | < 0.0001 | 1.116           |
| Limestone                      | 0.702    | 0.361  | 3.776  | 1  | 0.0520   | 2.018           |
| Settlements                    | 0.844    | 0.394  | 4.600  | 1  | 0.0320   | 2.327           |
| Deciduous forest               | 0.543    | 0.162  | 11.203 | 1  | 0.0008   | 1.721           |
| Coniferous forest              | 0.191    | 0.034  | 31.301 | 1  | < 0.0001 | 1.210           |
| Open sand                      | -46.862  | 18.097 | 6.706  | 1  | 0.0096   | 0.000           |
| Rocky ground                   | -0.172   | 0.075  | 5.219  | 1  | 0.0223   | 0.842           |
| <i>Ranunculus acris</i>        |          |        |        |    |          |                 |
| Area                           | 0.103    | 0.014  | 54.601 | 1  | < 0.0001 | 1.108           |
| Isolation                      | 0.049    | 0.013  | 14.996 | 1  | 0.0001   | 1.050           |
| Limestone                      | 0.651    | 0.279  | 5.426  | 1  | 0.0198   | 1.917           |
| Settlements                    | 2.030    | 0.818  | 6.164  | 1  | 0.0130   | 7.617           |
| Meadows and pastures           | 0.476    | 0.129  | 13.602 | 1  | 0.0002   | 1.610           |
| Deciduous forest               | 0.595    | 0.243  | 5.986  | 1  | 0.0144   | 1.813           |
| Coniferous forest              | 0.088    | 0.034  | 6.502  | 1  | 0.0108   | 1.092           |
| Mixed forest                   | 0.326    | 0.166  | 3.860  | 1  | 0.0495   | 1.386           |
| Scrubland                      | 0.170    | 0.070  | 5.906  | 1  | 0.0151   | 1.186           |
| Rocky ground                   | -0.092   | 0.055  | 2.833  | 1  | 0.0923   | 0.912           |
| <i>Ranunculus auricomus</i>    |          |        |        |    |          |                 |
| Area                           | 0.041    | 0.009  | 18.902 | 1  | < 0.0001 | 1.042           |
| Position WE                    | 0.183    | 0.090  | 4.166  | 1  | 0.0412   | 1.201           |
| Position SN                    | 2.207    | 0.687  | 10.323 | 1  | 0.0013   | 9.090           |
| Isolation                      | 0.041    | 0.016  | 6.583  | 1  | 0.0103   | 1.041           |
| Limestone                      | 1.084    | 0.308  | 12.361 | 1  | 0.0004   | 2.955           |
| Deciduous forest               | 0.182    | 0.083  | 4.812  | 1  | 0.0283   | 1.200           |
| Mixed forest                   | 0.736    | 0.122  | 36.137 | 1  | < 0.0001 | 2.088           |
| <i>Ranunculus flammula</i>     |          |        |        |    |          |                 |
| Area                           | 0.052    | 0.010  | 27.861 | 1  | < 0.0001 | 1.054           |
| Isolation                      | 0.050    | 0.014  | 12.994 | 1  | 0.0003   | 1.051           |
| Limestone                      | 0.834    | 0.289  | 8.312  | 1  | 0.0039   | 2.303           |
| Settlements                    | 1.459    | 0.731  | 3.988  | 1  | 0.0458   | 4.302           |
| Meadows and pastures           | 0.114    | 0.031  | 13.782 | 1  | 0.0002   | 1.120           |
| Deciduous forest               | 0.339    | 0.166  | 4.180  | 1  | 0.0409   | 1.404           |
| Coniferous forest              | 0.148    | 0.033  | 20.149 | 1  | < 0.0001 | 1.159           |
| Scrubland                      | 0.090    | 0.052  | 3.026  | 1  | 0.0820   | 1.094           |
| Open sand                      | -17.992  | 8.335  | 4.660  | 1  | 0.0309   | 0.000           |
| <i>Myosurus minimus</i>        |          |        |        |    |          |                 |
| Area                           | 0.028    | 0.010  | 8.307  | 1  | 0.0039   | 1.029           |
| Position WE                    | -0.534   | 0.180  | 8.802  | 1  | 0.0030   | 0.586           |
| Isolation                      | -0.058   | 0.034  | 2.958  | 1  | 0.0854   | 0.944           |
| Rocky ground                   | 0.120    | 0.039  | 9.676  | 1  | 0.0019   | 1.128           |
| <i>Thalictrum flavum</i>       |          |        |        |    |          |                 |
| Area                           | 0.040    | 0.011  | 13.011 | 1  | 0.0003   | 1.041           |
| Position WE                    | -0.459   | 0.187  | 6.029  | 1  | 0.0141   | 0.632           |
| Position SN                    | -2.660   | 1.505  | 3.124  | 1  | 0.0771   | 0.070           |
| Meadows and pastures           | 0.066    | 0.030  | 4.838  | 1  | 0.0278   | 1.068           |
| Scrubland                      | 0.193    | 0.066  | 8.473  | 1  | 0.0036   | 1.213           |
| <i>Urtica dioica</i>           |          |        |        |    |          |                 |
| Area                           | 0.075    | 0.017  | 19.964 | 1  | < 0.0001 | 1.078           |
| Position WE                    | -0.196   | 0.063  | 9.671  | 1  | 0.0019   | 0.822           |
| Settlements                    | 2.652    | 1.384  | 3.673  | 1  | 0.0553   | 14.181          |
| Mixed forest                   | 0.451    | 0.233  | 3.759  | 1  | 0.0525   | 1.570           |
| Scrubland                      | 0.147    | 0.075  | 3.816  | 1  | 0.0508   | 1.159           |

continued



## Appendix. Continued.

|                                | <i>B</i> | SE    | Wald   | df | <i>p</i> | Exp( <i>B</i> ) |
|--------------------------------|----------|-------|--------|----|----------|-----------------|
| <i>Quercus robur</i>           |          |       |        |    |          |                 |
| Island topographical diversity | 0.052    | 0.014 | 13.479 | 1  | 0.0002   | 1.054           |
| Isolation                      | 0.085    | 0.026 | 10.352 | 1  | 0.0013   | 1.089           |
| <i>Betula verrucosa</i>        |          |       |        |    |          |                 |
| Position WE                    | 1.022    | 0.152 | 45.136 | 1  | < 0.0001 | 2.778           |
| Position SN                    | 6.039    | 1.237 | 23.828 | 1  | < 0.0001 | 419.644         |
| Island topographical diversity | 0.030    | 0.010 | 8.012  | 1  | 0.0046   | 1.030           |
| Isolation                      | 0.153    | 0.023 | 43.958 | 1  | < 0.0001 | 1.165           |
| Limestone                      | 0.690    | 0.393 | 3.084  | 1  | 0.0791   | 1.993           |
| Coniferous forest              | 0.211    | 0.035 | 37.070 | 1  | < 0.0001 | 1.235           |
| Rocky ground                   | -0.629   | 0.124 | 25.662 | 1  | < 0.0001 | 0.533           |
| <i>Betula pubescens</i>        |          |       |        |    |          |                 |
| Area                           | 0.118    | 0.025 | 22.844 | 1  | < 0.0001 | 1.125           |
| Position WE                    | -0.152   | 0.072 | 4.498  | 1  | 0.0339   | 0.859           |
| Position SN                    | 1.589    | 0.535 | 8.839  | 1  | 0.0029   | 4.899           |
| Island topographical diversity | 0.039    | 0.010 | 15.091 | 1  | 0.0001   | 1.040           |
| Isolation                      | 0.049    | 0.013 | 14.019 | 1  | 0.0002   | 1.050           |
| Settlements                    | 2.664    | 1.217 | 4.791  | 1  | 0.0286   | 14.350          |
| Meadows and pastures           | 0.394    | 0.150 | 6.884  | 1  | 0.0087   | 1.483           |
| Mixed forest                   | 0.999    | 0.317 | 9.900  | 1  | 0.0017   | 2.715           |
| Scrubland                      | 0.508    | 0.104 | 24.010 | 1  | < 0.0001 | 1.662           |
| Open sand                      | -1.385   | 0.338 | 16.773 | 1  | < 0.0001 | 0.250           |
| <i>Alnus glutinosa</i>         |          |       |        |    |          |                 |
| Area                           | 0.407    | 0.073 | 30.918 | 1  | < 0.0001 | 1.502           |
| Position WE                    | 0.346    | 0.107 | 10.529 | 1  | 0.0012   | 1.413           |
| Position SN                    | 4.884    | 1.025 | 22.691 | 1  | < 0.0001 | 132.143         |
| Isolation                      | 0.170    | 0.034 | 24.751 | 1  | < 0.0001 | 1.185           |
| Meadows and pastures           | 0.357    | 0.174 | 4.194  | 1  | 0.0406   | 1.429           |
| Coniferous forest              | 3.164    | 0.784 | 16.280 | 1  | 0.0001   | 23.660          |
| Scrubland                      | 0.711    | 0.185 | 14.852 | 1  | 0.0001   | 2.037           |
| Open sand                      | -0.714   | 0.216 | 10.990 | 1  | 0.0009   | 0.489           |
| <i>Corylus avellana</i>        |          |       |        |    |          |                 |
| Area                           | 0.039    | 0.012 | 9.985  | 1  | 0.0016   | 1.040           |
| Position SN                    | 1.897    | 0.944 | 4.038  | 1  | 0.0445   | 6.664           |
| Island topographical diversity | 0.027    | 0.012 | 5.138  | 1  | 0.0234   | 1.027           |
| Isolation                      | 0.143    | 0.022 | 42.775 | 1  | < 0.0001 | 1.153           |
| Limestone                      | 0.699    | 0.380 | 3.393  | 1  | 0.0655   | 2.012           |
| Settlements                    | 1.466    | 0.628 | 5.455  | 1  | 0.0195   | 4.334           |
| Coniferous forest              | 0.121    | 0.028 | 19.015 | 1  | < 0.0001 | 1.128           |
| Scrubland                      | 0.232    | 0.081 | 8.246  | 1  | 0.0041   | 1.261           |
| Open sand                      | -2.251   | 0.789 | 8.147  | 1  | 0.0043   | 0.105           |
| Rocky ground                   | -0.317   | 0.102 | 9.655  | 1  | 0.0019   | 0.728           |
| <i>Arenaria serpyllifolia</i>  |          |       |        |    |          |                 |
| Area                           | 0.031    | 0.009 | 10.965 | 1  | 0.0009   | 1.031           |
| Position WE                    | 0.184    | 0.085 | 4.649  | 1  | 0.0311   | 1.202           |
| Position SN                    | -2.145   | 0.747 | 8.258  | 1  | 0.0041   | 0.117           |
| Isolation                      | 0.039    | 0.016 | 6.018  | 1  | 0.0142   | 1.040           |
| Limestone                      | 1.743    | 0.322 | 29.281 | 1  | < 0.0001 | 5.715           |
| Settlements                    | 2.191    | 0.580 | 14.253 | 1  | 0.0002   | 8.945           |
| Deciduous forest               | 0.359    | 0.142 | 6.412  | 1  | 0.0113   | 1.431           |
| <i>Moehringia trinervia</i>    |          |       |        |    |          |                 |
| Area                           | 0.094    | 0.020 | 22.020 | 1  | < 0.0001 | 1.099           |
| Position SN                    | 2.146    | 0.529 | 16.488 | 1  | < 0.0001 | 8.552           |
| Island topographical diversity | 0.031    | 0.009 | 11.380 | 1  | 0.0007   | 1.032           |
| Isolation                      | 0.085    | 0.014 | 38.550 | 1  | < 0.0001 | 1.089           |

continued

## Appendix. Continued.

|   | <i>B</i> | SE    | Wald   | df | <i>p</i> | Exp( <i>B</i> ) |
|---|----------|-------|--------|----|----------|-----------------|
| Meadows and pastures                          | 0.409    | 0.177 | 5.353  | 1  | 0.0207   | 1.505           |
| Deciduous forest                              | 1.171    | 0.682 | 2.947  | 1  | 0.0860   | 3.224           |
| Coniferous forest                             | 0.163    | 0.045 | 13.207 | 1  | 0.0003   | 1.177           |
| Scrubland                                     | 0.484    | 0.129 | 14.122 | 1  | 0.0002   | 1.622           |
| Open sand                                     | -3.559   | 1.129 | 9.938  | 1  | 0.0016   | 0.028           |
| Rocky ground                                  | -0.181   | 0.068 | 7.172  | 1  | 0.0074   | 0.834           |
| <i>Cerastium fontanum</i> ssp. <i>vulgare</i> |          |       |        |    |          |                 |
| Area  | 0.102    | 0.021 | 23.007 | 1  | < 0.0001 | 1.107           |
| Position WE                                   | -0.115   | 0.066 | 3.104  | 1  | 0.0781   | 0.891           |
| Isolation                                     | 0.035    | 0.013 | 7.863  | 1  | 0.0050   | 1.036           |
| Limestone                                     | 1.268    | 0.402 | 9.937  | 1  | 0.0016   | 3.553           |
| Deciduous forest                              | 1.999    | 0.867 | 5.313  | 1  | 0.0212   | 7.380           |
| Coniferous forest                             | 0.153    | 0.049 | 9.551  | 1  | 0.0020   | 1.165           |
| Rocky ground                                  | 0.099    | 0.053 | 3.556  | 1  | 0.0593   | 1.104           |
| <i>Cerastium semidecandrum</i>                |          |       |        |    |          |                 |
| Area  | 0.025    | 0.008 | 9.127  | 1  | 0.0025   | 1.026           |
| Limestone                                     | 1.422    | 0.366 | 15.110 | 1  | 0.0001   | 4.147           |
| Meadows and pastures                          | 0.049    | 0.023 | 4.450  | 1  | 0.0349   | 1.050           |
| Mixed forest                                  | 0.447    | 0.105 | 18.075 | 1  | < 0.0001 | 1.564           |
| <i>Cerastium glutinosum</i>                   |          |       |        |    |          |                 |
| Area  | 0.025    | 0.009 | 8.596  | 1  | 0.0034   | 1.026           |
| Position WE                                   | -0.479   | 0.123 | 15.075 | 1  | 0.0001   | 0.619           |
| Position SN                                   | -3.138   | 0.981 | 10.235 | 1  | 0.0014   | 0.043           |
| Isolation                                     | -0.041   | 0.023 | 3.317  | 1  | 0.0685   | 0.960           |
| Rocky ground                                  | 0.102    | 0.034 | 9.279  | 1  | 0.0023   | 1.108           |
| <i>Sagina nodosa</i>                          |          |       |        |    |          |                 |
| Area  | 0.030    | 0.009 | 10.924 | 1  | 0.0009   | 1.030           |
| Isolation                                     | 0.047    | 0.015 | 9.694  | 1  | 0.0018   | 1.049           |
| Limestone                                     | 1.848    | 0.297 | 38.702 | 1  | < 0.0001 | 6.350           |
| Meadows and pastures                          | 0.094    | 0.028 | 11.049 | 1  | 0.0009   | 1.098           |
| Rocky ground                                  | 0.061    | 0.033 | 3.413  | 1  | 0.0647   | 1.063           |
| <i>Scleranthus annuus</i>                     |          |       |        |    |          |                 |
| Area  | 0.024    | 0.012 | 4.264  | 1  | 0.0389   | 1.024           |
| Position SN                                   | -3.912   | 1.787 | 4.793  | 1  | 0.0286   | 0.020           |
| Island topographical diversity                | 0.045    | 0.018 | 6.261  | 1  | 0.0123   | 1.046           |
| Isolation                                     | 0.105    | 0.028 | 14.133 | 1  | 0.0002   | 1.111           |
| Meadows and pastures                          | 0.111    | 0.043 | 6.558  | 1  | 0.0104   | 1.117           |
| Deciduous forest                              | 0.522    | 0.158 | 10.940 | 1  | 0.0009   | 1.686           |
| Coniferous forest                             | 0.104    | 0.031 | 11.115 | 1  | 0.0009   | 1.109           |
| <i>Spergula arvensis</i>                      |          |       |        |    |          |                 |
| Area  | 0.048    | 0.013 | 13.440 | 1  | 0.0002   | 1.049           |
| Position WE                                   | -0.677   | 0.334 | 4.124  | 1  | 0.0423   | 0.508           |
| Isolation                                     | 0.127    | 0.046 | 7.689  | 1  | 0.0056   | 1.135           |
| Settlements                                   | 0.762    | 0.322 | 5.616  | 1  | 0.0180   | 2.143           |
| Deciduous forest                              | 0.579    | 0.199 | 8.502  | 1  | 0.0040   | 1.785           |
| Mixed forest                                  | 0.278    | 0.157 | 3.141  | 1  | 0.0760   | 1.320           |
| <i>Spergula morisonii</i>                     |          |       |        |    |          |                 |
| Area  | 0.017    | 0.010 | 2.902  | 1  | 0.0885   | 1.017           |
| Position WE                                   | 0.272    | 0.154 | 3.125  | 1  | 0.0771   | 1.312           |
| Island topographical diversity                | 0.053    | 0.015 | 12.927 | 1  | 0.0003   | 1.055           |
| Isolation                                     | 0.082    | 0.027 | 9.205  | 1  | 0.0024   | 1.086           |
| Coniferous forest                             | 0.130    | 0.027 | 23.747 | 1  | < 0.0001 | 1.139           |
| <i>Lychnis flos-cuculi</i>                    |          |       |        |    |          |                 |
| Area  | 0.023    | 0.011 | 4.021  | 1  | 0.0449   | 1.023           |
| Position WE                                   | -0.788   | 0.208 | 14.280 | 1  | 0.0002   | 0.455           |

continued

## Appendix. Continued.

|                                | <i>B</i> | SE    | Wald   | df | <i>p</i> | Exp( <i>B</i> ) |
|--------------------------------|----------|-------|--------|----|----------|-----------------|
| Position SN                    | -8.235   | 2.419 | 11.593 | 1  | 0.0007   | 0.000           |
| Meadows and pastures           | 0.126    | 0.032 | 15.603 | 1  | 0.0001   | 1.134           |
| Scrubland                      | -0.534   | 0.207 | 6.648  | 1  | 0.0099   | 0.586           |
| Rocky ground                   | 0.457    | 0.113 | 16.432 | 1  | 0.0001   | 1.580           |
| <i>Lychnis viscaria</i>        |          |       |        |    |          |                 |
| Area                           | 0.019    | 0.009 | 4.532  | 1  | 0.0333   | 1.020           |
| Position WE                    | 0.290    | 0.121 | 5.777  | 1  | 0.0162   | 1.336           |
| Isolation                      | 0.091    | 0.020 | 20.811 | 1  | < 0.0001 | 1.096           |
| Limestone                      | 0.958    | 0.433 | 4.904  | 1  | 0.0268   | 2.608           |
| Deciduous forest               | 0.425    | 0.134 | 10.030 | 1  | 0.0015   | 1.530           |
| Mixed forest                   | 0.410    | 0.133 | 9.454  | 1  | 0.0021   | 1.507           |
| Rocky ground                   | -0.191   | 0.089 | 4.624  | 1  | 0.0315   | 0.826           |
| <i>Silene nutans</i>           |          |       |        |    |          |                 |
| Area                           | 0.026    | 0.011 | 5.903  | 1  | 0.0151   | 1.027           |
| Position WE                    | -0.710   | 0.215 | 10.954 | 1  | 0.0009   | 0.492           |
| Position SN                    | -3.381   | 1.545 | 4.789  | 1  | 0.0286   | 0.034           |
| Island topographical diversity | 0.038    | 0.018 | 4.303  | 1  | 0.0380   | 1.039           |
| Isolation                      | 0.079    | 0.027 | 8.911  | 1  | 0.0028   | 1.083           |
| Limestone                      | 1.414    | 0.539 | 6.876  | 1  | 0.0087   | 4.113           |
| Settlements                    | 2.408    | 0.882 | 7.461  | 1  | 0.0063   | 11.110          |
| Meadows and pastures           | 0.126    | 0.030 | 17.010 | 1  | < 0.0001 | 1.134           |
| Deciduous forest               | 1.303    | 0.341 | 14.582 | 1  | 0.0001   | 3.682           |
| Mixed forest                   | -0.535   | 0.226 | 5.598  | 1  | 0.0180   | 0.586           |
| <i>Silene viscosa</i>          |          |       |        |    |          |                 |
| Position WE                    | -0.205   | 0.104 | 3.896  | 1  | 0.0484   | 0.815           |
| Position SN                    | -3.636   | 1.059 | 11.791 | 1  | 0.0006   | 0.026           |
| Isolation                      | -0.105   | 0.033 | 10.255 | 1  | 0.0014   | 0.900           |
| Coniferous forest              | -0.165   | 0.093 | 3.147  | 1  | 0.0760   | 0.848           |
| Open sand                      | 0.709    | 0.313 | 5.144  | 1  | 0.0233   | 2.033           |
| Rocky ground                   | 0.090    | 0.043 | 4.403  | 1  | 0.0359   | 1.095           |
| <i>Silene dioica</i>           |          |       |        |    |          |                 |
| Area                           | 0.042    | 0.011 | 13.602 | 1  | 0.0002   | 1.042           |
| Position SN                    | 2.668    | 0.562 | 22.549 | 1  | < 0.0001 | 14.418          |
| Island topographical diversity | 0.023    | 0.009 | 6.746  | 1  | 0.0094   | 1.023           |
| Isolation                      | 0.073    | 0.013 | 30.978 | 1  | < 0.0001 | 1.076           |
| Limestone                      | 0.811    | 0.273 | 8.857  | 1  | 0.0029   | 2.250           |
| Meadows and pastures           | 0.148    | 0.053 | 7.832  | 1  | 0.0051   | 1.160           |
| Deciduous forest               | 0.771    | 0.274 | 7.903  | 1  | 0.0049   | 2.163           |
| Mixed forest                   | 0.866    | 0.171 | 25.730 | 1  | < 0.0001 | 2.377           |
| Scrubland                      | 0.245    | 0.093 | 6.868  | 1  | 0.0088   | 1.277           |
| Open sand                      | -2.219   | 1.320 | 2.824  | 1  | 0.0929   | 0.109           |
| Rocky ground                   | -0.251   | 0.074 | 11.412 | 1  | 0.0007   | 0.778           |
| <i>Dianthus deltooides</i>     |          |       |        |    |          |                 |
| Area                           | 0.028    | 0.011 | 6.100  | 1  | 0.0135   | 1.029           |
| Position WE                    | -0.382   | 0.157 | 5.882  | 1  | 0.0153   | 0.683           |
| Position SN                    | -2.731   | 1.361 | 4.023  | 1  | 0.0449   | 0.065           |
| Island topographical diversity | 0.058    | 0.016 | 13.006 | 1  | 0.0003   | 1.060           |
| Isolation                      | 0.127    | 0.025 | 26.099 | 1  | < 0.0001 | 1.136           |
| Settlements                    | 1.138    | 0.674 | 2.848  | 1  | 0.0915   | 3.120           |
| Meadows and pastures           | 0.098    | 0.027 | 13.254 | 1  | 0.0003   | 1.103           |
| Deciduous forest               | 0.651    | 0.166 | 15.475 | 1  | 0.0001   | 1.918           |
| Coniferous forest              | 0.059    | 0.027 | 4.954  | 1  | 0.0260   | 1.061           |
| <i>Chenopodium album</i>       |          |       |        |    |          |                 |
| Area                           | 0.039    | 0.011 | 11.736 | 1  | 0.0006   | 1.040           |
| Position SN                    | -3.469   | 1.331 | 6.796  | 1  | 0.0091   | 0.031           |

continued

## Appendix. Continued.

|   | <i>B</i> | SE    | Wald   | df | <i>p</i> | Exp( <i>B</i> ) |
|---|----------|-------|--------|----|----------|-----------------|
| Isolation   | 0.095    | 0.021 | 19.971 | 1  | < 0.0001 | 1.100           |
| Settlements   | 1.320    | 0.601 | 4.822  | 1  | 0.0281   | 3.745           |
| Deciduous forest  | 0.205    | 0.104 | 3.897  | 1  | 0.0484   | 1.227           |
| Coniferous forest                                       | 0.028    | 0.019 | 2.285  | 1  | 0.1306   | 1.029           |
| <i>Persicaria minor</i>                                 |          |       |        |    |          |                 |
| Isolation   | -0.291   | 0.075 | 15.004 | 1  | 0.0001   | 0.748           |
| Scrubland   | -0.522   | 0.229 | 5.215  | 1  | 0.0224   | 0.593           |
| Open sand   | 0.593    | 0.260 | 5.190  | 1  | 0.0227   | 1.809           |
| Rocky ground  | 0.306    | 0.107 | 8.229  | 1  | 0.0041   | 1.359           |
| <i>Persicaria lapathifolia</i> ssp. <i>lapathifolia</i> |          |       |        |    |          |                 |
| Area  | 0.043    | 0.010 | 17.819 | 1  | < 0.0001 | 1.044           |
| Position SN   | -2.799   | 1.115 | 6.295  | 1  | 0.0121   | 0.061           |
| Isolation   | 0.037    | 0.021 | 3.271  | 1  | 0.0705   | 1.038           |
| Settlements   | 1.322    | 0.588 | 5.060  | 1  | 0.0240   | 3.749           |
| Meadows and pastures                                    | 0.069    | 0.026 | 6.763  | 1  | 0.0090   | 1.071           |
| Scrubland   | 0.117    | 0.050 | 5.439  | 1  | 0.0200   | 1.124           |
| <i>Fallopia convolvulus</i>                             |          |       |        |    |          |                 |
| Area  | 0.018    | 0.009 | 3.610  | 1  | 0.0574   | 1.018           |
| Island topographical diversity                          | 0.020    | 0.011 | 3.213  | 1  | 0.0730   | 1.020           |
| Isolation   | 0.065    | 0.018 | 13.263 | 1  | 0.0003   | 1.067           |
| Settlements   | 0.851    | 0.421 | 4.079  | 1  | 0.0434   | 2.343           |
| Deciduous forest  | 0.382    | 0.137 | 7.746  | 1  | 0.0054   | 1.464           |
| <i>Fallopia dumetorum</i>                               |          |       |        |    |          |                 |
| Area  | 0.048    | 0.012 | 14.537 | 1  | 0.0001   | 1.049           |
| Position WE   | 0.270    | 0.077 | 12.413 | 1  | 0.0004   | 1.311           |
| Position SN   | 4.482    | 0.596 | 56.514 | 1  | < 0.0001 | 88.430          |
| Island topographical diversity                          | 0.045    | 0.010 | 21.994 | 1  | < 0.0001 | 1.046           |
| Isolation   | 0.049    | 0.013 | 14.139 | 1  | 0.0002   | 1.051           |
| Coniferous forest                                       | 0.120    | 0.038 | 9.998  | 1  | 0.0016   | 1.128           |
| Mixed forest  | 0.443    | 0.175 | 6.388  | 1  | 0.0115   | 1.557           |
| Scrubland   | 0.178    | 0.065 | 7.455  | 1  | 0.0063   | 1.194           |
| Rocky ground  | -0.095   | 0.052 | 3.357  | 1  | 0.0669   | 0.909           |
| <i>Rumex acetosa</i>                                    |          |       |        |    |          |                 |
| Area  | 0.122    | 0.023 | 28.768 | 1  | < 0.0001 | 1.130           |
| Position WE   | -0.282   | 0.068 | 17.049 | 1  | < 0.0001 | 0.754           |
| Isolation   | 0.050    | 0.013 | 14.345 | 1  | 0.0002   | 1.051           |
| Limestone   | 0.624    | 0.350 | 3.191  | 1  | 0.0740   | 1.867           |
| Meadows and pastures                                    | 0.497    | 0.226 | 4.825  | 1  | 0.0281   | 1.644           |
| Mixed forest  | 0.937    | 0.316 | 8.775  | 1  | 0.0031   | 2.551           |
| Scrubland   | 0.364    | 0.097 | 14.128 | 1  | 0.0002   | 1.440           |
| Open sand   | -0.321   | 0.152 | 4.429  | 1  | 0.0353   | 0.725           |