Aim To propose a new approach to the small island effect (SIE) and a simple mathematical procedure for the estimation of its upper limit. The main feature of the SIE is that below an upper size threshold an increase of species number with increase of area in small islands is not observed.

Location Species richness patterns from different taxa and insular systems are analysed.

Methods Sixteen different data sets from 12 studies are analysed. Path analysis was used for the estimation of the upper limit of the SIE. We studied each data set in order to detect whether there was a certain island size under which the direct effects of area were eliminated. This detection was carried out through the sequential exclusion of islands from the largest to the smallest. For the cases where an SIE was detected, a log-log plot of species number against area is presented. The relationships between habitat diversity, species number and area are studied within the limits of the SIE. In previous studies only area was used for the detection of the SIE, whereas we also encompass habitat diversity, a parameter with well documented influence on species richness, especially at small scales.

Results An SIE was detected in six out of the 16 studied cases. The upper limit of the SIE varies, depending on the characteristics of the taxon and the archipelago under study. In general, the values of the upper limit of the SIE calculated according to the approach undertaken in our study differ from the values calculated in previous studies.

Main conclusions Although the classical species–area models have been used to estimate the upper limit of the SIE, we propose that the detection of this phenomenon should be undertaken independently from the species–area relationship, so that the net effects of area are calculated excluding the surrogate action of area on other variables, such as environmental heterogeneity. The SIE appears when and where area ceases to influence species richness directly. There are two distinct SIE patterns: (1) the classical SIE where both the direct and indirect effects of area are eliminated and (2) the cryptic SIE where area affects species richness indirectly. Our approach offers the opportunity of studying the different factors influencing biodiversity on small scales more accurately. The SIE cannot be considered a general pattern with fixed behavior that can be described by the same model for different island groups and taxa. The SIE should be recognized as a genuine but idiosyncratic phenomenon.