# Evolution of wild cereals over 28 years of global warming in Israel

Eviatar Nevo, Yong-Bi Fu, Tomas Pavlicek, Souad Khalifa, Mordechai Tavasi, and Avigdor Beiles

**Supporting Information Appendix**

I. Additional assessment on climate changes in Israel
II. Tables S1 to S8
III. Figures S1 to S6

## I. Additional assessment on climatic changes over the last 30 years in Israel

Extra effort was made to assess the last 30 years of climatic change in Israel. The climate data were obtained from Israel Meteorological Service and Prof. Yair Goldreich's report (No 8-814) to the Ministry of Environmental Quality in 2010 on climate change trend analysis during the last 30 years in Israel. The assessment deals with three parameters: temperature (seven stations), annual rainfall (30 stations), and daily rainfall (10 stations). Linear regression and Mann-Kendall methods were applied as trend tests. Both trend tests clearly revealed that in the last 30 years the mean annual temperature increased significantly in all seven stations, where in five stations the significant level was very high (0.001). The trend of the minimum temperature increase was significant in all seven stations (see Fig. S4). The increase in the maximum temperature was somewhat lower than that of the minimum temperature. Summer season is dominant in the temperature increase maximal significant level, less in autumn, followed by spring and winter. On a monthly basis, an increase was found in all months but the trend is significant mainly during summer months.

Although various drought levels prevailed in the last six years, there was no significant trend for rainfall depth decrease over the last 30 years (e.g., see Figs. S5, S6). In all of the stations there was a rainfall depth decrease, but only in the two Negev stations (Be'er Sheva and Sde Boker) the decrease was significant. The spatial trend variation shows a South-North discontinuity. The trend values decrease northward up to the Yizre'el Valley and Lower Galilee and then increase towards the Upper Galilee. Similar to past studies in Israel and in contrast to some southern European countries, there is no increase in the daily rainfall depth above various thresholds. Even when the trend was tested on the annual maximal daily rainfall depth all results were not significant and seven out of ten trends were in a decreasing direction.

## II. Tables S1 to S8

**Table S1**. A list of drought-resistant populations of wild emmer wheat (TD) and wild barley (HS), including basic climatic characteristics, selected for the drought experiments.

**Table S2a**. Flowering time in days from germination (FT) in wild emmer wheat, *Triticum dicoccoides.* The number of days from germination to flower obtained in wild emmer wheat genotypes.

**Table S2b**. Flowering time in days from germination of wild barley, *Hordeum spontaneum.* The number of days from germination to flower obtained in wild barley genotypes.

**Table S3.** Description of 32 wheat and 29 barley SSR markers used in 1980 and 2008 wild emmer wheat and wild barley samples.

**Table S4.** Results of permutation tests for allelic differences and allelic changes displayed by 32 SSR primer pairs between paired samples of 10 wild emmer wheat populations and by 29 SSR primer pairs between paired samples of 10 wild barley populations.

**Table S5.** Comparison of SSR alleles between 1980 and 2008 samples of 10 wild emmer wheat and 10 wild barley populations.

**Table S6a**. Loci with allelic changes in wild emmer wheat, *Triticum dicoccoides*.The chromosomal regions with SSR allelic changes over two sampling periods in each wild emmer wheat population.

**Table S6b.** Loci with allelic changes in wild barley, *Hordeum spontaneum.* The chromosomal regions with SSR allelic changes over two sampling periods in each wild barley population.

**Table S7**. Comparison of genome coverage and estimated allele sizes (bp) for lost, new, and retained alleles between 1980 and 2008 samples of 10 wild emmer wheat and 10 wild barley populations.

**Table S8.** Results of molecular analysis of variance for 292 wild emmer wheat and 296 wild barley samples with six models of genetic structure.

**III. Figures S1 to S6**

**Fig. S1.** Locations for sampled populations of wild barley and wild emmer wheat.

**Fig. S2.** Comparative allelic counts and frequencies in wild emmer wheat plants collected in 1980 and 2008. The left figure displays the relationship between the numbers of 245 SSR alleles and their frequencies in each period. The right figure shows the relationship between the numbers of SSR alleles unique to each period of wild emmer wheat plants (73 vs. 45) and their frequencies in each period.

**Fig. S3.** Comparative allele counts and frequencies in wild barley plants collected in 1980 and 2008. The left figure displays the relationship between the numbers of 268 SSR alleles and their frequencies in each period. The right figure shows the relationship between the numbers of SSR alleles unique to each period of wild barley plants (51 vs. 43) and their frequencies in each period.

**Fig. S4**. The mean annual temperatures over nine stations in Israel (Source: Goldreich 2010).

**Fig. S5.** Annual rainfall volume in Israel from 1989 to 2010 (source: Israel Meteorological Service).

**Fig. S6.** Annual rainfall pattern in Israel from 1920 to 2010 (source: Israel Meteorological Service).

**Table S1.** A list of drought-resistant populations of wild emmer wheat (TD) and wild barley (HS), including basic climatic characteristics, selected for the drought experiments.

| Wild emmer wheat | | | Wild barley | | |
|---|---|---|---|---|---|
| Population | Mean annual temp. (°C) | Mean annual rainfall (mm) | Population | Mean annual temp. ($^{o}$C) | Mean annual rainfall (mm) |
| 1. Mt. Hermon | 11 | 1400 | 1. Mt. Hermon | 11 | 1400 |
| 2. Qazrin | 18 | 530 | 2. Rosh Pinna | 19 | 697 |
| 3. Rosh Pinna | 18 | 697 | 3. Tabigha, terra rossa | 24.1 | 436 |
| 4. Yehudiyya | 19 | 550 | 4. Tabigha, basalt | 24.1 | 436 |
| 5. Tabigha, terra rossa | 24 | 436 | 5. Bet Shean | 22.8 | 290 |
| 6. Tabigha, basalt | 24 | 436 | 6. Mehola | 23 | 290 |
| 7. Mt.Gilboa | 21 | 400 | 7. Wadi Qilt | 24.8 | 144 |
| 8. Kokhav Hashahar | 20 | 400 | 8. Eizariya | 20 | 380 |
| 9. Taiyiba | 19 | 400 | 9. Talpiyyot | 18.2 | 486 |
| 10. Sanhedriyya | 17 | 548 | 10. Sede Boqer | 19.4 | 91 |

**Table S2a.** Flowering time in days from germination (FT) in wild emmer wheat, *Triticum dicoccoides*. The number of days from germination to flower obtained in wild emmer wheat genotypes.

| | Mt. Hermon | | | | | | Qazrin | | | | | | Rosh Pinna | | | | | | Yehudiyya | | | | | | Tabigha, terra rossa | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | | | 2008 | | | 1980 | | | 2008 | | | 1980 | | | 2008 | | | 1980 | | | 2008 | | | 1980 | | | 2008 | | |
| | d | d | w | d | d | w | d | d | w | d | d | w | d | d | w | d | d | w | d | d | w | d | d | w | d | d | w | d | d | w |
| 1 | 110 | 107 | 106 | 94 | 93 | 92 | 98 | 97 | 98 | 90 | 90 | 91 | 95 | 97 | 97 | 91 | 90 | 92 | 109 | | 107 | 91 | 92 | 91 | 100 | 99 | 108 | 93 | 93 | 92 |
| 2 | 110 | 107 | 106 | 95 | 94 | 93 | 98 | 99 | 99 | 91 | 91 | 91 | 98 | 98 | 98 | 91 | 91 | 93 | 109 | 109 | 110 | 91 | 96 | 92 | 102 | 103 | 100 | 95 | 94 | 96 |
| 3 | 112 | 107 | 105 | 96 | 96 | 94 | 99 | 99 | 99 | 93 | 92 | 94 | 99 | 100 | 99 | 93 | 94 | 93 | 110 | 110 | | 91 | 98 | 92 | 103 | 103 | 103 | 95 | 95 | 97 |
| 4 | 113 | 107 | 104 | 97 | 97 | 95 | 100 | 99 | 101 | 93 | 95 | 95 | 99 | 101 | 99 | 93 | 92 | 95 | 111 | 110 | 110 | 93 | 92 | 93 | 103 | 104 | 103 | 96 | 95 | 97 |
| 5 | 100 | 106 | 104 | 97 | 97 | 96 | 101 | 99 | 102 | 95 | 95 | 97 | 100 | 101 | 100 | 94 | 94 | 95 | 101 | 102 | 102 | 94 | 98 | 93 | 103 | 104 | 104 | 97 | 95 | 98 |
| 6 | 101 | 105 | 103 | 98 | 98 | 96 | 102 | 100 | 102 | 95 | 96 | 98 | 100 | 102 | 100 | 95 | 95 | 95 | 102 | 104 | | 94 | 96 | 95 | 103 | 105 | 104 | 97 | 97 | 98 |
| 7 | 102 | 105 | 103 | 98 | 98 | 96 | 103 | 100 | 102 | 95 | 97 | 98 | 101 | 103 | 100 | 95 | 99 | 96 | 103 | 105 | 104 | 95 | 93 | 95 | 104 | 105 | 105 | 98 | 97 | 99 |
| 8 | 104 | 105 | 103 | 98 | 98 | 97 | 103 | 102 | 103 | 96 | 98 | 98 | 101 | 104 | 102 | 95 | 92 | 97 | 104 | 105 | 104 | 95 | 99 | 96 | 105 | 105 | 105 | 98 | 98 | 99 |
| 9 | 105 | 103 | 103 | 98 | 98 | 97 | 103 | 102 | 104 | 97 | 98 | 99 | 103 | 104 | 102 | 97 | 96 | 99 | 107 | 106 | | 96 | 96 | 98 | 105 | 105 | 105 | 98 | 98 | 99 |
| 10 | 105 | 102 | 102 | 99 | 98 | 97 | 105 | 104 | 105 | 98 | 99 | 101 | 105 | 106 | 104 | 98 | 100 | 100 | 107 | 106 | 106 | 96 | 98 | 98 | 106 | 106 | 106 | 98 | 98 | 100 |
| 11 | 105 | 102 | 101 | 99 | 99 | 98 | 105 | 105 | 106 | 98 | 101 | 101 | 105 | 110 | 104 | 98 | 103 | 102 | 108 | | 108 | 98 | 93 | 98 | 106 | 106 | 107 | 99 | 99 | 100 |
| 12 | 106 | 102 | 100 | 100 | 100 | 98 | 107 | 106 | 108 | 98 | | | 106 | 109 | 106 | 98 | 103 | 102 | 108 | | 108 | 98 | 99 | 99 | 106 | 107 | 107 | 99 | 99 | 100 |
| 13 | 107 | 102 | 99 | 100 | 100 | 100 | 109 | 109 | 109 | 99 | | | 106 | 110 | 106 | 100 | 94 | | | | | 98 | 93 | 99 | 107 | 109 | 109 | 99 | 99 | 101 |
| 14 | 107 | 113 | 111 | 100 | 101 | 100 | 109 | 109 | 109 | 99 | | | 106 | 111 | 107 | 100 | 95 | | | | | 99 | 99 | 100 | 107 | 109 | 109 | 100 | 99 | 101 |
| 15 | 108 | 112 | 110 | 100 | 101 | 100 | 109 | 109 | 110 | 100 | | | 108 | 99 | 109 | 101 | 98 | | | | | 99 | 99 | 101 | 108 | 109 | 109 | 100 | 100 | |
| 16 | | 111 | 109 | 101 | 101 | 100 | 110 | 109 | 110 | 100 | | | 109 | 100 | 109 | 103 | 98 | | | | | 99 | 95 | | 109 | 109 | 109 | 100 | 101 | |
| 17 | | 111 | 109 | 102 | 102 | 101 | 110 | 110 | 110 | | | | 109 | 107 | 110 | | | | | | | 99 | | | 109 | 109 | 109 | 101 | 102 | |
| 18 | | 111 | 109 | | 103 | 101 | 111 | 110 | 110 | | | | 110 | 109 | 111 | | | | | | | 100 | | | 109 | 110 | | 101 | 103 | |
| 19 | | 110 | 109 | 97 | 103 | 101 | 112 | 110 | 110 | | | | 111 | 109 | 111 | | | | | | | 100 | | | 109 | | | | | |
| 20 | | 109 | 109 | | | | 113 | 110 | 112 | | | | 111 | | 112 | | | | | | | | | | 109 | | | | | |
| Av. | 106.3 | 106.9 | 105.3 | 98.3 | 98.8 | 97.5 | 105.4 | 104.4 | 105.5 | 96.1 | 95.6 | 96.6 | 104.1 | 104.2 | 104.3 | 96.4 | 95.9 | 96.6 | 106.6 | 106.3 | 106.6 | 96.1 | 96.0 | 96.0 | 105.7 | 105.9 | 106.0 | 98.0 | 97.9 | 98.4 |
| | Mt. Hermon | | | | | | Qazrin | | | | | | Rosh Pinna | | | | | | Yehudiyya | | | | | | Tabigha, terra rossa | | | | | |
| | 1980 | | | 2008 | | | 1980 | | | 2008 | | | 1980 | | | 2008 | | | 1980 | | | 2008 | | | 1980 | | | 2008 | | |
| | 106.14 | | | 98.18 | | | 105.07 | | | 96.11 | | | 104.20 | | | 96.28 | | | 106.49 | | | 96.04 | | | 105.86 | | | 98.08 | | |

| | Tabigha, basalt | | | | | | Mt. Gilboa | | | | | | Kokhav Hashahar | | | | | | Taiyiba | | | | | | Sanhedriyya | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | | | 2008 | | | 1980 | | | 2008 | | | 1980 | | | 2008 | | | 1980 | | | 2008 | | | 1980 | | | 2008 | | |
| | d | d | w | d | d | w | d | d | w | d | d | w | d | d | w | d | d | w | d | d | w | d | d | w | d | d | w | d | d | w |
| 1 | 108 | 98 | 97 | 91 | 91 | | 108 | 109 | 105 | 94 | 94 | 93 | 104 | 103 | 103 | 95 | 97 | 93 | 103 | 105 | 103 | 95 | 96 | 94 | 99 | 102 | 98 | 91 | 95 | 91 |
| 2 | 98 | 98 | 100 | 93 | 92 | | 108 | 109 | 107 | 96 | 95 | 93 | 104 | 103 | 103 | 97 | 97 | 96 | 105 | 105 | 104 | 96 | 96 | 95 | 100 | 103 | 98 | 93 | 96 | 92 |
| 3 | 99 | 99 | 100 | 93 | 94 | | 109 | 110 | 108 | 96 | 96 | 94 | 104 | 105 | 103 | 98 | 98 | 96 | 106 | 106 | 105 | 96 | 97 | 95 | 101 | 105 | 99 | 95 | 96 | 93 |
| 4 | 99 | 101 | 100 | 93 | 97 | | 110 | 110 | 108 | 96 | 98 | 95 | 104 | 106 | 103 | 98 | 98 | 97 | 106 | 107 | 105 | 97 | 97 | 95 | 103 | 106 | 101 | 95 | 98 | 93 |
| 5 | 100 | 101 | 100 | 94 | 98 | | 111 | 110 | 109 | 98 | 98 | 95 | 105 | 106 | 103 | 99 | 98 | 97 | 107 | 107 | 108 | 97 | 97 | 96 | 103 | 107 | 102 | 97 | 98 | 95 |
| 6 | 101 | 102 | 101 | 94 | | | 111 | 110 | 107 | 100 | 98 | 96 | 107 | 107 | 103 | 99 | 99 | 98 | 109 | 108 | 108 | 98 | 99 | 97 | 104 | 108 | 103 | 97 | 98 | 96 |
| 7 | 101 | 102 | 101 | 95 | | | 112 | 110 | 109 | 100 | 99 | 97 | 107 | 107 | 104 | 99 | 99 | 98 | 109 | 109 | 106 | 98 | 99 | 97 | 105 | 111 | 103 | 97 | 98 | 96 |
| 8 | 102 | 102 | 101 | 97 | | | 112 | 110 | 109 | 99 | 100 | 97 | 108 | 107 | 105 | 100 | 100 | 100 | 111 | 109 | 107 | 98 | 100 | 97 | 105 | 111 | 106 | 98 | 99 | 97 |
| 9 | 103 | 103 | 101 | 97 | | | 112 | 113 | 109 | 100 | 100 | 98 | 105 | 108 | 105 | 100 | 100 | 100 | 111 | 109 | 109 | 99 | 100 | 98 | 107 | 111 | 106 | 98 | 100 | 97 |
| 10 | 103 | 103 | 102 | 99 | | | 105 | 103 | 103 | 100 | 100 | 98 | 108 | 108 | 105 | 100 | 100 | 100 | 111 | 110 | 110 | 99 | 100 | 98 | 107 | 112 | 106 | 99 | 101 | 97 |
| 11 | 103 | 103 | 103 | 100 | | | 104 | 104 | 103 | 101 | 100 | 98 | 108 | 108 | 105 | 100 | 102 | 100 | 111 | 111 | 108 | 99 | 100 | 98 | 108 | | 107 | 99 | 101 | 98 |
| 12 | 105 | 106 | 104 | 100 | | | 105 | 104 | 103 | 101 | 100 | 99 | 108 | 108 | 107 | 102 | 102 | 101 | | 113 | 103 | 100 | 101 | 98 | 108 | | 107 | 100 | 102 | 98 |
| 13 | 105 | 106 | 106 | | | 91 | 105 | 105 | 103 | 102 | 100 | 99 | 111 | 109 | 107 | 103 | 102 | 102 | | | 109 | 100 | 101 | 99 | 108 | | 109 | 100 | 102 | 98 |
| 14 | 105 | 107 | 106 | | | | 104 | 106 | 104 | 102 | 101 | 100 | 109 | 109 | 107 | 103 | 102 | | | | | 100 | 102 | 99 | 108 | | 109 | 100 | 103 | 99 |
| 15 | 107 | 107 | 107 | | | | 105 | 106 | 103 | 103 | 101 | 101 | 109 | 109 | 107 | 104 | 103 | | | | | 101 | 103 | 99 | 110 | | 109 | 100 | 103 | 99 |
| 16 | 108 | 107 | 108 | | | | 106 | 108 | 106 | 103 | 102 | 101 | 109 | 110 | 108 | 104 | 103 | | | | | 101 | 103 | 100 | 110 | | 110 | 101 | 103 | 99 |
| 17 | 108 | 108 | 108 | | | | 107 | 108 | 105 | 103 | 102 | 101 | 105 | 110 | 108 | | 103 | | | | | 102 | 103 | 100 | 110 | | 110 | 101 | | 100 |
| 18 | 109 | 110 | 109 | | | | 108 | 108 | 106 | 103 | 103 | 97 | 110 | 110 | 108 | | 103 | | | | | 102 | | | 110 | | | 101 | | 101 |
| 19 | 109 | 110 | 109 | | | | 108 | 108 | 106 | 102 | 104 | | 111 | 111 | 109 | | 105 | | | | | 103 | | | 111 | | | 102 | | 101 |
| 20 | 110 | 111 | 110 | | | | | | | 99 | 108 | | 111 | | 109 | | | | | | | | | | 111 | | | | | |
| Av. | 104.2 | 104.2 | 103.7 | 95.5 | 94.4 | | 107.9 | 107.9 | 105.9 | 99.9 | 100.0 | 97.3 | 107.4 | 107.6 | 105.6 | 100.1 | 100.6 | 98.3 | 108.1 | 108.3 | 106.5 | 99.0 | 99.6 | 97.4 | 106.4 | 107.6 | 104.9 | 98.1 | 99.6 | 96.8 |
| | Tabigha, basalt | | | | | | Mt. Gilboa | | | | | | Kokhav Hashahar | | | | | | Taiyiba | | | | | | Sanhedriyya | | | | | |
| | 1980 | | | 2008 | | | 1980 | | | 2008 | | | 1980 | | | 2008 | | | 1980 | | | 2008 | | | 1980 | | | 2008 | | |
| | 104.00 | | | 94.95 | | | 107.26 | | | 99.06 | | | 106.84 | | | 99.65 | | | 107.63 | | | 98.67 | | | 106.29 | | | 98.17 | | |

d=dry, irrigated by 300 mm; w=wet, irrigated by 600 mm wild emmer wheat (a) and wild barley (b) flowering time in days from germination on 12 November 2008 to flowering and the average value of 20 wild populations. Each population was planted in three blocks: two in dry (d) and one in wet (w).

**Table S2b.** Flowering time in days from germination of wild barley, *Hordeum spontaneum.* The number of days from germination to flower obtained in wild barley genotypes.

| | Mt. Hermon | | | | | | Rosh Pinna | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | | | 2008 | | | 1980 | | | 2008 | | |
| | d | d | w | d | d | w | d | d | w | d | d | w |
| 1 | 93 | 95 | 93 | 89 | 90 | 88 | 95 | 95 | 95 | 87 | 87 | 87 |
| 2 | 94 | 95 | 94 | 89 | 89 | 89 | 97 | 98 | 96 | 87 | 89 | 88 |
| 3 | 96 | 97 | 95 | 90 | 89 | 89 | 97 | 98 | 98 | 89 | 89 | 89 |
| 4 | 96 | 97 | 96 | 89 | 90 | 89 | 99 | 97 | 99 | 90 | 90 | 89 |
| 5 | 97 | 97 | 97 | 90 | 89 | 90 | 98 | 99 | 99 | 91 | 91 | 90 |
| 6 | 98 | 97 | 99 | 90 | 90 | 91 | 99 | 99 | 99 | 93 | 92 | 91 |
| 7 | 96 | 98 | 96 | 93 | 93 | 92 | 101 | 99 | 100 | 93 | 92 | 91 |
| 8 | 98 | 98 | 98 | 86 | 86 | 98 | 100 | 100 | 100 | 94 | 92 | 92 |
| 9 | 100 | 99 | 100 | 88 | 88 | | 100 | 100 | 100 | 94 | 93 | 96 |
| 10 | 101 | 100 | 102 | 90 | 88 | | 103 | 100 | 102 | 97 | 93 | 96 |
| 11 | 101 | 101 | 101 | 94 | 92 | | 103 | 101 | 103 | 99 | 93 | 96 |
| 12 | 100 | 102 | 100 | 96 | 94 | | 105 | 104 | 104 | 100 | 94 | 99 |
| 13 | 102 | 102 | 100 | 97 | 96 | | 105 | 103 | 105 | | 96 | 100 |
| 14 | 102 | 102 | 101 | 91 | 97 | | 105 | 106 | 105 | | 96 | |
| 15 | 102 | 102 | 102 | 95 | | | 104 | 105 | 106 | | 100 | |
| 16 | 104 | 104 | 103 | 97 | | | 108 | 108 | 107 | | | |
| 17 | 105 | 105 | 105 | 100 | | | 98 | 97 | | | | |
| 18 | 104 | 106 | 104 | | | | 100 | 100 | | | | |
| 19 | 108 | 106 | 107 | | | | 104 | 103 | | | | |
| 20 | 108 | 109 | 107 | | | | 103 | 104 | | | | |
| Av. | 100.3 | 100.6 | 100.0 | 92.0 | 90.8 | 90.8 | 101.2 | 100.8 | 101.1 | 92.8 | 92.5 | 92.6 |

| | Tabigha, terra rossa | | | | | | Tabigha, Basalt | | | | | | Bet Shean | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | | | 2008 | | | 1980 | | | 2008 | | | 1980 | | | 2008 | | |
| | d | d | w | d | d | w | d | d | w | d | d | w | d | d | w | d | d | w |
| 1 | 101 | 99 | 100 | 85 | 85 | 84 | 96 | 97 | 95 | 86 | 87 | 87 | 101 | 100 | 100 | 83 | 83 | 82 |
| 2 | 101 | 100 | 101 | 87 | 87 | 86 | 98 | 97 | 96 | 88 | 87 | 88 | 101 | 102 | 100 | 82 | 83 | 83 |
| 3 | 102 | 101 | 100 | 88 | 86 | 86 | 98 | 98 | 97 | 89 | 89 | 88 | 102 | 101 | 100 | 86 | 84 | 85 |
| 4 | 102 | 102 | 103 | 87 | 88 | 87 | 100 | 99 | 98 | 90 | 90 | 89 | 102 | 101 | 100 | 87 | 84 | 86 |
| 5 | 104 | 104 | 104 | 88 | 88 | 87 | 100 | 99 | 98 | 90 | 90 | 89 | 102 | 101 | 101 | 91 | 85 | 90 |
| 6 | 105 | 104 | 102 | 87 | 87 | 87 | 100 | 99 | 99 | 91 | 90 | 90 | 102 | 102 | 101 | 91 | 86 | 90 |
| 7 | 105 | 105 | 106 | 89 | 90 | 89 | 101 | 100 | 99 | 91 | 90 | 90 | 102 | 103 | 101 | 83 | 86 | |
| 8 | 105 | 105 | 105 | 91 | 90 | 90 | 101 | 102 | 100 | 91 | 91 | 90 | 103 | 102 | 101 | 84 | 87 | |
| 9 | 106 | 105 | 106 | 91 | 90 | 90 | 101 | 102 | 100 | 91 | 92 | 90 | 103 | 102 | 101 | 85 | 87 | |
| 10 | 106 | 106 | 106 | 93 | 92 | 92 | 101 | 102 | 100 | 92 | 92 | 91 | 103 | 102 | 102 | 86 | 88 | |
| 11 | 107 | 107 | 107 | 94 | 94 | 93 | 102 | 103 | 101 | 93 | 93 | 92 | 105 | 103 | 102 | 86 | 89 | |
| 12 | 108 | 108 | 108 | 95 | 96 | 93 | 103 | 103 | 101 | 93 | 93 | 94 | 104 | 103 | 103 | 86 | 91 | |
| 13 | 108 | 108 | 107 | 95 | 95 | 94 | 104 | 103 | 101 | 94 | 94 | 94 | 105 | 105 | 104 | 88 | | |
| 14 | 108 | 109 | | 98 | 97 | 95 | 104 | 103 | 102 | 95 | 95 | 95 | 105 | 105 | 104 | 88 | | |
| 15 | 108 | 109 | | 98 | 96 | 96 | 104 | 104 | 103 | 97 | 97 | 95 | 108 | 107 | 105 | 88 | | |
| 16 | 109 | | | 97 | 98 | 96 | 105 | 105 | 103 | 97 | 99 | 98 | 108 | 107 | 107 | 88 | | |
| 17 | | | | 100 | 99 | 98 | 106 | 105 | 104 | 97 | 99 | 99 | 108 | 108 | 107 | 88 | | |
| 18 | | | | 99 | 100 | 98 | 108 | 108 | 107 | 99 | | | 108 | 109 | 108 | 88 | | |
| 19 | | | | 100 | 100 | 99 | 108 | 108 | | 101 | | | 103 | 109 | 108 | 91 | | |
| 20 | | | | 91 | 90 | | | | | | | | | 103 | | | | |
| Av. | 105.3 | 104.8 | 104.2 | 92.7 | 92.4 | 91.6 | 102.1 | 101.9 | 100.2 | 92.9 | 92.2 | 91.7 | 103.9 | 103.8 | 102.9 | 86.8 | 86.1 | 86.0 |

| | Mt. Hermon | | Rosh Pinna | | Tabigha, terra rossa | | Tabigha, Basalt | | Bet Shean | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | 2008 | 1980 | 2008 | 1980 | 2008 | 1980 | 2008 | 1980 | 2008 |
| | **100.28** | **91.18** | **101.04** | **92.64** | **104.78** | **92.21** | **101.42** | **92.28** | **103.53** | **86.29** |

| | Mehola | | | | | | Wadi Qilt | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | | | 2008 | | | 1980 | | | 2008 | | |
| | d | d | w | d | d | w | d | d | w | d | d | w |
| 1 | 93 | | 95 | 84 | | 83 | 97 | 96 | 95 | 83 | 82 | 81 |
| 2 | 95 | | 95 | 85 | | 86 | 97 | 97 | 97 | 85 | 84 | 85 |
| 3 | 97 | | 96 | 88 | | 86 | 98 | 98 | 99 | 87 | 85 | 85 |
| 4 | 97 | | 97 | 88 | | 88 | 99 | 99 | 100 | 87 | 86 | 86 |
| 5 | 99 | | 98 | 89 | | 89 | 99 | 100 | 100 | 88 | 86 | 87 |
| 6 | 99 | | 98 | 89 | | 90 | 101 | 100 | 101 | 88 | 87 | 88 |
| 7 | 99 | | 99 | 89 | | 90 | 101 | 103 | 102 | 88 | 89 | 88 |
| 8 | 100 | | 99 | 90 | | 90 | 101 | 100 | 102 | 89 | 89 | 89 |
| 9 | 101 | | 99 | 91 | | 91 | 101 | 102 | 103 | 90 | 89 | 89 |
| 10 | 101 | | 99 | 91 | | 91 | 101 | 103 | 104 | 91 | 90 | 91 |
| 11 | 102 | | 100 | 93 | | 92 | 102 | 103 | 105 | 92 | 90 | 91 |
| 12 | 104 | | 100 | 93 | | 94 | 103 | 104 | 103 | 92 | 92 | 92 |
| 13 | 105 | | 100 | 94 | | 94 | 103 | 104 | 106 | 93 | 92 | 95 |
| 14 | 105 | | 101 | 96 | | 95 | 104 | 104 | 107 | 93 | 93 | |
| 15 | 106 | | 104 | 98 | | 97 | 105 | 105 | | 95 | 94 | |
| 16 | | | 105 | 99 | | 97 | 105 | 106 | | 95 | 95 | |
| 17 | | | 106 | 100 | | 98 | 106 | 106 | | 96 | 96 | |
| 18 | | | | | | 99 | 107 | 108 | | | | |
| 19 | | | | | | | 107 | | | | | |
| 20 | | | | | | | | | | | | |
| Av. | 100.2 | | 99.5 | 91.6 | | 91.7 | 101.9 | 102.1 | 101.7 | 90.1 | 89.4 | 88.2 |

| | Eizariya | | | | | | Talpiyyot | | | | | | Sede Boqer | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | | | 2008 | | | 1980 | | | 2008 | | | 1980 | | | 2008 | | |
| | d | d | w | d | d | w | d | d | w | d | d | w | d | d | w | d | d | w |
| 1 | | 100 | 101 | | 88 | 88 | 95 | 93 | | 84 | 83 | | 91 | 90 | 90 | 84 | 83 | 82 |
| 2 | | 102 | 98 | | 88 | 89 | 96 | 96 | | 86 | 85 | | 95 | 94 | 93 | 85 | 85 | 83 |
| 3 | | 103 | 99 | | 89 | 87 | 98 | 98 | | 87 | 87 | | 95 | 95 | 94 | 86 | 85 | 84 |
| 4 | | 103 | 100 | | 89 | 88 | 99 | 98 | | 87 | 87 | | 97 | 98 | 97 | 86 | 85 | 85 |
| 5 | | 103 | 101 | | 90 | 89 | 99 | 99 | | 88 | 89 | | 98 | 96 | 95 | 87 | 86 | 85 |
| 6 | | 103 | 102 | | 91 | 90 | 99 | 99 | | 88 | 89 | | 98 | 98 | 97 | 87 | 87 | 86 |
| 7 | | 103 | 102 | | 91 | 90 | 101 | 100 | | 88 | 89 | | 98 | 98 | 97 | 89 | 88 | 87 |
| 8 | | 103 | 103 | | 91 | 91 | 101 | 101 | | 88 | 90 | | 99 | 98 | 97 | 89 | 88 | 87 |
| 9 | | 103 | 103 | | 93 | 92 | 101 | 102 | | 89 | 89 | | 99 | 98 | 98 | 90 | 89 | 88 |
| 10 | | 103 | 102 | | 93 | 92 | 102 | 102 | | 90 | 89 | | 100 | 99 | 99 | 90 | 91 | 89 |
| 11 | | 104 | 103 | | 95 | 94 | 103 | 102 | | 91 | 90 | | 100 | 99 | 108 | 90 | 92 | 89 |
| 12 | | 104 | 103 | | 95 | 94 | 102 | 103 | | 91 | 91 | | 100 | 100 | 99 | 91 | 90 | 90 |
| 13 | | 104 | 103 | | 96 | 95 | 103 | 103 | | 91 | 91 | | 100 | 101 | 99 | 91 | 90 | 89 |
| 14 | | 105 | 103 | | 96 | 95 | 103 | 103 | | 92 | 92 | | 101 | 102 | 100 | 91 | 91 | 90 |
| 15 | | 105 | 104 | | 96 | 96 | 105 | 103 | | 93 | 93 | | 102 | 102 | 101 | 91 | 91 | 92 |
| 16 | | 105 | 105 | | 97 | 97 | 104 | 104 | | 93 | 93 | | 103 | 103 | 101 | 93 | 92 | 93 |
| 17 | | 107 | 106 | | 98 | 96 | 104 | 105 | | 96 | 96 | | 105 | 106 | 102 | 93 | 94 | 93 |
| 18 | | 107 | 107 | | 101 | 99 | 105 | 106 | | 96 | 97 | | 105 | 106 | 104 | 93 | 94 | 91 |
| 19 | | 108 | 105 | | | 91 | 107 | 107 | | 98 | 97 | | 106 | 107 | 105 | 94 | 92 | 94 |
| 20 | | | | | | 94 | 108 | 108 | | | 91 | | 108 | | 106 | 96 | 96 | |
| Av. | | 103.9 | 102.6 | | 93.2 | 92.4 | 101.8 | 101.6 | | 90.3 | 90.4 | | 100.0 | 99.5 | 99.1 | 89.8 | 89.5 | 88.3 |

| | Mehola | | Wadi Qilt | | Eizariya | | Talpiyyot | | Sede Boqer | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | 2008 | 1980 | 2008 | 1980 | 2008 | 1980 | 2008 | 1980 | 2008 |
| | **99.84** | **91.63** | **101.92** | **89.23** | **103.29** | **92.76** | **101.68** | **90.36** | **99.52** | **89.17** |

d=dry, irrigated by 300 mm; w=wet, irrigated by 600 mm wild emmer wheat (a) and wild barley (b) flower time in days from germination on 12 November 2008 to flowering and the average value of 20 wild populations. Each population was planted in three blocks: two in dry (d) and one in wet (w).

**Table S3.** Description of 32 wheat and 29 barley SSR markers used in 1980 and 2008 wild emmer wheat and wild barley samples.

| Wheat primer [a] | Chr [b] | Tn [c] | Entropy-based diversity content [c] 1980 | 2008 | Barley primer [a] | Chr | Tn | Entropy-based diversity content 1980 | 2008 |
|---|---|---|---|---|---|---|---|---|---|
| cwm435* | 1A | 17 | 3.341 | 3.956 | Bmac0032 | 1H | 30 | 2.913 | 2.625 |
| gwm135 | 1A | 23 | 3.426 | 3.078 | Bmag0211 | 1H | 17 | 1.983 | 2.211 |
| gwm357 | 1A | 11 | 2.839 | 2.732 | GBM1204* | 1H | 10 | 0.999 | 0.842 |
| gwm497 | 1A,2A,3D | 23 | 3.321 | 3.188 | GBM1216* | 1H | 14 | 1.817 | 2.563 |
| cwm075* | 1AS | 19 | 3.379 | 2.498 | Bmac0093 | 2H | 9 | 1.555 | 1.622 |
| cwm109* | 1AS | 17 | 3.388 | 3.353 | Bmac0134 | 2H | 14 | 2.043 | 1.777 |
| ksum104* | 1AS | 7 | 1.013 | 1.883 | Bmag0711 | 2H | 9 | 1.617 | 1.798 |
| ksum117* | 1AS/1BS | 14 | 3.441 | 2.412 | EBmac0415 | 2H | 10 | 2.038 | 1.813 |
| ksum157* | 1BS/6AS | 12 | 0.839 | 0.965 | GBM1459* | 2H | 9 | 1.648 | 1.386 |
| gwm448 | 2A | 16 | 0.618 | 4.011 | GBM1233* | 3H | 22 | 2.119 | 2.245 |
| cwm214* | 2AS | 7 | 1.585 | 1.814 | HvLTPPB | 3H | 9 | 1.914 | 1.716 |
| cwm568* | 2BL | 8 | 1.439 | 1.626 | HVM62 | 3H | 21 | 2.588 | 2.419 |
| gwm455 | 2D | 7 | 1.773 | 1.338 | Bmag0808 | 4H | 13 | 1.612 | 1.931 |
| gwm484 | 2D | 3 | 0.115 | 0.479 | EBmac0701 | 4H | 19 | 2.325 | 1.833 |
| ksum174* | 2DS | 5 | 0.701 | 0.588 | GBM1323* | 4H | 13 | 1.865 | 4.338 |
| cwm325* | 3AL | 11 | 1.892 | 2.545 | HVM03 | 4H | 13 | 2.093 | 1.899 |
| cwm093* | 3AS | 13 | 1.267 | 1.566 | Bmac0096 | 5H | 11 | 1.877 | 1.711 |
| gwm247 | 3B | 24 | 4.844 | 0.853 | Bmac0113 | 5H | 11 | 1.929 | 1.775 |
| gwm314 | 3D | 2 | 0.600 | 0.692 | Bmag0222 | 5H | 23 | 2.232 | 2.004 |
| ksum008* | 4AL | 9 | 1.690 | 1.302 | GBM1176* | 5H | 3 | 0.431 | 0.298 |
| ksum130* | 4AL^ | 14 | 3.260 | 2.361 | scssr03907* | 5H | 3 | 1.032 | 0.973 |
| ksum062* | 4BL | 11 | 2.732 | 2.608 | Bmac0018 | 6H | 8 | 1.421 | 1.680 |
| cnl123* | 4BL/4D | 5 | 0.171 | 0.269 | Bmac0316 | 6H | 11 | 1.891 | 2.154 |
| ksum180* | 4D | 4 | 0.416 | 0.368 | Bmag0496 | 6H | 12 | 1.952 | 1.874 |
| gwm213 | 5B | 24 | 3.686 | 3.567 | scss00103* | 6H | 9 | 1.374 | 1.358 |
| cwm094* | 5DL | 3 | 0.371 | 0.007 | Bmag0120 | 7H | 10 | 1.976 | 1.774 |
| gwm088 | 6B | 3 | 0.858 | 0.762 | EBmac0764 | 7H | 13 | 1.937 | 1.866 |
| cnl064* | 6BS | 7 | 0.185 | 0.974 | GBM1419* | 7H | 7 | 1.267 | 1.204 |
| cwm048* | 7A^ | 13 | 1.180 | 2.419 | GBM1464* | 7H | 8 | 1.786 | 1.826 |
| gwm046 | 7B | 12 | 3.107 | 2.889 | | | | | |
| gwm302 | 7B | 6 | 1.066 | 1.179 | | | | | |
| cwm206* | 7BL | 13 | 1.444 | 3.023 | | | | | |

[a] The wheat primer pairs were described previously (30, 31) and barley primer pairs (32). The primer pairs with stars are EST-SSR markers and those without stars are genomic SSR markers.
[b] Chr=Chromosome. The chromosome information was obtained from related literature (31,32). Possible multiple loci were given with ^ and loci with uncertain (short or long) chromosomal arms were given with the chromosomes only.
[c] Tn=total number of alleles detected in both sampling periods. The entropy-based diversity content measures the effective number of alleles for the marker (34) in 1980 or 2008 samples.

**Table S4.** Results of permutation tests for allelic differences and allelic changes displayed by 32 SSR primer pairs between paired samples of 10 wild emmer wheat populations and by 29 SSR primer pairs between paired samples of 10 wild barley populations.

| | Observed allelic count | | Allelic | Expected allelic count (SD) | | | Allelic change [b] | | |
|---|---|---|---|---|---|---|---|---|---|
| Population | 1980 | 2008 | Difference | 1980 | 2008 | Prob [a] | Lost | New | Retained |
| *Wheat samples* | | | | | | | | | |
| 1. Mt. Hermon | 173 | 157 | -16 | 243.5(6.5) | 243.6(6.4) | 0.0512 | 54 | 38 | 119 |
| 2. Qazrin | 138 | 153 | 15 | 248.5(6.4) | 248.1(6.4) | 0.0534 | 60 | 75 | 78 |
| 3. Rosh Pinna | 151 | 142 | -9 | 248.2(6.4) | 248.0(6.5) | 0.1896 | 70 | 61 | 81 |
| 4. Yehudiyya | 135 | 126 | -9 | 227.1(6.5) | 248.1(6.3) | ***0.0012*** | 67 | 58 | 68 |
| 5. Tabigha, terra rossa | 141 | 137 | -4 | 256.4(6.3) | 248.2(6.4) | 0.6940 | 55 | 51 | 86 |
| 6. Tabigha, basalt | 113 | 141 | 28 | 248.4(6.3) | 248.2(6.4) | ***0.0018*** | 45 | 73 | 68 |
| 7. Mt.Gilboa | 143 | 104 | -39 | 248.3(6.4) | 248.4(6.4) | ***<0.0001*** | 79 | 40 | 64 |
| 8. Kokhav Hashahar | 159 | 148 | -11 | 243.6(6.5) | 248.3(6.4) | ***0.0492*** | 69 | 58 | 90 |
| 9. Taiyiba | 150 | 157 | 7 | 233.2(6.5) | 248.3(6.4) | 0.8220 | 61 | 68 | 89 |
| 10. Sanhedriyya | 161 | 115 | -46 | 248.1(6.5) | 248.3(6.4) | ***<0.0001*** | 89 | 43 | 72 |
| All | 318 | 290 | -28 | 349.0(3.0) | 350.0(2.9) | ***<0.0001*** | 73 | 45 | 245 |
| *Barley samples* | | | | | | | | | |
| 1. Mt. Hermon | 144 | 87 | -57 | 188.9(7.6) | 175.8(7.5) | ***<0.0001*** | 92 | 35 | 52 |
| 2. Rosh Pinna | 94 | 109 | 15 | 188.8(7.5) | 182.5(7.6) | ***0.0270*** | 57 | 72 | 37 |
| 3. Tabigha, terra rossa | 118 | 149 | 31 | 188.7(7.6) | 188.9(7.5) | ***0.0016*** | 47 | 78 | 71 |
| 4. Tabigha, basalt | 103 | 112 | 9 | 188.9(7.5) | 188.8(7.5) | 0.2188 | 52 | 61 | 51 |
| 5. Bet Shean | 144 | 116 | -28 | 188.8(7.6) | 188.6(7.7) | ***0.0072*** | 75 | 47 | 69 |
| 6. Mehola | 122 | 82 | -40 | 182.6(7.7) | 188.7(7.6) | ***<0.0001*** | 91 | 51 | 31 |
| 7. Wadi Qilt | 139 | 128 | -11 | 188.8(7.5) | 194.4(7.5) | 0.0670 | 75 | 64 | 64 |
| 8. Eizariya | 117 | 111 | -6 | 188.8(7.6) | 188.7(7.6) | 0.3160 | 64 | 58 | 53 |
| 9. Talpiyyot | 124 | 134 | 10 | 182.8(7.5) | 188.9(7.7) | 0.3794 | 63 | 73 | 61 |
| 10. Sede Boqer | 123 | 106 | -17 | 188.7(7.6) | 188.8(7.7) | 0.0662 | 76 | 59 | 47 |
| All | 319 | 309 | -10 | 339.8(3.7) | 339.8(3.7) | 0.0816 | 51 | 43 | 268 |

[a] The probability of detecting the allelic difference between two samples was defined as the proportion of the 10,000 runs in which the permutated difference in allelic counts was larger or smaller than the observed allelic difference, depending on the sign of the difference, as described (33). The significant probability (i.e., <0.05) is highlighted with bold and italics.

[b] Lost alleles in the 2008 samples are those alleles unique to the 1980 samples. New alleles are those alleles not found in (or new to) the 1980 samples. Retained alleles are those alleles detected in both periods of sampling within a population, but their occurrence frequencies may differ (see Figs. S2 to S3).

**Table S5.** Comparison of SSR alleles between 1980 and 2008 samples of 10 wild emmer wheat and 10 wild barley populations [a] .

| | | Allelic | Frequency difference | | | | | Allelic | Frequency difference | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Wpp | Type | count | Mean | Min | Max | Bpp | Type | count | Mean | Min | Max |
| 1. Mt. | New | 38 | 0.385 | 0.071 | 1.000 | 1. Mt. | New | 35 | 0.233 | 0.077 | 0.769 |
| Hermon | R-IF | 58 | 0.287 | 0.071 | 0.857 | Hermon | R-IF | 29 | 0.259 | 0.005 | 0.713 |
| | R-DF | 36 | -0.185 | -0.571 | -0.071 | | R-DF | 23 | -0.238 | -0.713 | -0.046 |
| | Lost | 54 | -0.282 | -1.000 | -0.071 | | Lost | 92 | -0.172 | -0.867 | -0.067 |
| | Pooled | 211 | 0.393 | 0.036 | 1.000 | | Pooled | 179 | 0.165 | 0.036 | 0.929 |
| 2. Qaz- | New | 75 | 0.513 | 0.067 | 1.000 | 2. Rosh | New | 72 | 0.213 | 0.071 | 0.786 |
| Rin | R-IF | 33 | 0.297 | 0.067 | 0.933 | Pinna | R-IF | 17 | 0.207 | 0.005 | 0.790 |
| | R-DF | 27 | -0.299 | -0.867 | -0.067 | | R-DF | 18 | -0.348 | -0.929 | -0.062 |
| | Lost | 60 | -0.474 | -1.000 | -0.067 | | Lost | 57 | -0.274 | -1.000 | -0.067 |
| | Pooled | 213 | 0.406 | 0.033 | 1.000 | | Pooled | 166 | 0.186 | 0.034 | 1.000 |
| 3. Rosh | New | 61 | 0.402 | 0.067 | 1.000 | 3. Tabig- | New | 78 | 0.151 | 0.067 | 0.600 |
| Pinna | R-IF | 27 | 0.281 | 0.067 | 0.933 | ha, terra | R-IF | 23 | 0.148 | 0.067 | 0.333 |
| | R-DF | 28 | -0.257 | -0.867 | -0.067 | rossa | R-DF | 29 | -0.234 | -0.600 | -0.067 |
| | Lost | 70 | -0.296 | -1.000 | -0.067 | | Lost | 47 | -0.193 | -0.867 | -0.067 |
| | Pooled | 212 | 0.339 | 0.033 | 1.000 | | Pooled | 196 | 0.145 | 0.033 | 0.900 |
| 4. Yehu- | New | 58 | 0.520 | 0.067 | 1.000 | 4. Tabig- | New | 61 | 0.161 | 0.067 | 0.733 |
| Diyya | R-IF | 20 | 0.366 | 0.018 | 0.818 | ha, ba- | R-IF | 20 | 0.157 | 0.067 | 0.333 |
| | R-DF | 29 | -0.317 | -0.933 | -0.042 | salt | R-DF | 24 | -0.194 | -0.800 | -0.067 |
| | Lost | 67 | -0.566 | -1.000 | -0.091 | | Lost | 52 | -0.242 | -0.933 | -0.067 |
| | Pooled | 193 | 0.430 | 0.038 | 1.000 | | Pooled | 164 | 0.172 | 0.033 | 1.000 |
| 5. Tabig- | New | 51 | 0.400 | 0.067 | 1.000 | 5. Bet | New | 47 | 0.155 | 0.067 | 0.667 |
| ha, terra | R-IF | 31 | 0.298 | 0.008 | 0.941 | Shean | R-IF | 32 | 0.256 | 0.067 | 0.667 |
| Rossa | R-DF | 37 | -0.281 | -0.933 | -0.008 | | R-DF | 23 | -0.180 | -0.467 | -0.067 |
| | Lost | 55 | -0.357 | -1.000 | -0.059 | | Lost | 75 | -0.178 | -0.800 | -0.067 |
| | Pooled | 192 | 0.418 | 0.031 | 1.000 | | Pooled | 191 | 0.147 | 0.033 | 0.967 |
| 6. Tabig- | New | 73 | 0.445 | 0.067 | 1.000 | 6. Meho- | New | 51 | 0.244 | 0.067 | 1.000 |
| ha, ba- | R-IF | 15 | 0.427 | 0.067 | 0.933 | la | R-IF | 22 | 0.363 | 0.005 | 0.862 |
| salt | R-DF | 35 | -0.387 | -0.867 | -0.067 | | R-DF | 8 | -0.210 | -0.652 | -0.010 |
| | Lost | 45 | -0.554 | -1.000 | -0.067 | | Lost | 91 | -0.217 | -1.000 | -0.071 |
| | Pooled | 186 | 0.439 | 0.033 | 1.000 | | Pooled | 173 | 0.172 | 0.034 | 1.000 |
| 7. Mt. | New | 40 | 0.805 | 0.067 | 1.000 | 7. Wadi | New | 64 | 0.194 | 0.063 | 0.563 |
| Gilboa | R-IF | 39 | 0.417 | 0.067 | 0.933 | Qilt | R-IF | 24 | 0.232 | 0.004 | 0.683 |
| | R-DF | 8 | -0.242 | -0.733 | -0.067 | | R-DF | 40 | -0.086 | -0.483 | -0.004 |
| | Lost | 79 | -0.378 | -1.000 | -0.067 | | Lost | 75 | -0.183 | -0.667 | -0.067 |
| | Pooled | 183 | 0.448 | 0.033 | 1.000 | | Pooled | 203 | 0.135 | 0.032 | 0.935 |
| 8. Kokh- | New | 58 | 0.408 | 0.067 | 1.000 | 8. Eiza- | New | 58 | 0.199 | 0.067 | 0.800 |
| av, Has- | R-IF | 47 | 0.232 | 0.005 | 0.714 | riya | R-IF | 20 | 0.203 | 0.067 | 0.600 |
| Hahar | R-DF | 35 | -0.258 | -0.933 | -0.005 | | R-DF | 23 | -0.241 | -0.600 | -0.067 |
| | Lost | 69 | -0.360 | -1.000 | -0.071 | | Lost | 64 | -0.167 | -1.000 | -0.067 |
| | Pooled | 217 | 0.365 | 0.034 | 1.000 | | Pooled | 175 | 0.152 | 0.033 | 0.933 |
| 9. Taiyi- | New | 68 | 0.363 | 0.067 | 1.000 | 9. Tal- | New | 73 | 0.190 | 0.067 | 0.667 |
| Ba | R-IF | 38 | 0.200 | 0.017 | 0.533 | piyyot | R-IF | 21 | 0.184 | 0.019 | 0.519 |
| | R-DF | 47 | -0.220 | -0.850 | -0.017 | | R-DF | 40 | -0.159 | -0.790 | -0.005 |
| | Lost | 61 | -0.322 | -1.000 | -0.083 | | Lost | 63 | -0.172 | -0.643 | -0.071 |
| | Pooled | 218 | 0.343 | 0.037 | 1.000 | | Pooled | 197 | 0.144 | 0.034 | 0.966 |
| 10. San- | New | 43 | 0.515 | 0.067 | 1.000 | 10. Sede | New | 59 | 0.194 | 0.067 | 0.867 |
| hedriyya | R-IF | 29 | 0.375 | 0.067 | 0.800 | Boqer | R-IF | 22 | 0.224 | 0.067 | 0.800 |
| | R-DF | 35 | -0.250 | -0.867 | -0.067 | | R-DF | 14 | -0.214 | -0.533 | -0.067 |
| | Lost | 89 | -0.346 | -1.000 | -0.067 | | Lost | 76 | -0.178 | -0.733 | -0.067 |
| | Pooled | 204 | 0.361 | 0.033 | 1.000 | | Pooled | 182 | 0.148 | 0.033 | 0.867 |

[a] Wpp=wheat paired samples in each population; Type, New=alleles in 2008 sample new to 1980 sample, R-IF=retained alleles with increased frequency, R-DF=retained alleles with decreased frequency, Lost=alleles present in 1980 sample but undetected in 2008 sample, Pooled=allele characteristics in samples pooled over two periods (for comparison with those between two periods); Frequency difference with respect to mean, minimum, and maximum frequency; and Bpp=barley paired samples in each population.

**Table S6a.** Loci with allelic changes in wild emmer wheat, *Triticum dicoccoides*.The chromosomal regions with SSR allelic changes over two sampling periods in each wild emmer wheat population.

| Wheat primer[a] | Chr[b] | Tn[c] | Mt. Hermon[d] | Qazrin | Rosh Pinna | Yehudiyya | Tabigha, terra rossa | Tabigha, basalt | Mt. Gilboa | Kokhav Hashahar | Taiyiba | Sanhedriyya |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| cwm435* | 1A | 17 | -4a | 2 | -1 | -2 | 0 | 3c | -4a | -1 | -2 | -3 |
| gwm135 | 1A | 23 | -3a | 5c | -3 | -1 | -3a | 0 | -4d | -5a | -2 | -4b |
| gwm357 | 1A | 11 | -2 | 1 | -1 | -4d | -2 | 0 | -5d | 0 | 2 | -3d |
| gwm497 | 1A, 2A, 3D | 23 | -1 | 0 | -1 | 0 | -4c | 4b | -3b | -6d | -7b | -5b |
| cwm075* | 1AS | 19 | 0 | -1 | -4d | -5d | -1a | -1 | -2d | -7d | -2a | -7d |
| cwm109* | 1AS | 17 | -1 | 1 | -2 | 4 | -1 | 2c | -5d | -4d | -2 | -5b |
| ksum104* | 1AS | 7 | 0 | 1 | -2d | -1d | 0 | 0 | 0 | -3d | -1 | -3d |
| ksum117* | 1AS/1BS | 14 | -2 | 2b | 2 | -1 | -1 | -3d | -5d | -1a | -2 | -2 |
| ksum157* | 1BS/6AS | 12 | 0 | 0 | 1 | 1d | -1 | 0 | 1 | -1 | 0 | 1 |
| gwm448 | 2A | 16 | -1 | 7d | 7d | 8d | 3d | 4d | 7d | 12d | 10d | 4d |
| cwm214* | 2AS | 7 | 0 | 2 | -1 | 0 | 1b | -2c | -1 | 2 | 1 | -2d |
| cwm568* | 2BL | 8 | -2 | -3d | -1 | -1d | 1 | 1d | -1 | 1 | -1 | 0 |
| gwm455 | 2D | 7 | 0 | -2a | 0 | -1d | 1 | -3d | -1 | -2d | -1 | 0 |
| gwm484 | 2D | 3 | 0 | 1b | 2b | 1 | 2b | 1 | 1 | 2d | 1b | 1b |
| ksum174* | 2DS | 5 | 1 | 0 | 2 | 0 | 1 | 0 | -1c | -1 | 1 | -3 |
| cwm325* | 3AL | 11 | 3d | 9d | 7d | 7d | 5d | 2a | 7d | 9d | 7d | 6d |
| cwm093* | 3AS | 13 | 1 | 1d | 1 | 4d | 1 | 3d | 1d | -1 | 2d | -1 |
| gwm247 | 3B | 24 | 0 | -8d | -11c | -8d | -4d | -3b | -5b | -2 | -5b | -5c |
| gwm314 | 3D | 2 | 0 | 1 | 0 | 0 | 0 | 1a | 0 | 0 | 0 | -1d |
| ksum008* | 4AL | 9 | -1d | 2 | 0 | 1d | 2 | 0 | 0 | 2a | 2d | -3c |
| ksum130* | 4AL^ | 14 | 0 | -2a | -5b | -1 | -3 | 3b | -7d | -5d | 4d | -6d |
| ksum062* | 4BL | 11 | 0 | 0 | -2 | -1 | 3c | 2d | -1 | 4c | 1 | -3b |
| cnl123* | 4BL/4D | 5 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 1 |
| ksum180* | 4D | 4 | 0 | 0 | -1 | -1b | 0 | 0 | -1c | -1 | 0 | -1 |
| gwm213 | 5B | 24 | -1 | -3 | 7b | 1 | 0 | 6d | -3a | 0 | -6b | -3 |
| cwm094* | 5DL | 3 | -1 | -1d | -2d | -2d | -1d | -1d | -1d | -1d | -1d | -1d |
| gwm088 | 6B | 3 | 0 | 0 | 3a | 0 | 0 | 1d | 0 | 0 | 0 | -1d |
| cnl064* | 6BS | 7 | 0 | 0 | 0 | 0 | 0 | 2d | 0 | 0 | 0 | 0 |
| cwm048* | 7A^ | 13 | 2d | 4d | -1 | 0 | -2d | 0 | -1d | 0 | 0 | 0 |
| gwm046 | 7B | 12 | -2d | -4d | -3 | -5d | -4b | 1 | -4d | -1 | 1 | 0 |
| gwm302 | 7B | 6 | -3c | -1 | 2 | 0 | 2 | 4d | -1 | 0 | 1 | 1 |
| cwm206* | 7BL | 13 | 1 | 1 | -2 | -2a | 0 | 1d | 0 | -1 | 4b | 2d |

[a] The primer pairs with stars are EST-SSR markers and those without stars are genomic SSR markers.

[b] Chr=Chromosome. Possible multiple loci were given with ^ and loci with uncertain (short or long) chromosomal arms were given with the chromosomes only.

[c] Tn=total number of alleles detected in all samples.

[d] A positive or negative number means more or fewer alleles were detected in 2008, than 1980, samples, respectively. The letters (a, b, c, d) after a number represent the levels of test significance at $p<0.05$, 0.01, 0.001, and 0.0001, respectively.

**Table S6b.** Loci with allelic changes in wild barley, *Hordeum spontaneum.* The chromosomal regions with SSR allelic changes over two sampling periods in each wild barley population.

| Barley primer[a] | Chr[b] | Tn[c] | Mt. Hermon[d] | Rosh Pinna | Tabigha, terra rossa | Tabigha, basalt | Bet Shean | Mehola | Wadi Qilt | Eizariya | Talpiyyot | Sede Boqer |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bmac0032 | 1H | 30 | -4 | 2 | 2 | -1 | -2 | -1 | 0 | -3 | -2 | -4 |
| Bmag0211 | 1H | 17 | 1 | 1 | 3b | 0 | -3 | -4 | 2 | -1 | 0 | 0 |
| GBM1204* | 1H | 10 | 0 | -2 | 0 | 0 | 0 | -4b | -1 | 2 | 2 | 2 |
| GBM1216* | 1H | 14 | -1 | 5b | 1 | -1 | 1 | 1 | 0 | 2 | 2 | 0 |
| Bmac0093 | 2H | 9 | -3 | 1 | 3a | 0 | 0 | -1 | 1 | 1 | 3 | 0 |
| Bmac0134 | 2H | 14 | -1a | -1 | 3 | 0 | -1 | -4d | -1 | -4 | 0 | 0 |
| Bmag0711 | 2H | 9 | -3 | 0 | 1 | -1 | -2 | 1 | 0 | -1 | 4 | -1 |
| EBmac0415 | 2H | 10 | -2 | -1 | 4 | 0 | -1 | -1 | 0 | 0 | -1 | -1 |
| GBM1459* | 2H | 9 | -3 | 1 | 3 | 0 | 1 | 1 | -1 | 0 | -3b | -2a |
| GBM1233* | 3H | 22 | -3 | 2 | 0 | 1 | -2 | 0 | -2 | 1 | 1 | -1 |
| HvLTPPB | 3H | 9 | -1 | -1 | 1 | 0 | 0 | -3c | 0 | -1 | 2 | -1a |
| HVM62 | 3H | 21 | -5a | 2 | 1 | 0 | 2 | -6b | -3 | 0 | 1 | -1 |
| Bmag0808 | 4H | 13 | -3 | 2 | 2 | 1 | -2 | 0 | 0 | 3b | 1 | 3 |
| EBmac0701 | 4H | 19 | -4 | -3 | -1 | -4a | -2 | 3 | 1 | 0 | 0 | 0 |
| GBM1323* | 4H | 13 | 1 | 0 | -1 | -2 | -2a | -1 | 2 | 10d | -1 | 10d |
| HVM03 | 4H | 13 | -7c | -2 | 1 | 3 | -2 | -4a | -2 | -1 | -1 | -4a |
| Bmac0096 | 5H | 11 | -1 | 0 | 0 | 0 | -2 | -1 | -2 | -1 | 0 | -3 |
| Bmac0113 | 5H | 11 | -3 | -2 | -2 | 1 | 0 | -4d | 0 | 2 | 2 | 1 |
| Bmag0222 | 5H | 23 | -2 | -1 | 1 | 3 | -3 | 1 | 0 | 1 | 0 | 0 |
| GBM1176* | 5H | 3 | 0 | 0 | 0 | -1 | 0 | -1 | 0 | 0 | 2 | -1 |
| scssr03907* | 5H | 3 | 0 | 0 | 0 | 0 | 0 | -2d | -1 | 1 | 2d | 1 |
| Bmac0018 | 6H | 8 | 1 | 2 | -1 | 2 | 0 | -2 | 0 | 2 | -1 | 1 |
| Bmac0316 | 6H | 11 | -5b | 1 | -1 | 1 | 0 | 2 | 0 | -1 | 0 | -2 |
| Bmag0496 | 6H | 12 | -2 | 3c | 2a | -1 | -1 | -3 | -2 | -2 | 0 | 0 |
| scss00103* | 6H | 9 | -2 | 2d | 1 | 2a | -1 | -1 | -1 | -1 | -1b | 1 |
| Bmag0120 | 7H | 10 | -1 | 1 | 1 | 2 | -3 | -3 | 0 | -1 | -1 | -1 |
| EBmac0764 | 7H | 13 | -2 | 0 | 2 | 4a | -2 | -3b | -3d | 0 | 0 | -1 |
| GBM1419* | 7H | 7 | -1 | 2 | 2 | -1a | -1 | -1 | 0 | 0 | -1 | 0 |
| GBM1464* | 7H | 8 | -1 | 1 | 3a | 1 | 0 | 1 | 2 | -3 | 0 | -2 |

[a] The primer pairs with stars are EST-SSR markers and those without stars are genomic SSR markers.
[b] Chr=Chromosome.
[c] Tn=total number of alleles detected in all samples.
[d] A positive or negative number means more or fewer alleles were detected in 2008, than 1980, samples, respectively. The letters (a, b, c, d) after a number represent the levels of test significance at $p<0.05$, 0.01, 0.001, and 0.0001, respectively.

**Table S7.** Comparison of genome coverage and estimated allele sizes (bp) for lost, new, and retained alleles between 1980 and 2008 samples of 10 wild emmer wheat and 10 wild barley populations.

| Type | Total allelic (loci) count | EST-SSR allelic (loci) count | Genomic SSR allelic (loci) count | Allelic size | | |
|---|---|---|---|---|---|---|
| | | | | Mean | Minimum | Maximum |
| *Wheat samples* | | | | | | |
| Lost | 73(20) | 30(13) | 43(7) | 206.9 | 102 | 415 |
| New | 45(20) | 27(14) | 18(6) | 244.2 | 94 | 445 |
| Retained | 245(32) | 152(20) | 93(12) | 225.5 | 35 | 800 |
| *Barley samples* | | | | | | |
| Lost | 51(22) | 14(5) | 37(17) | 188.9 | 97 | 370 |
| new | 43(19) | 15(7) | 28(12) | 193.1 | 107 | 350 |
| Retained | 268(29) | 70(10) | 198(19) | 181 | 90 | 330 |

**Table S8.** Results of molecular analysis of variance for 292 wild emmer wheat and 296 wild barley samples with six models of genetic structure.

| Model/source | df | Sum of squares | Estimated variance | Proportional variation (%) [a] |
|---|---|---|---|---|
| *Two periods of wheat sampling* | | | | |
| Among samples | 1 | 1217.7 | 8.1 | 20.4 |
| Within samples | 290 | 9197.0 | 31.7 | 79.6 |
| *1980 wheat samples* | | | | |
| Among populations | 9 | 1867.3 | 13.3 | 42.5 |
| Within populations | 133 | 2387.8 | 18.0 | 57.5 |
| *2008 wheat samples* | | | | |
| Among populations | 9 | 2551.1 | 17.9 | 51.0 |
| Within populations | 138 | 2390.1 | 17.2 | 49.0 |
| *Two periods of barley sampling* | | | | |
| Among samples | 1 | 167.2 | 1.0 | 4.4 |
| Within samples | 294 | 6266.4 | 21.3 | 95.6 |
| *1980 barley samples* | | | | |
| Among populations | 9 | 815.2 | 5.0 | 22.8 |
| Within populations | 138 | 2332.7 | 16.9 | 77.2 |
| *2008 barley samples* | | | | |
| Among populations | 9 | 781.4 | 4.8 | 23.5 |
| Within populations | 138 | 2164.9 | 15.7 | 76.5 |

[a] All the proportional variations reported here were statistically significant from zero at $p < 0.0001$.

**Fig. S1.** Locations for sampled populations of wild barley and wild emmer wheat.

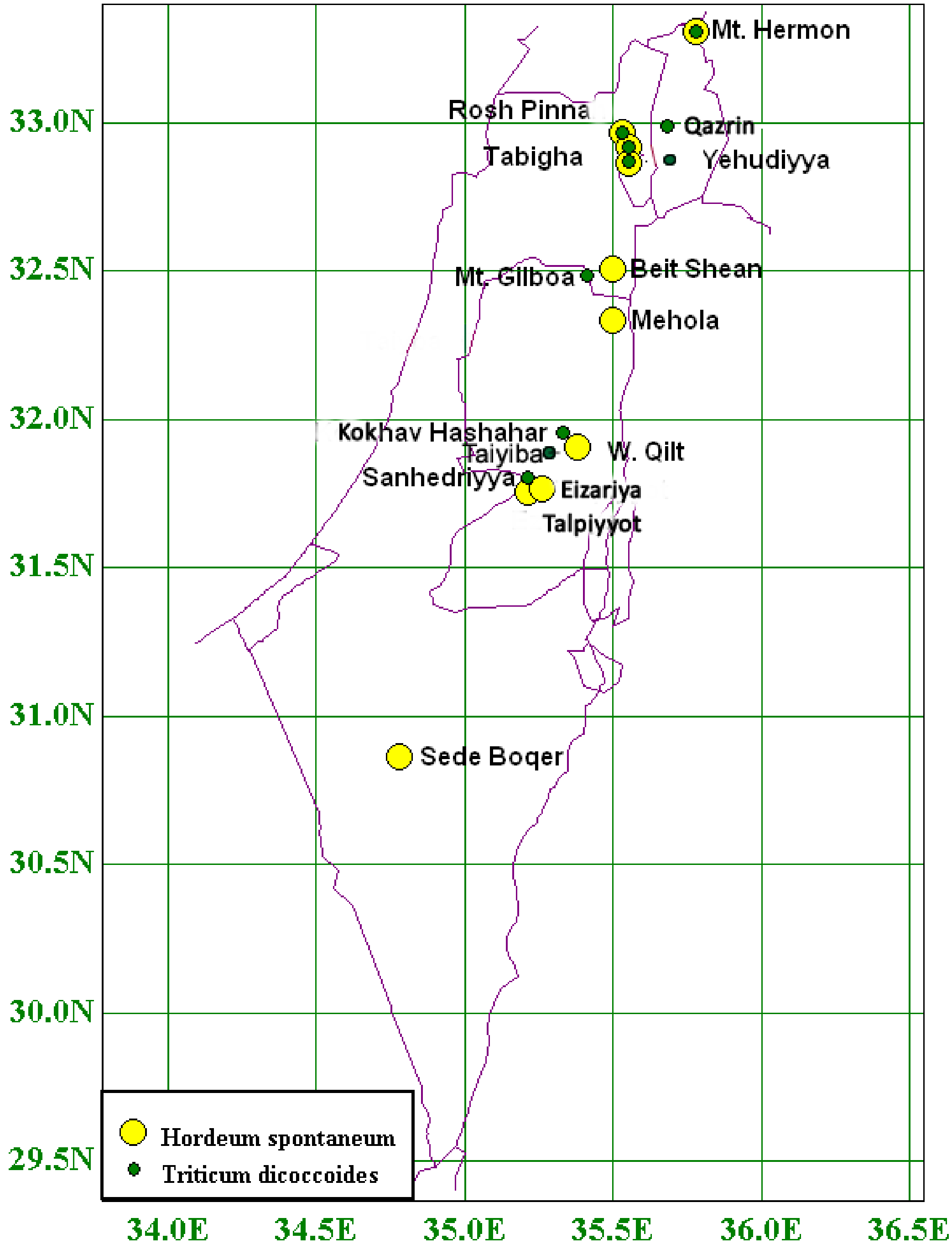

**Fig. S2.** Comparative allelic counts and frequencies in wild emmer wheat plants collected in 1980 and 2008. The left figure displays the relationship between the numbers of 245 SSR alleles and their frequencies in each period. The right figure shows the relationship between the numbers of SSR alleles unique to each period of wild emmer wheat plants (73 vs. 45) and their frequencies in each period.

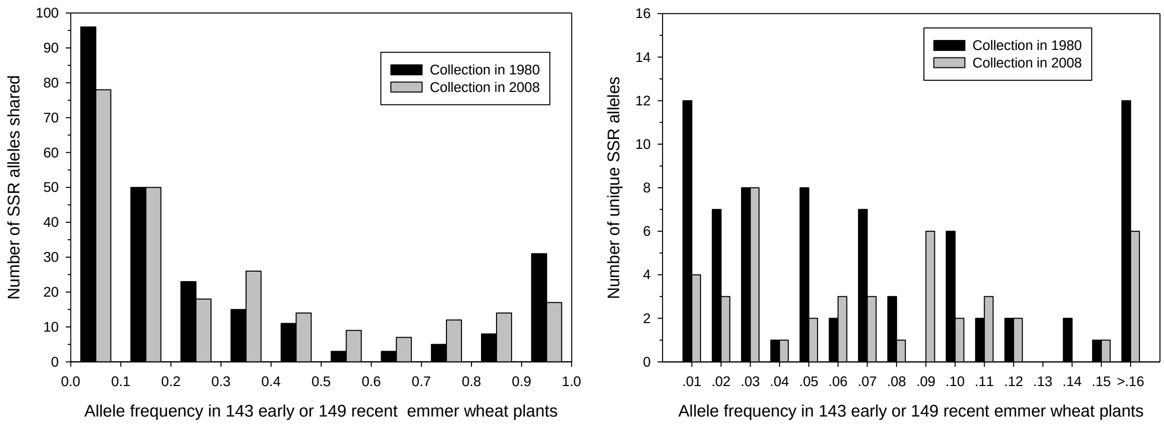


**Fig. S3.** Comparative allele counts and frequencies in wild barley plants collected in 1980 and 2008. The left figure displays the relationship between the numbers of 268 SSR alleles and their frequencies in each period. The right figure shows the relationship between the numbers of SSR alleles unique to each period of wild barley plants (51 vs. 43) and their frequencies in each period.

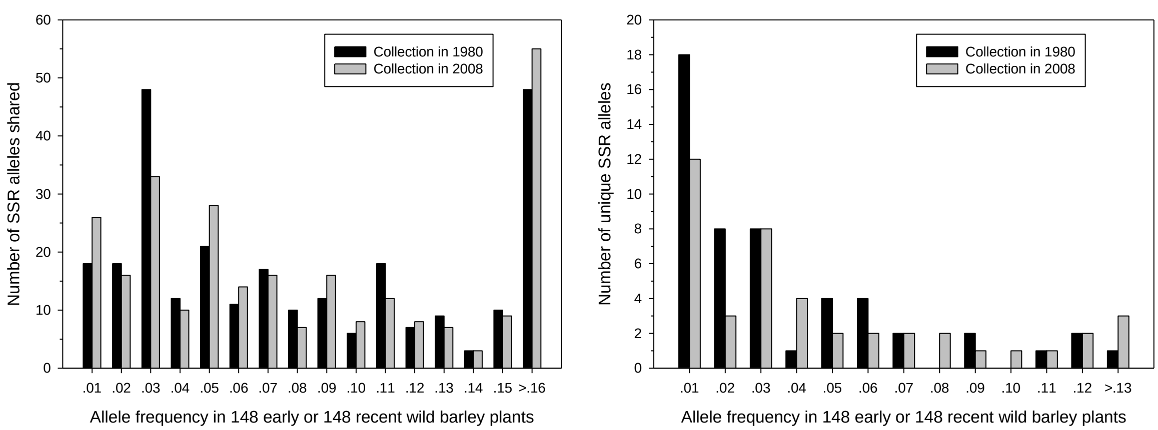

**Fig. S4**. The mean annual temperatures over nine stations in Israel (Source: Goldreich 2010).

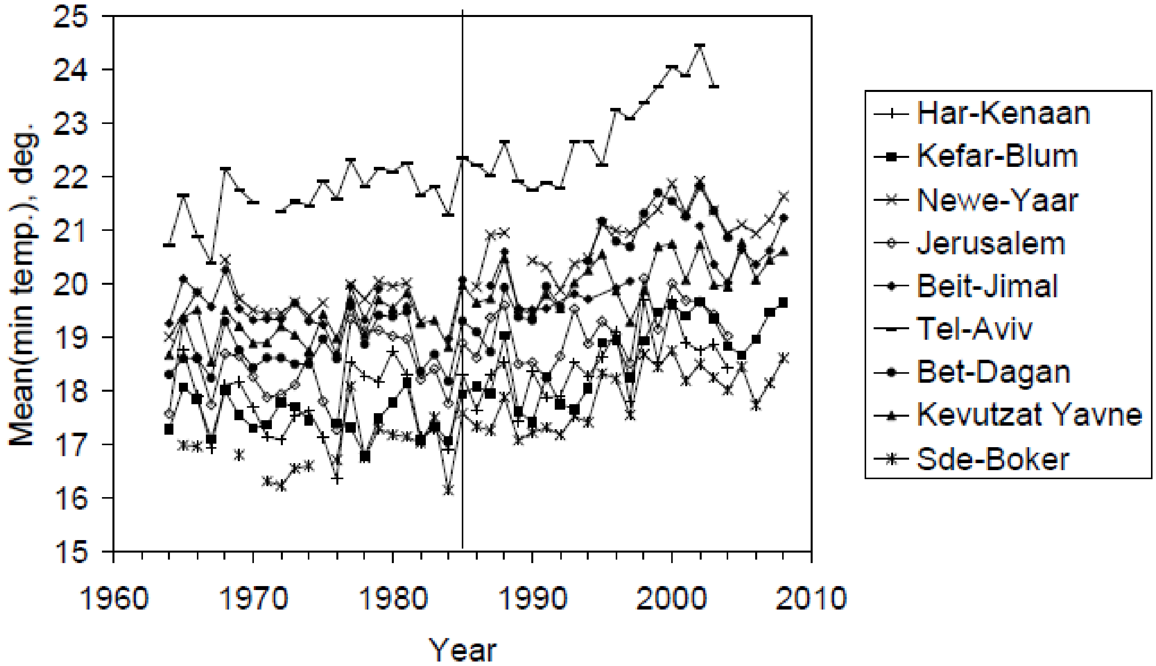

**Fig. S5.** Annual rainfall volume in Israel from 1989 to 2010 (source: Israel Meteorological Service).

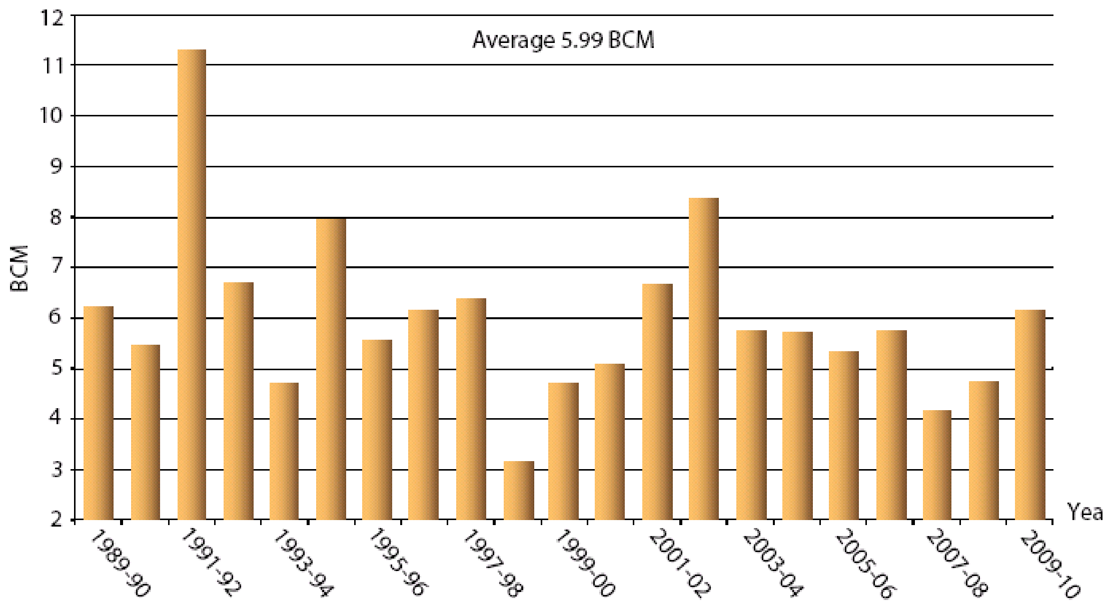


**Fig. S6.** Annual rainfall pattern in Israel from 1920 to 2010 (source: Israel Meteorological Service).