ISRAEL JOURNAL OF ECOLOGY & EVOLUTION, Vol. 57, 2011, pp. 193–204
10.1560/IJEE.57.3.193

NOT SO HOLY AFTER ALL

Uri Roll,[a,]* Lewi Stone,[a] Rich Grenyer,[b] and Shai Meiri[c]
[a]*Biomathematics Unit, Department of Zoology, Tel Aviv University, Tel Aviv 69978, Israel*
[b]*School of Geography and the Environment, Oxford University, Oxford, OX1 3QY, UK*
[c]*Department of Zoology, Tel Aviv University, Tel Aviv 69978, Israel*

ABSTRACT

In responses to our paper questioning Israel's great biodiversity, Gavish and Yom-Tov claim that our methods and geographic scope are erroneous, and responsible for our inability to find Israel as diversity hotspot. They maintain that relative to its latitude and realm, Israel is very species-rich. However, our original work corrected for latitude and we highlight the failure of Israel to lie outside the prediction limits of any test in all geographical scopes. We now also analyze richness to test whether realms have parallel slopes in species area curves as Gavish claims and upon which he bases his analysis. We also analyze species richness in the Palearctic realm, calculate prediction limits, and add latitude as a predictor. Moreover, we analyze a new dataset of mammal, bird, and amphibian richness in grid-cells comparing Israeli cell values to the entire world, the Palearctic, and Israel's latitudes. We reject the idea that realms have equal slopes and therefore the Palearctic is not always at a disadvantage compared to other realms. Within the Palearctic realm Israel never lies outside the prediction limits for a country of its area, and adding latitude to this analysis lowered Israel's residual placement. Israel's richness in grid-cells is unexceptional for any taxon at all geographical scopes. In sum, irrespective of the test performed or the geographical region it is compared to, Israel is not a diversity hotspot.

Keywords: Biodiversity hotspots, diversity, Israel, latitude, Mediterranean, Palearctic, realms, species–area relationship, species richness.

INTRODUCTION

In the following paper we respond to Yom-Tov (2011) and Gavish (2011) who, in turn, replied to our paper questioning Israel's great diversity (Roll et al., 2009). Gavish and Yom-Tov claim that Israel, when examined relative to its latitude (Yom-Tov) and realm (Gavish), is indeed very species-rich (at least for mammals, birds, and reptiles). Here we both respond to their claims and present new analyses that further substantiate our original claim—Israel's species richness is not different from that expected for a country

*Author to whom correspondence should be addressed. E-mail: uroll@post.tau.ac.il
Received 23 March 2011, accepted 24 March 2011.

its size, latitude, and realm.

Both Yom-Tov and Gavish raise interesting arguments in an effort to regain Israel's (lost) honor—at least with regards to its biological diversity. Both claim that we conduct the wrong analysis as we compare Israel to all world countries, which is "inappropriate" since tropical regions would be expected to have more species richness due to latitudinal gradients (Fischer, 1961; Willig et al., 2003; Hillebrand, 2004). However, both authors ignore our analyses adding latitude as a predictor, which correct for latitudinal diversity gradients and thus to the greater richness of the tropics.

We conducted six different tests (Roll et al., 2009), using: 1. Area as the sole predictor; 2. A test of richness against area, insularity, altitudinal span and, crucially, latitude; 3. Analysis of species vs. area for countries >1000 km^2. We then repeated these analyses for Mediterranean countries only (all of which are Palearctic). In each analysis we examined both Israel's residual placement and its position relative to prediction limits. Both authors did not mention our examination of prediction limit calculations for a country of Israel's size, which we view as the correct test to determine if Israel is **significantly** species-rich given its area. In these analyses, Israel failed to stand out in any test. Gavish and Yom-Tov refer to only one analysis—our most simple analysis of richness vs. area, with an examination of model residuals. We thus feel that both authors pick out a few of our original analyses, with a particular method on particular taxa (amniotes), and disregard the other, more informative, analyses (and excuse other taxa) we presented that do not support their claims.

Yom-Tov asserts that other works do not deal with Israel but with the Levant and do not compare it to tropical countries, rendering our analyses irrelevant. However we do find other works that relate directly to Israel (see, e.g., Netanyahu, 1957; Alon, 1990; Yom-Tov and Werner, 1996) and our results do contradict their statements. In all global comparisons, and in all comparisons to Mediterranean countries, Israeli species richness was never significantly higher than expected by our models, even with latitude as a covariate. In a sample of only Mediterranean countries larger than 1,000 km^2 (between 9 and 12 countries in the different tests, Roll et al. 2009), Israel lay inside the prediction limits of the models for all taxa—hence it is **not** significantly different from what would be expected from a country of its size, even for this smaller sample. In this last particular analysis of Mediterranean countries, as Yom-Tov states, Israel's residuals are highest for three taxa (mammals, birds, and reptiles). However, one of these—birds—has a non-significant regression, making a residual statistically meaningless. In such a small sample Israel would be expected to be placed high in some of the comparisons by chance alone. This can be verified theoretically by calculating the chance of a country being placed first in two or more of the five taxa that had significant regressions in these tests. This probability is $p = 0.07$ for the datasets we were analyzing, thus not significant. Hence it is not especially surprising that Israel appears in one of the two top places for five of the taxa.

Yom-Tov's second misgiving is that our analysis was conducted specifically on the species richness of countries. This was necessary because the main question we were examining required dealing with particular countries. One can of course study hotspots in different ways, such as in ecoregions or grid-cells, and this has been explored elsewhere (e.g., Myers et al., 2000; Grenyer et al., 2006); however such analyses do not contribute to the particular question we address: whether the country of Israel is a diversity hotspot. Yom-Tov suggested an alternative method for hotspot identification, which is not based on the species area curve, i.e., placing Israel's exact shape elsewhere in the world in similar latitudes and examining the diversity that falls in these new boundaries. Conducting an analysis as Yom-Tov suggested with Israel's exact shape is impossible with the data at our disposal. Apart from this, Yom-Tov himself describes countries as "notoriously arbitrary and rarely representing any meaningful biological parameter". We therefore explore below a grid-cell approach in order to conduct a test very similar to that suggested by Yom-Tov.

Gavish disapproves of our global analysis, and claims that hotspots should be analyzed separately within each realm. He asserts that the "slopes of mainland SPARs of different provinces in a log–log space are nearly parallel", and thus species-poor realms (i.e., those characterized by low intercepts) would have lower residuals than richer ones when analyzed together. Gavish implicitly acknowledges that latitudinal gradients (referred to explicitly by Yom-Tov) underlie such inter-realm differences. Nevertheless, Gavish never tests either his claim that different realms are characterized by parallel slopes, or that Palearctic intercepts are low, both of which his reasoning depends upon. Below, we test these assumptions. Furthermore, we identify latitudinal gradients as the major mechanism behind Gavish's criticism of our work. In fact Gavish implicitly acknowledges this when claiming that Palaearctic countries placed "above" Israel "have significant representation of species-rich tropical provinces". However, he fails to correct for this important gradient in diversity while conducting his analysis within the Palearctic realm. We therefore reanalyzed species diversity in Palearctic countries, taking latitude into account.

ANALYSIS

We reanalyzed country species richness data with respect to realms, particularly the Palearctic realm. We augmented this by a new analysis of species richness of amphibians, mammals, and breeding birds in 100 × 100 km grid-cells over the entire world, only in the Palearctic, and in all land cells of similar latitude to Israel (in the Northern Hemisphere).

We replicated Gavish's analysis by using our original dataset, analyzing data by realm. We divided the world into realms based on the classification of the WWF (http://www.worldwildlife.org/science/ecoregions/global200.html, which Gavish also used). For each realm we indicated which countries have some portion of their area falling within it. Countries that fall in more than one realm were analyzed in all the realms that they belong to. We omitted the Antarctic realm from all analyses, ending up with 7 realms: Australasia, Nearctic, Neotropics, Afrotropics, Oceania, IndoMalay and Palearctic. Thus our dataset is identical to that of Gavish (2011). We regressed (log transformed) country species richness in seven taxa—amphibians, mammals, birds, reptiles, flowering plants, conifers and cycads, and ferns—on (log transformed) country area.

In the first analysis we followed Gavish's assumption (based on Rosenzweig, 1995), that different realms have parallel lines (equal z values) on the log-transformed species-area curve and only differ from each other by their intercepts (the c values of the log-transformed species area equation: $\log S = \log c + z^*\log A$). We thus first ran models of species vs. areas in which we forced all realms to have the same slope and compared the intercepts (c values). The intercept of the Palearctic is indeed lowest of all realms in amphibians, reptiles, and ferns and fairly low in the other taxa, except birds, where it ranks 4th of seven realms (Table 1). Therefore, provided all the realms have equal slopes, the Palearctic is somewhat at a disadvantage when compared to the rest of the world. However, we then re-ran the models but allowed slopes (z values) to vary between realms. For five taxa (but not for conifers and cycads or for ferns) there was at least one realm with a significantly different slope value from that of the Palearctic (Table 2). Therefore, it is incorrect to claim that all realms have parallel lines on the species–area curve. Furthermore, for four taxa—amphibians, birds, mammals, and flowering plants—the model with varying slopes was found to be preferable according to the Akaike information criterion (Table 2). The assumption that all realms always have the same slope (Rosenzweig, 1995) is thus incorrect and Gavish's approach to biodiversity hotspot designation only within a realm, providing they all have the same slope, can be erroneous.

In our second analysis we limited our scope only to the Palearctic realm—much in the same way as Gavish analyzed the data. However, in addition to ranking country residuals, we also calculated the prediction limits (Zar, 1999) of the models, as we did in our initial paper (Roll et al., 2009). These tests showed that the value of Israel's residual never lies outside the prediction limits of the models for any taxon (Fig. 1, Table 3). Therefore **Israel's species numbers in all taxa are never statistically significantly higher than expected for a country of Israel's area**, even when only Palearctic countries are examined. We then added latitude as a second predictor in a species–area analysis within the Palearctic realm. In this analysis, Israel's residual placement is still placed high for mammals, birds, and reptiles but lower than in Gavish's analysis, and is never in the top 5% (Table 3).

In a third analysis we examined the dataset of Grenyer et al. (2006) for species numbers of amphibians, mammals, and breeding birds in 100 × 100 km grid-cells over the entire world. We omitted all cells that had zero values for a taxon from analyses of this taxon. We compared the average richness of the 10 cells that Israel falls in, to the average richness values of all of the cells of the world; to all the cells of the Palearctic; and to all those cells that have the same northerly latitude as Israel, 24ºN to 39ºN (Table 4). The average values of cells belonging to Israel are lower than the world average, Palearctic average, and same-latitude average for amphibians and birds. For mammals, Israel's average is higher than the Palearctic and same-latitude averages and lower than the world average (Table 4). When analyzing the frequency distribution of the average value of cells belonging to Israel, it was always placed in, or right next to, the mode of all cells in all the geographical scopes aforementioned.

We approximated Yom-Tov's suggested analysis by comparing Israel's average richness values in the 10 cells it occupies, to an average value we calculated for all possible

Table 1
OLS regressions of species richness in different realms when compared to the Palearctic results—analysis of a fixed slope for all realms

Realm	Statistic	Index	Amphibians	Birds	Mammals	Reptiles	Flowering plants	Conifers and cycads	Ferns
Afrotropical	p-value	intercept	4.4E–04	1.6E–03	9.7E–04	1.0E–12	0.17	1.8E–07	0.06
Australasia	p-value	intercept	0.09	0.77	0.62	5.4E–06	0.01	3.2E–03	1.6E–04
Indomalaysian	p-value	intercept	2.1E–05	2.4E–05	2.0E–05	3.8E–13	5.1E–07	4.0E–03	1.2E–09
Nearctic	p-value	intercept	0.02	0.50	0.47	0.08	0.37	0.15	0.09
Neotropic	p-value	intercept	1.9E–13	1.2E–06	1.3E–03	2.0E–16	1.2E–11	0.72	1.3E–14
Oceania	p-value	intercept	0.44	2.7E–07	9.0E–07	0.01	0.45	0.38	0.03
Afrotropical	value	intercept	–0.59	1.67	0.40	0.41	1.78	–1.17	0.97
Australasia	value	intercept	–0.55	1.54	0.30	0.58	2.03	–0.04	1.60
Indomalaysian	value	intercept	–0.37	1.77	0.54	0.61	2.15	–0.22	1.80
Nearctic	value	intercept	–0.33	1.50	0.17	0.27	1.84	–0.31	1.17
Neotropic	value	intercept	–0.18	1.75	0.41	0.62	2.19	–0.69	1.66
Oceania	value	intercept	–0.70	1.25	–0.13	0.25	1.59	–0.49	1.24
Palearctic	value	intercept	–0.88	1.56	0.25	–0.02	1.69	–0.66	0.78
Afrotropical	rank	intercept	5	3	3	4	5	7	6
Australasia	rank	intercept	4	5	4	3	3	1	3
Indomalaysian	rank	intercept	3	1	1	2	2	2	1
Nearctic	rank	intercept	2	6	6	5	4	3	5
Neotropic	rank	intercept	1	2	2	1	1	6	2
Oceania	rank	intercept	6	7	7	6	7	4	4
Palearctic	rank	intercept	7	4	5	7	6	5	7

Table 2
OLS regressions of species richness in different realms when compared to the Palearctic - with slope allowed to vary between realms. At the bottom are displayed the AIC values of the different model sets.

Realm	Statistic	Index	Amphibians	Birds	Mammals	Reptiles	Flowering plants	Conifers and cycads	Ferns
Afrotropical	p-value	intercept	0.88	0.76	0.53	0.48	0.78	0.62	0.07
Australasia	p-value	intercept	4.1E–03	0.01	0.03	0.34	0.32	0.36	0.33
Indomalaysian	p-value	intercept	0.24	0.22	0.58	0.43	0.57	0.44	0.39
Nearctic	p-value	intercept	0.78	0.05	0.51	0.92	0.31	0.85	0.61
Neotropic	p-value	intercept	2.6E–03	0.45	5.2E–04	0.37	0.46	0.16	0.10
Oceania	p-value	intercept	0.02	2.3E–05	4.4E–08	0.77	2.4E–03	0.19	0.69
Afrotropical	value	intercept	–0.14	1.64	0.48	0.42	2.23	–0.54	1.71
Australasia	value	intercept	–3.20	0.66	–0.53	–0.43	1.45	0.72	1.77
Indomalaysian	value	intercept	–0.83	1.97	0.78	0.53	2.41	–0.85	1.36
Nearctic	value	intercept	–0.26	2.23	0.38	0.27	1.64	0.64	1.00
Neotropic	value	intercept	–1.01	1.59	0.03	0.43	1.90	–0.95	1.50
Oceania	value	intercept	–1.73	0.99	–0.55	0.14	0.85	–1.06	0.90
Palearctic	value	intercept	–0.09	1.69	0.62	0.23	2.13	–0.26	0.62
Afrotropical	p-value	slope	0.33	0.31	0.16	0.38	0.97	0.69	0.12
Australasia	p-value	slope	1.1E-03	0.01	0.02	0.06	0.13	0.73	0.77
Indomalaysian	p-value	slope	0.04	0.77	0.63	0.39	0.70	0.17	0.76
Nearctic	p-value	slope	0.17	0.03	0.56	0.54	0.15	0.93	1.00
Neotropic	p-value	slope	8.1E–08	0.02	6.3E–06	0.05	0.02	0.17	0.98
Oceania	p-value	slope	0.01	0.01	2.2E–04	0.26	3.3E–03	0.10	0.75
Afrotropical	value	slope	0.29	0.21	0.31	0.30	0.23	0.19	0.04
Australasia	value	slope	0.86	0.36	0.49	0.49	0.42	0.16	0.16
Indomalaysian	value	slope	0.46	0.16	0.28	0.32	0.26	0.43	0.27
Nearctic	value	slope	0.36	0.07	0.29	0.30	0.35	0.17	0.22
Neotropic	value	slope	0.56	0.23	0.42	0.35	0.37	0.36	0.22
Oceania	value	slope	0.58	0.28	0.45	0.33	0.49	0.44	0.27
Palearctic	value	slope	0.22	0.17	0.26	0.25	0.23	0.23	0.22
Common slope value			0.38	0.20	0.33	0.30	0.31	0.31	0.19
Palearctic slope rank			7	5	7	7	6	4	4
Palearctic intercept rank			1	3	2	5	3	3	7
AIC variable slope			257.92	–92.53	24.55	153.71	107.58	135.06	186.88
AIC fixed slope			287.48	–80.01	45.09	148.88	112.47	131.56	180.71

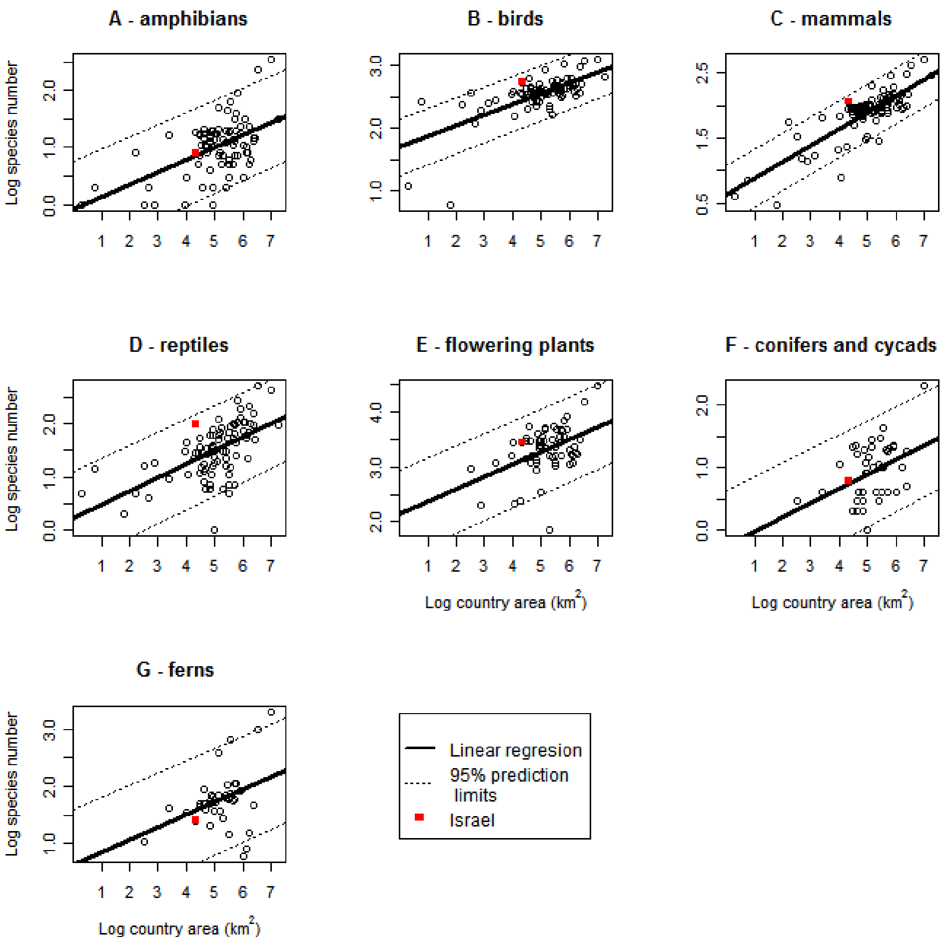

Fig. 1. OLS regressions of species against country area (after log transformation), for seven different taxa, comparing all Palearctic countries. Israel is indicated in the filled squares; prediction limits are displayed with the dashed lines.

combinations of 10 cells placed in the same orientation as Israel—two across and 5 up. We conducted this analysis for all such 10 cell combinations in the entire world, in the Palearctic, and in Israel's latitude, for amphibians, birds, and mammals. We omitted all such averages that had at least one cell with a zero value in them (usually these are cells that are placed in the sea). Figure 2 displays Israel's 10-cell average, its maximum, and its minimum values compared to the frequency distributions of 10 cells for all such 10 cell averages, for Palearctic cells, and for Israeli latitude cells. Israel's average falls in the mode of the distributions for mammals in the world and same-latitude distributions,

Table 3

Results of analyzing Israel's species richness compared to Palearctic countries, taking latitude as an added predictor. The table displays Israel's rank and percentile, based on the total sample size, for seven different taxa. Also displayed are Israel's richness (after log transformation) and the prediction limits for a country of Israel's size

	Birds	Reptiles	Mammals	Amphibians	Flowers	Conifers and cycads	Ferns
Sample size (countries)	89	88	89	84	62	44	43
Israel's rank[a]	7	5	5	31	13	32	31
Israel's percentile	92	94	94	63	79	27	28
Israel's (log) species number	2.73	2	2.06	0.9	3.44	0.78	1.4
Prediction limits interval	2–2.88	0.49–2.18	1.3–2.16	0.05–1.67	2.34–3.9	–0.11–1.58	0.65–2.50

[a]Rank from 1 = highest value.

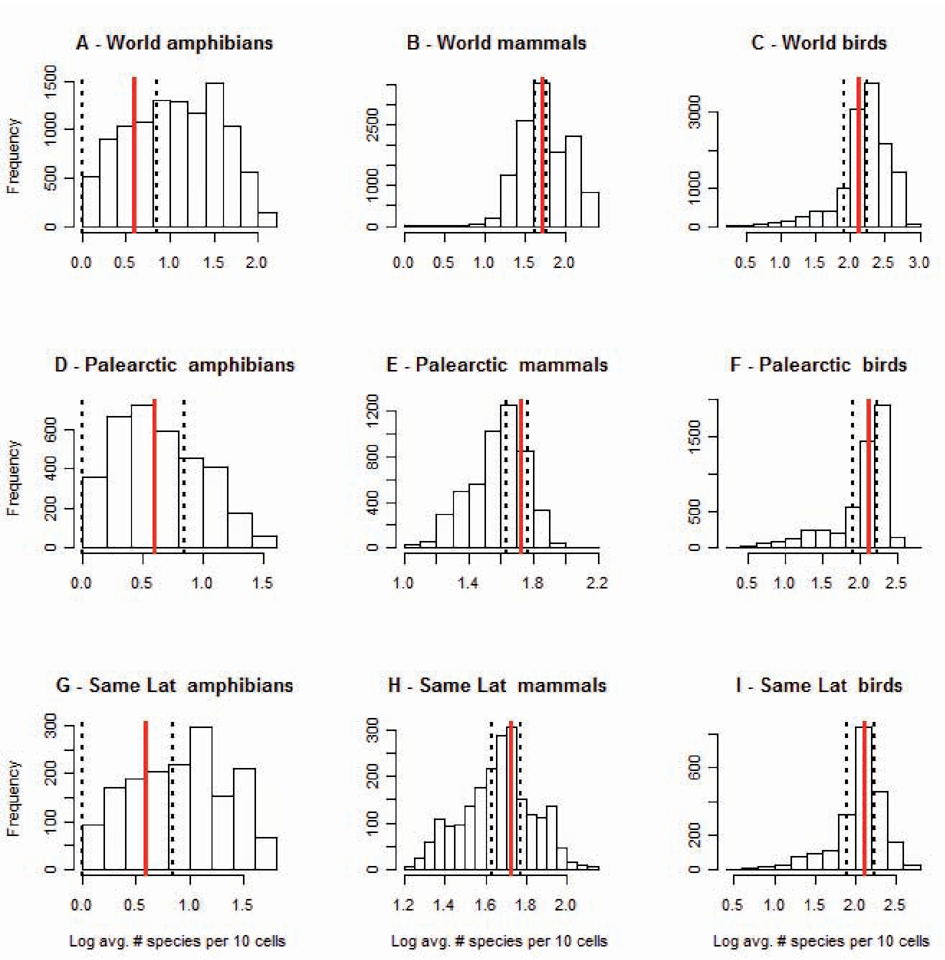

Fig. 2. Frequency distribution of 10-cell averages and Israel's average, for three geographical scopes and three taxa. The histograms are the distribution of richness of all possible combinations of 10-cell averages similar in shape to Israel (see text). The red line is Israel's mean value and the dashed lines are Israel's richest and poorest cell values. Species richness values are log-transformed.

amphibians in the Palearctic and birds in the same-latitude distributions. Its value sits just below the mode for birds in the world and Palearctic distributions, and amphibians in the world and same-latitude distributions. Its value is just above the mode of the distribution for mammals in the Palearctic (Fig. 2). We can therefore conclude that the grid-cells in which Israel is placed are not particularly species-rich for amphibians, mammals, and birds when compared to all world cells, Palearctic cells, and those cells with the same latitude as Israel.

DISCUSSION

Yom-Tov and Gavish claim that our finding that Israeli richness is not exceptional stems from either incorrect scope of our analyses or inappropriate methods. The authors suggest or provide alternatives. We pick up this gauntlet, explain our original analysis, follow through the analysis conducted by Gavish, and also analyze a new dataset. All this only serves to strengthen our conviction that Israel's biodiversity is not exceptionally rich. Israel species richness is not significantly higher than expected regardless of geographical scope, method of analysis, or dataset used.

When the analysis of only Palearctic countries is pursued further, it is clear that Israel's species-richness does not lie outside the prediction limits for a country its size (Fig. 1). Adding latitude as a predictor lowers the placement of its residuals compared to Gavish's analysis. Failure to do this (as in the case of Gavish) is in essence using the latitudinal gradient to Israel's "advantage" by artificially inflating its diversity. As the Palearctic is a northern realm and Israel is a relatively southern country within it, not correcting for this correlate of diversity within the realm is equivalent to placing Israel at a favorable geographical location.

Furthermore, our analysis of the different realms' species–areas relationships refutes Gavish's claim that they have parallel slopes. Therefore, one cannot claim that one realm is at a disadvantage throughout the range of country areas. The Palearctic usually starts from a high point on the species–area curve for countries of small area (high c), but its slopes are usually shallower than those of other realms (Table 2). Therefore, expected richness is contingent on country area rather than always being lower or higher in some realms. Either this fact is taken into account in the analysis or the analysis should be limited in geographical scope to within realms—making no claims on interactions between them. All one can say relating to this analysis is that compared to all Palearctic countries Israel has a high, though not significantly high, species richness in some taxa,

Table 4

The mean number of species per 100 × 100 km grid-cell for Israel, the Palearctic, grid-cells with the same latitude as Israel and the entire world. The table displays the analysis for amphibians, mammals, and birds. In brackets are the sample sizes—the number of grid-cells used in the analysis

	Amphibians	Mammals	Birds
Israel	**3.9** (10)	**52.7** (10)	**128.1** (10)
Palearctic	**5.7** (3439)	**39.0** (4928)	**128.5** (5041)
Same-latitude	**12.0** (1607)	**47.6** (2093)	**129.1** (2138)
World	**18.4** (10509)	**62.0** (12613)	**181.5** (12851)

average richness in other taxa, and low richness in yet others. Also, we find no biological or statistical justification to treat only particular taxa (i.e., Gavish and Yom-Tov discuss only amniotes, but Israel's diversity is low in other taxa) and ignore the rest as uninformative.

The new analysis presented here on grid-cells further supports our claims. Grid-cell richness in Israel's region is not unique regardless of the taxon analyzed. This remains true regardless of geographical scope studied—be it the entire world, Palearctic or Israel's latitude. This grid-cell analysis also undermines Gavish's statement on other Palearctic countries scoring higher than Israel because they also have tropical climates in them as well. Even when only Palearctic grid-cells were included in our analysis, Israel failed to shine. Israeli richness is placed either right in the middle of the distribution or just off the middle. In essence, there are many places 2 × 5 cells (200 × 500 km) long elsewhere in the world, in the Palearctic, or in Israel's latitude that have equal or greater species richness than Israel, at least in the three taxa examined. Feldman (2011) also show that snake species richness in Israeli grid-cells is no higher than that of cells in similar latitudes elsewhere.

At the end of the day neither analyses conducted on equal area grid-cells, nor our method which corrects for differences in a country area, found this region to be particularly species-rich. This is true when Israel is compared to countries in similar latitudes or just the Palearctic. We feel this is strong enough evidence against any general claims that Israel is a diversity hotspot.

Israel has beautiful natural splendor, amazing vistas, fascinating organisms, and a variety of habitats. All this beauty lies in peril due to human actions which have been greatly intensified in recent years. We can enjoy our nature and we need to conserve it regardless if we are the most diverse country in a particular region or analysis. We have to do it because it is the right thing to do!

ACKNOWLEDGMENTS

UR is supported by the Adams Fellowship Program of the Israel Academy of Sciences and Humanities. RG acknowledges financial support from the University of Oxford. SM is supported by an Alon Fellowship.

REFERENCES

Alon, A. 1990. Plants and animals of Israel, Vol. 1: introductions and indexes. Ministry of Defense Publishing, Tel-Aviv, Israel.

Feldman, A. 2011. Drivers of snake richness differ geographically. In: Proceedings of the 5th international conference of the International Biogeography Society, Crete, p. 102.

Fischer, A.G. 1961. Latitudinal variations in organic diversity. Am. Nat. 49: 50–74.

Gavish, Y. 2011 Questioning Israel's great biodiversity—relative to whom? A comment on Roll et al., 2009. Isr. J. Ecol. Evol. 57: 183–192, this issue.

Grenyer, R., Orme, C.D.L., Jackson, S.F., Thomas, G.H., Davies, R.G., Davies, T.J., Jones, K.E., Olson, V.A., Ridgely, R.S., Rasmussen, P.C., Ding, T.S., Bennett, P.M., Blackburn, T.M., Gas-

ton, K.J., Gittleman, J.L., Owens, I.P.F. 2006. Global distribution and conservation of rare and threatened vertebrates. Nature 444: 93–96.
Hillebrand, H. 2004. On the generality of the latitudinal diversity gradient. Am. Nat. 163: 192–211.
Myers, N., Mittermeier, R.A., Mittermeier, C.G., Da Fonseca, G.A.B., Kent, J. 2000. Biodiversity hotspots for conservation priorities. Nature 403: 853–858.
Netanyahu, B. 1957. The Hebrew encyclopedia—general, Jewish and Israeli. The Encyclopedias Publishing House Ltd., Jerusalem.
Roll, U., Stone, L., Meiri, S. 2009. Hot-spot facts and artifacts—questioning Israel's great biodiversity. Isr. J. Ecol. Evol. 55: 263–279.
Rosenzweig, M.L. 1995. Species diversity in space and time. Cambridge University Press, Cambridge, UK.
Willig, M.R., Kaufman, D.M., Stevens, R.D. 2003. Latitudinal gradients of biodiversity: Pattern, process, scale, and synthesis. Annu. Rev. Ecol. Evol. Syst. 34: 273–309.
Yom-Tov, Y. 2011. Biodiversity of Israel—a response to Roll et al. Isr. J. Ecol. Evol. 57: 181–182, this issue.
Yom-Tov, Y., Werner, Y.L. 1996. Environmental correlates of geographical distribution of terrestrial vertebrates in Israel. Isr. J. Zool. 42: 307–315.
Zar, J.H. 1999. Biostatistical analysis, 4th edn. Prentice Hall, Upper Saddle River, NJ.