

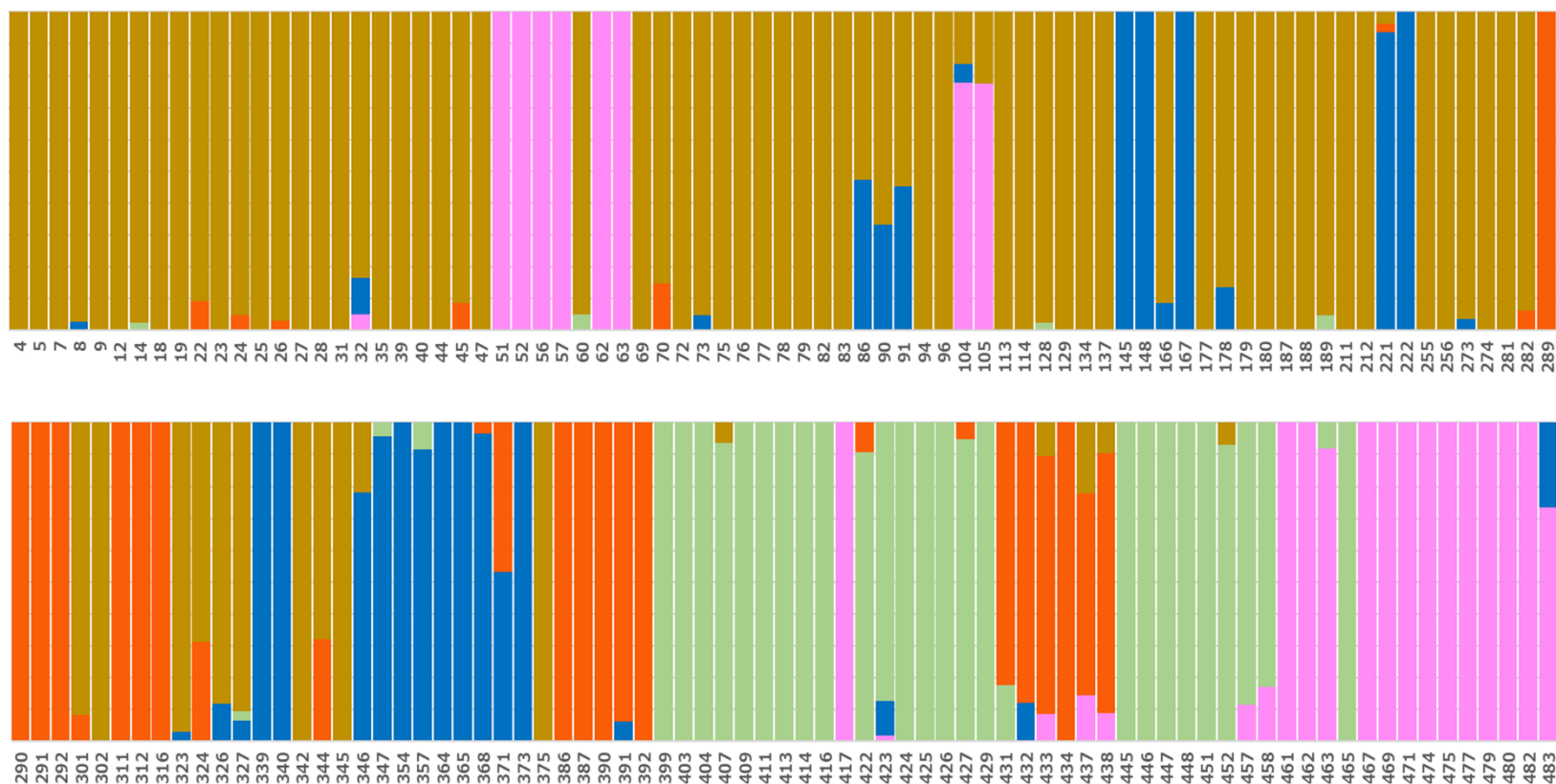


Fig. S1. Genetic structure based on 313 SNPs from MIG-seq for the *G. dehaani* species complex. The colors in bars corresponding to each group and genetic elements are as follows: HO, brown; SHI, blue; nKC, orange; cK, green; and sKK, pink. The sample numbers refer to Table S1.

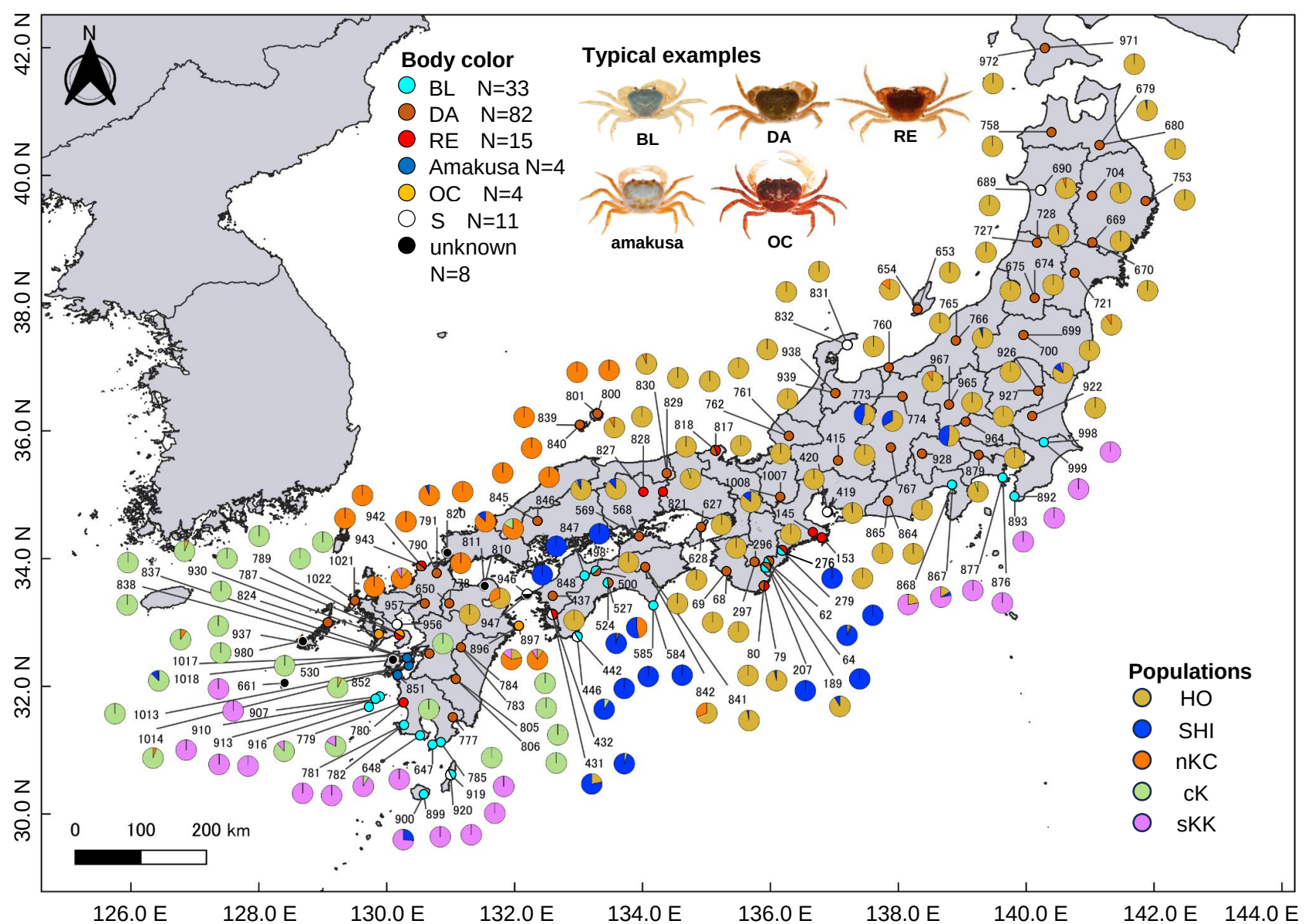


Fig. S2. Map showing detailed geographical distributions of color types with sample numbers, and the results of the ADMIXTURE analysis for each location (set 0). Large pie chart, genetic elements of each individual; small pie chart, color types of individuals at each location used in this analysis. Color types are indicated as in Figure 1. The colors in the pie charts corresponding to each group and genetic elements are as follows: HO, brown; SHI, blue; nKC, orange; cK, green; and sKK, pink. The sample numbers refer to Table S1, Figs. 1 and 3. The map was created using QGIS ver. 3.40.7 (<https://www.qgis.org/ja/site/forusers/download.html>.) based on digital map data provided by the Geographical Information Authority of Japan (<https://www.gsi.go.jp/>).

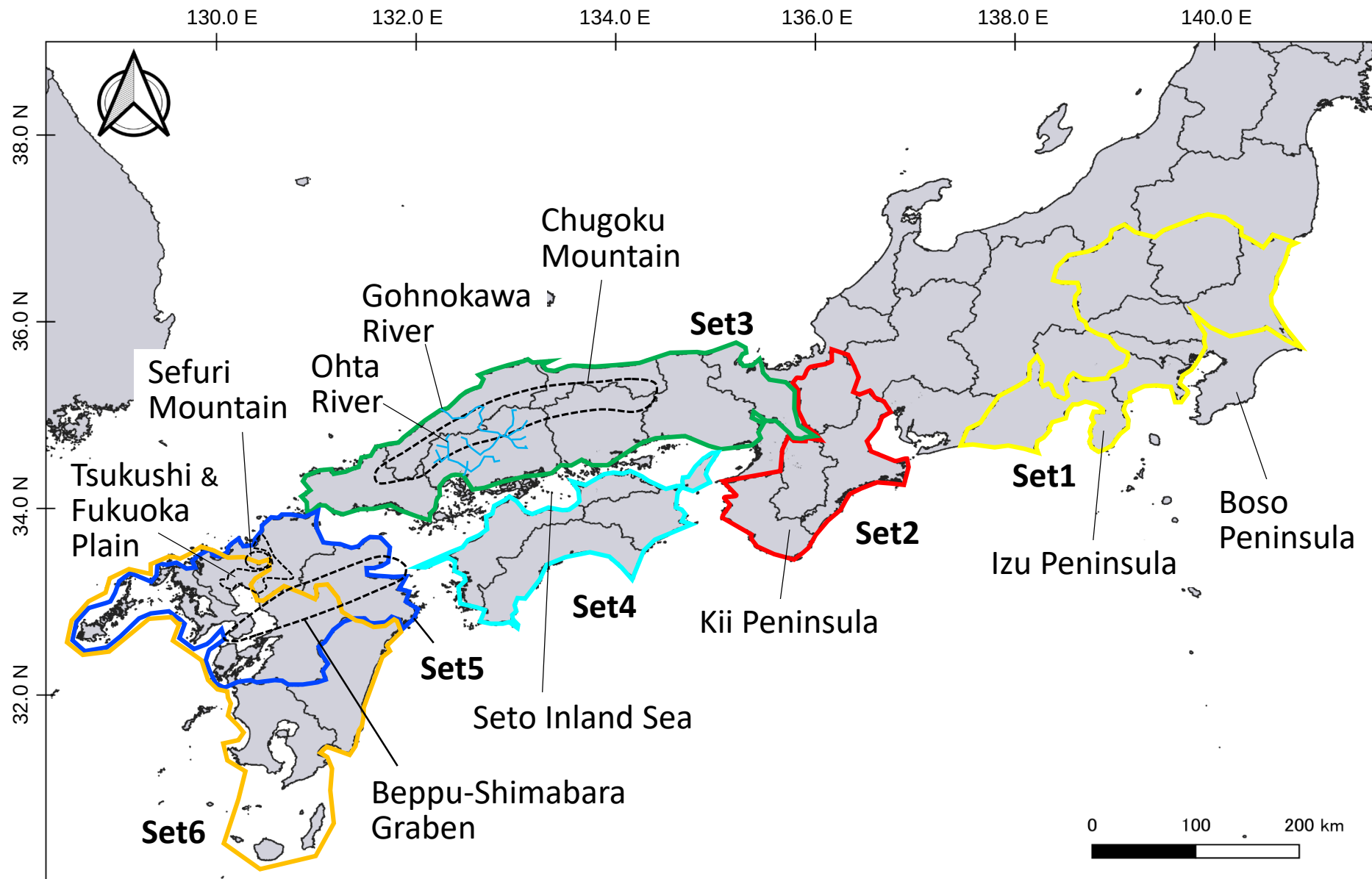


Fig. S3. Map showing six adjacent sets for the ADMIXTURE analysis to assess hybridization among populations. Geological names and their approximate locations relative to this study are also indicated. The map was created using QGIS ver. 3.40.7 (<https://www.qgis.org/ja/site/forusers/download.html>.) based on digital map data provided by the Geographical Information Authority of Japan (<https://www.gsi.go.jp/>).

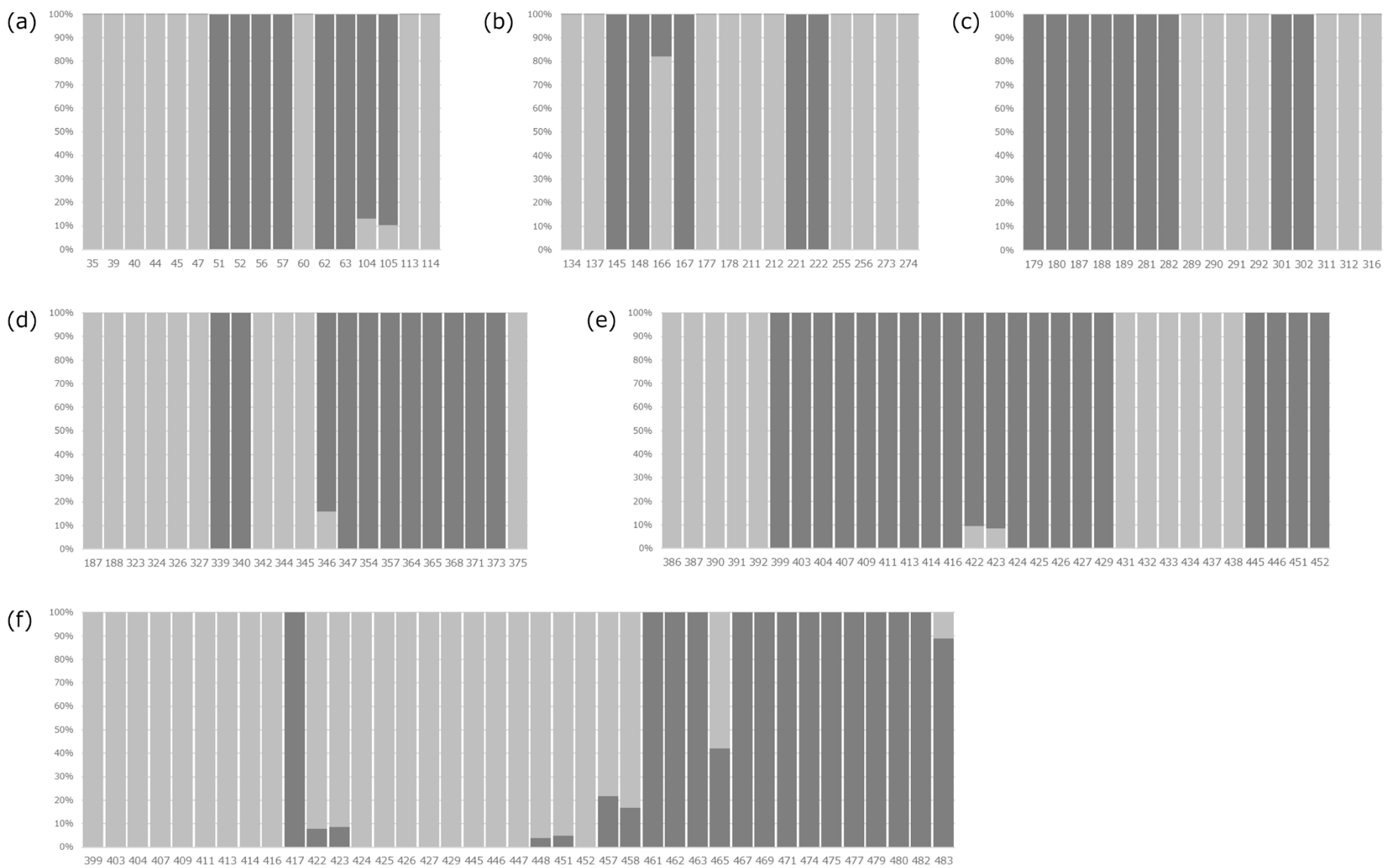


Fig. S4. Admixture analysis using samples from the two populations at each group boundary. For sample numbers, refer to Table S1. (a) Set 1: Kanto region (17 individuals from Ibaraki, Tochigi, Gunma, Saitama, Tokyo, Kanagawa, and Shizuoka prefectures), (b) Set 2: Kinki region (16 individuals from Shiga, Mie, Nara, and Wakayama prefectures), (c) Set 3: Chugoku region (16 individuals from Kyoto, Hyogo, Tottori, Okayama, Shimane, Hiroshima, and Yamaguchi Prefectures), (d) Set 4: Shikoku region (21 individuals from Awaji Island-Hyogo Prefecture, Kagawa, Tokushima, Kochi, and Ehime Prefectures), (e) Set 5: central Kyushu (31 individuals from Fukuoka, Saga, Oita, Nagasaki, and Kumamoto Prefectures), and (f) Set 6: southern Kyushu (39 individuals from Saga, Nagasaki, Kumamoto, Miyazaki, and Kagoshima Prefectures).

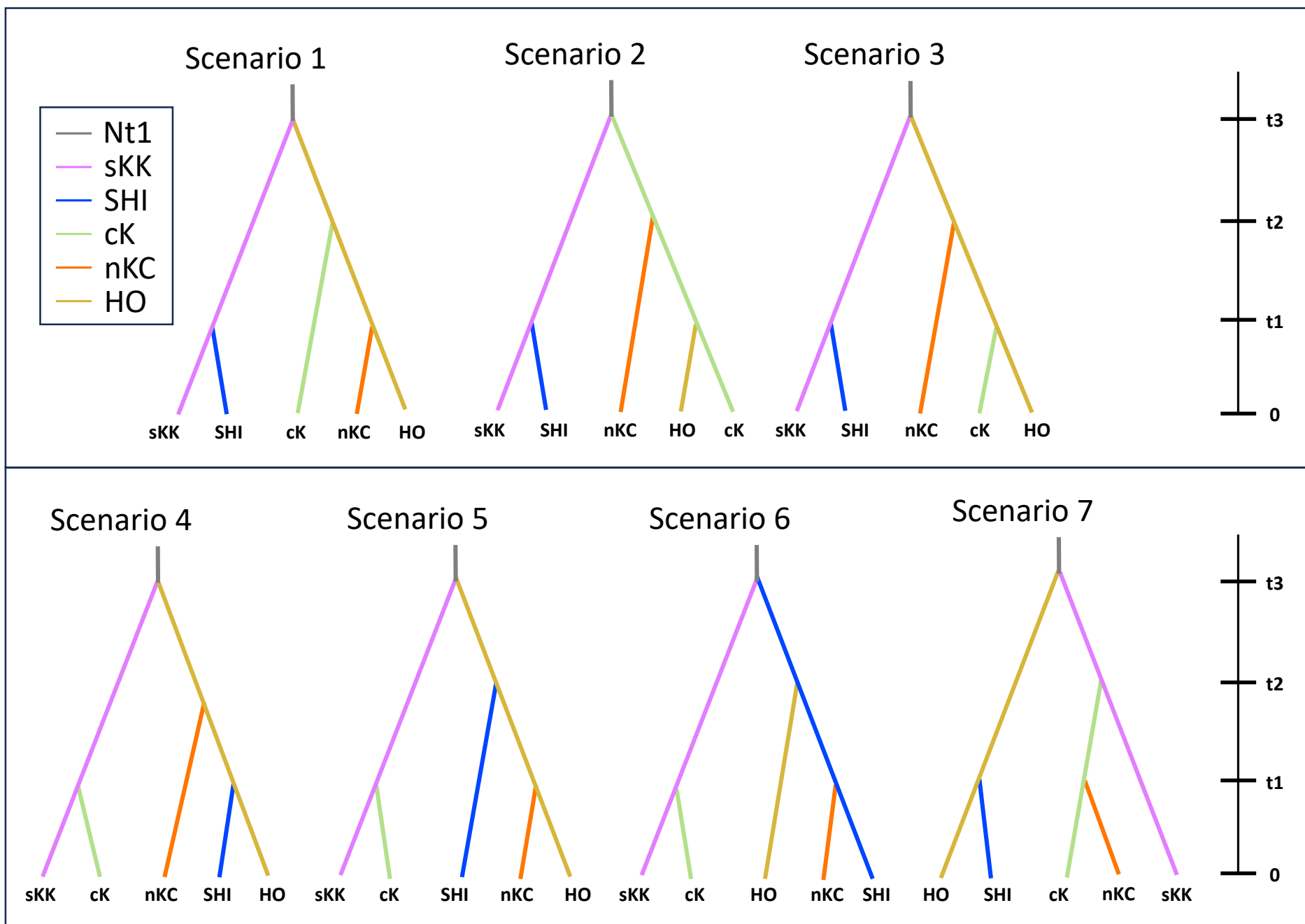


Fig. S5. Tested demographic scenarios in the DIYABC-RF analysis for the five *Geothelphusa dehaani* population datasets. See detailed parameters in Table S7.

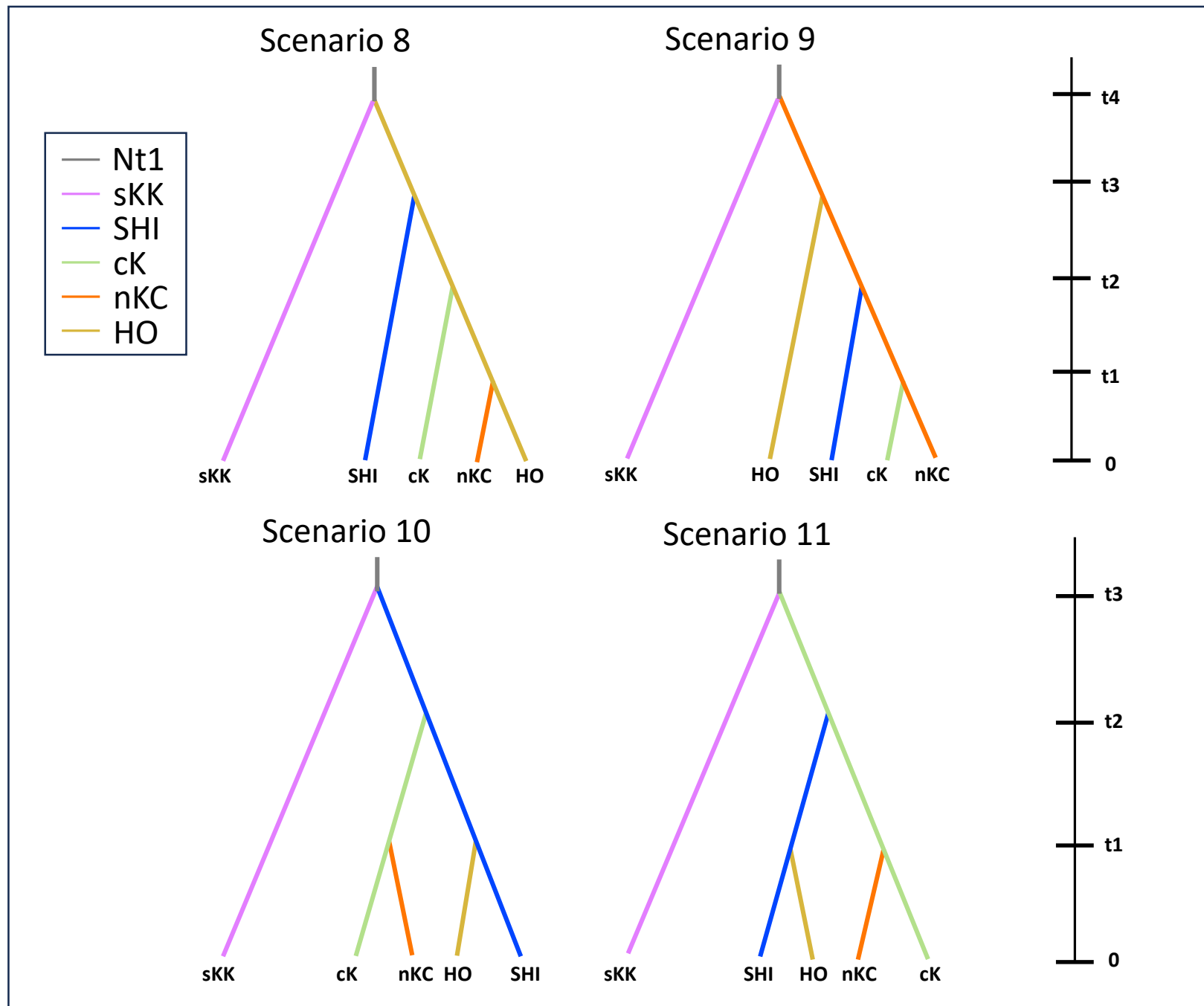


Fig. S5 Continued.

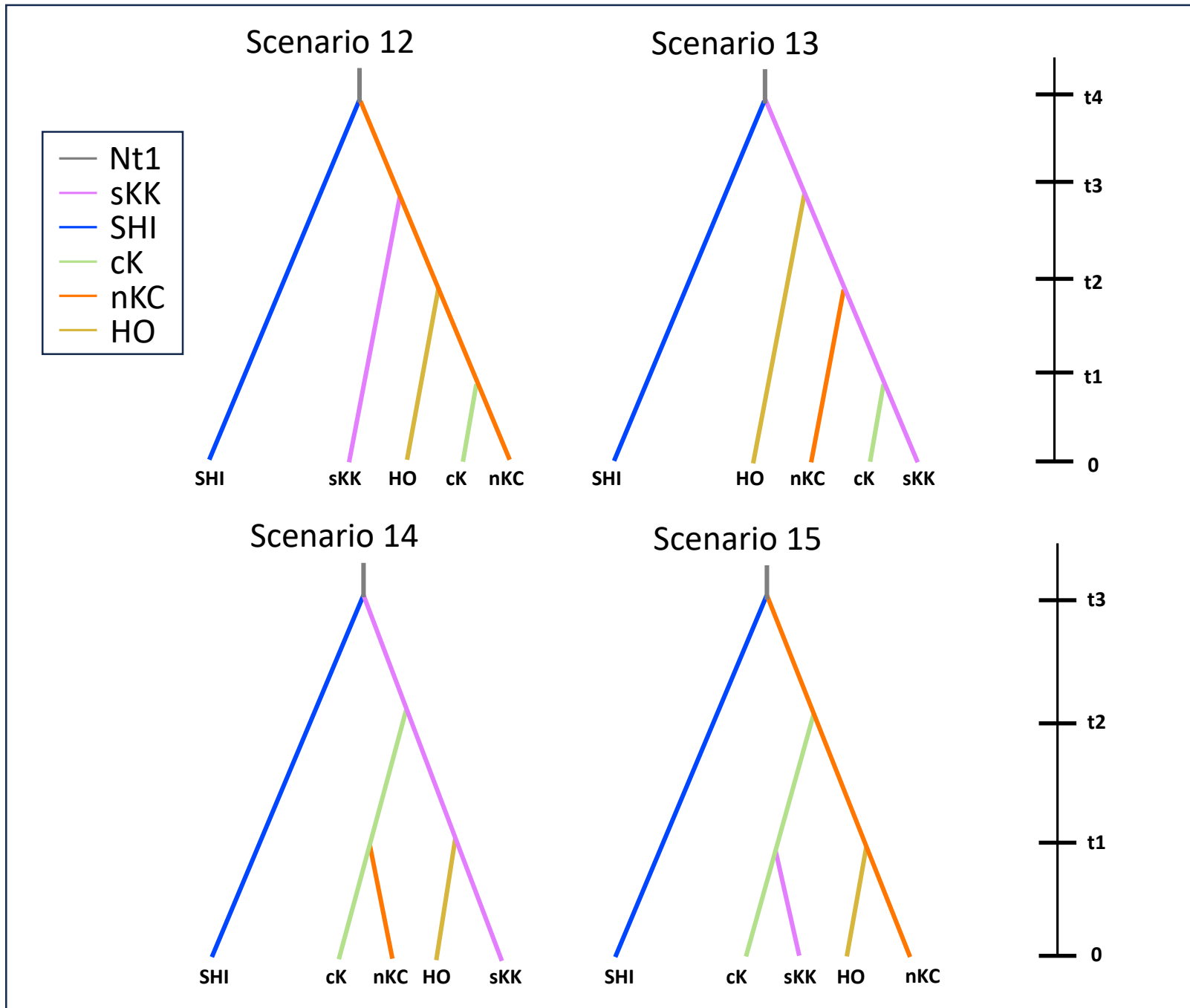


Fig. S5 Continued.

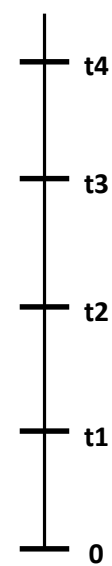
Scenario 16



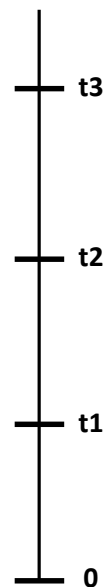
Scenario 17



Scenario 18



Scenario 19



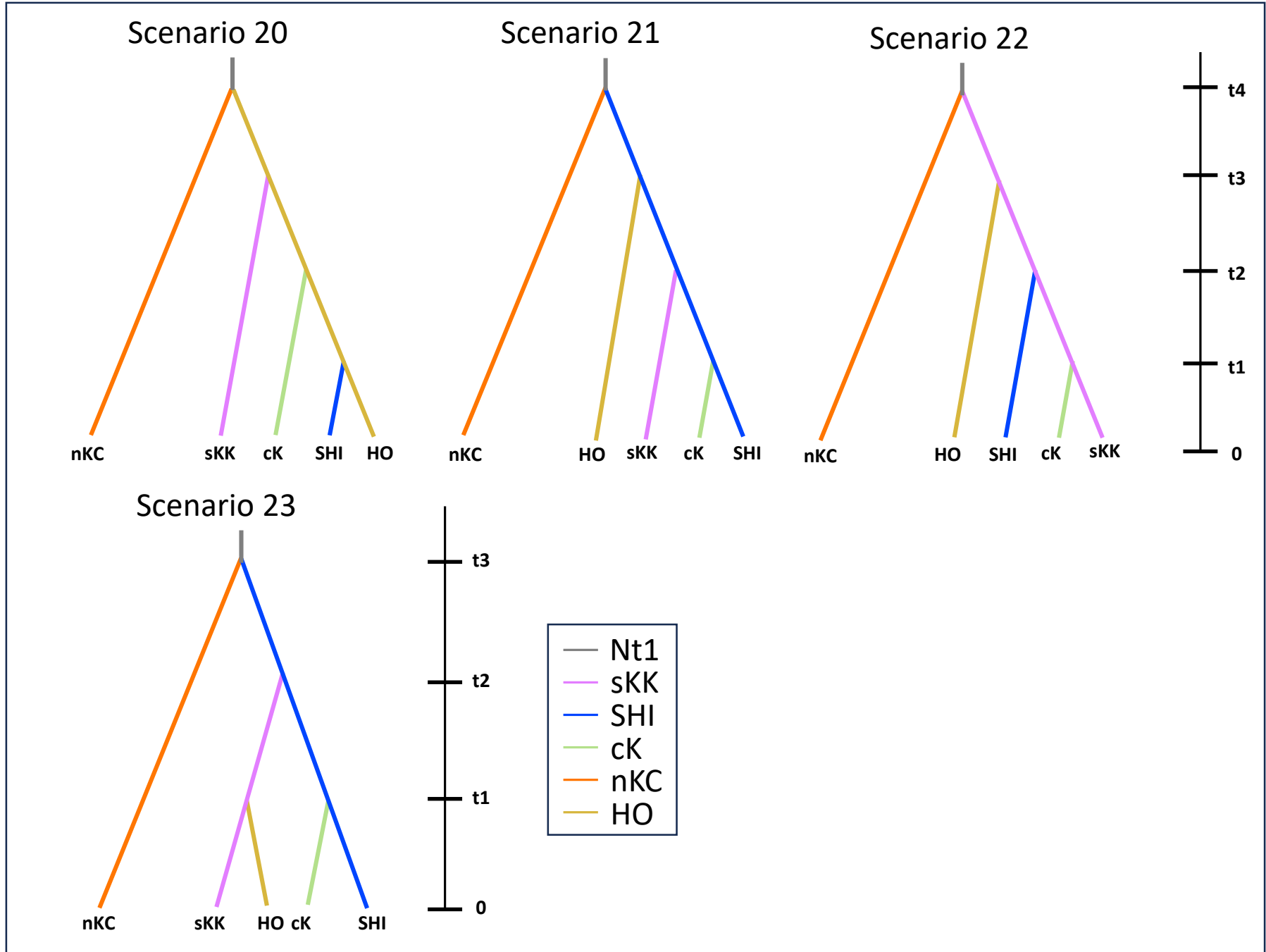


Fig. S5 Continued.

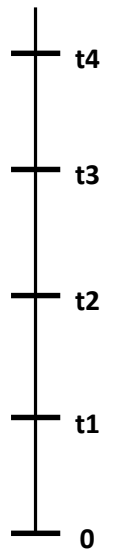
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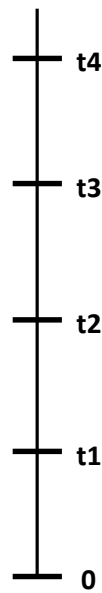
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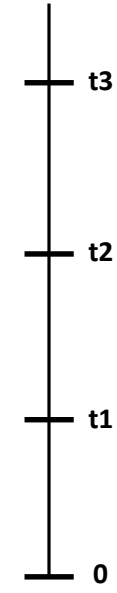
Scenario 26



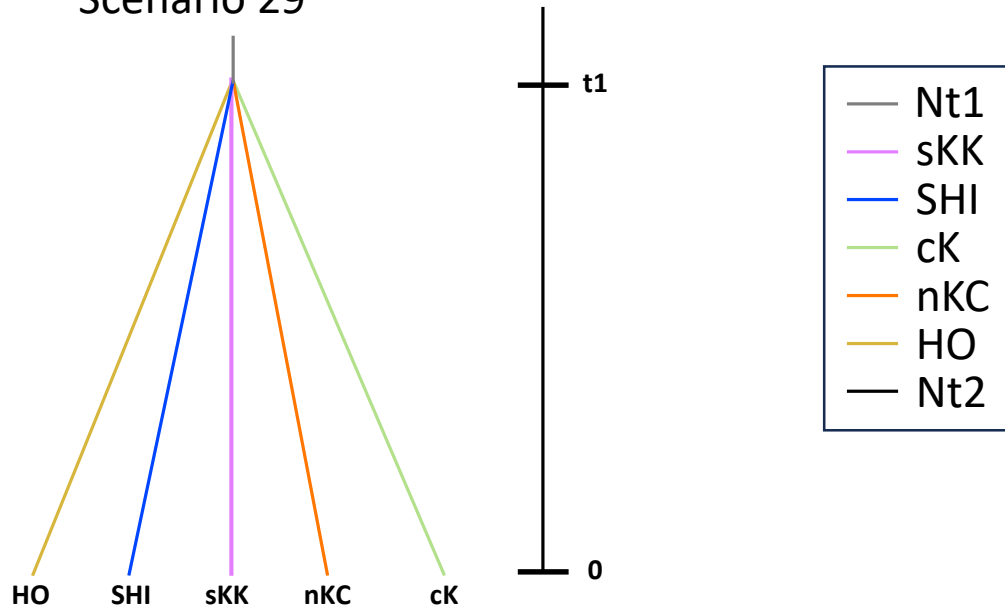
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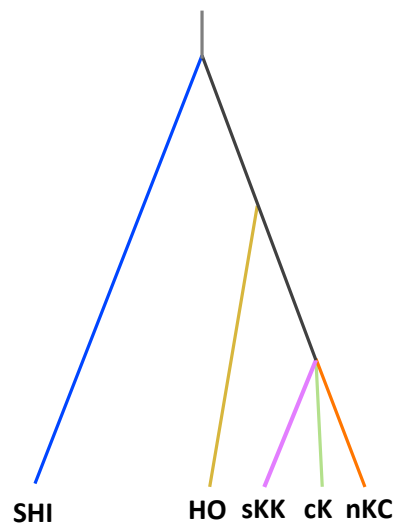
Scenario 28



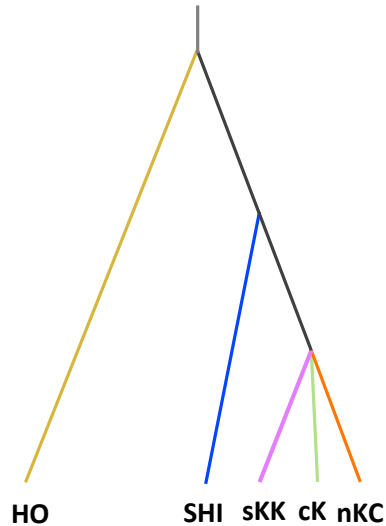
Scenario 29



Scenario 30



Scenario 31



Scenario 32

