

Inconsistent Statements in 10.3390/f17040470

A recent investigation reveals several inconsistent statements in the article [1]:

(1) The article states in the 3.1 section that the meteorological information was obtained from CN05.1 database; while the table indicates than the meteorological information was obtained from WorldClim database.

3. Environmental Predictors

3.1. Baseline Environmental Variables

To represent the current (2000–2020) environmental background of the study area, we adopted the CN05.1 gridded observational climate dataset which is derived from monthly observation records of more than 2400 national meteorological stations in China and has high reliability for regional climate simulation. The original dataset has a spatial resolution of $(0.25^\circ \times 0.25^\circ)$; we converted the NetCDF format data to GeoTIFF format, resampled it to a 1 km resolution consistent with species occurrence data, and performed cropping, projection conversion, and other preprocessing operations using ArcGIS 10.8 software.

Table 2. Environment variables used in the study.

Variables	Indicators	Data Sources	Data Processing
Meteorological factors	Bio 1, Bio 2, Bio 3, Bio 4, Bio 12, Bio 13, Bio 14, Bio 15, Bio 17, Bio 19	WorldClim http://worldclim.org/version2 (accessed on 17 December 2025)	Random value points were extracted and then interpolated to 90 m resolution, collected using a Calibration Factor

Based on the baseline climate dataset, 19 bioclimatic variables (Table 1) were calculated using the R 4.2.1 package “BioVars” to reflect long-term climate characteristics [49], with a final spatial resolution of 30 arc seconds (~ 1 km). To reduce the interference of multicollinearity among variables, we used SPSS 21.0 software to calculate Pearson correlation coefficients and excluded variables with $|r| > 0.8$ (Figure 2), retaining the most ecologically relevant factors. Finally, we retained ten bioclimatic variables: one specific soil variable (soil sand content, mass percentage), one vegetation index (NDVI), and three topographic variables from the initial 19 environmental predictors [27] (Table 2). The selection of soil sand content was based on three key rationales: (1) Ecological relevance to target species: *Malus sieversii* and *Prunus cerasifera* are typical dryland wild fruit trees, and soil sand content directly regulates soil water-holding capacity, aeration, and root penetration, critical factors for their growth and establishment in arid and semi-arid regions. (2) Regional adaptability: The Il Valley has heterogeneous soil types (e.g., Chernozems, Kastanozems) with significant variations in sand content, which effectively captures soil spatial heterogeneity complementary to climatic and topographic predictors. (3) Data reliability: The FAO soil dataset provides standardized sand content data for Central Asia, consistent with the 1 km spatial resolution of other environmental variables, avoiding scaling biases in modeling.

4.3. Soil Associations

Soil conditions in the Il Valley exhibit strong heterogeneity along geomorphic and altitudinal gradients, ranging from deep loess deposits in foothills and alluvial fans to distinct mountain soil belts at higher elevations. Habitat suitability patterns uncovered significant species-specific soil affinities (Figure 6), which serve as a key driver of habitat partitioning between the two taxa. Highly suitable areas for *Malus sieversii* were predominantly associated with Leptosols and Chernozems, characterized by moderate soil depth and good water retention capacity. In comparison, *Prunus cerasifera* suitability was strongly linked to Chernozems and Kastanozems, which feature better drainage and higher organic matter content in mid-elevation zones. These soil preference differences further amplify the habitat differentiation and spatial segregation of the two wild fruit tree species in the region.

(2) The article states in the 3.1 section that soil sand content (mass percentage) was chosen as the sole soil variable; however, in section 4.3, the article discusses the effect of soil type, including fluvisols, gleysols, and others.

Abstract

Globally, Central Asian wild fruit forests are critical repositories of wild fruit germplasm resources and provide essential ecosystem services. However, their habitats are facing escalating degradation risks driven by climate warming, shifting precipitation regimes, and intensifying anthropogenic disturbances. Accurately quantifying climate-driven spatiotemporal variations in habitat suitability for keystone wild fruit tree species is therefore an essential prerequisite for formulating targeted conservation and management strategies in arid and semi-arid landscapes. In this study, we applied the maximum entropy (MaxEnt) model to simulate the current (2000–2020) baseline and future (2030s, 2050s, 2070s) potential suitable habitats of two dominant wild fruit tree species, *Malus sieversii* (Ledeb.) M.Roem. and *Prunus cerasifera* Ehrh., in the Il Valley, a core distribution area of Central Asian wild fruit forests in northwestern China. We integrated rigorously screened species occurrence records with key environmental predictors and characterized future climate conditions using three Shared Socioeconomic Pathways (SSPs: SSP126, SSP245, and SSP585) spanning low to high radiative forcing levels. The model exhibited excellent predictive performance (AUC > 0.85), confirming the robustness and reliability of our habitat suitability simulations. Elevation and annual precipitation were identified as the dominant environmental variables governing habitat suitability for both species, highlighting the critical role of terrain–hydroclimate interactions in maintaining viable dryland refugia for wild fruit forests. Under the baseline climate scenario, the total area of suitable habitats reached $24,014 \times 10^3$ km² for *Malus sieversii* and $18,990 \times 10^3$ km² for *Prunus cerasifera*. Future climate projections revealed a consistent and significant contraction trend in suitable habitats for both species, with the magnitude of habitat loss escalating with increasing radiative forcing and longer projection time horizons. Specifically, under the high-emission SSP585 scenario by the 2070s, the suitable habitat area is projected to decline by $7,579 \times 10^3$ km² for *Malus sieversii* and $5,883 \times 10^3$ km² for *Prunus cerasifera* relative to the baseline. Our findings delineate climate-vulnerable hotspots of wild fruit forests and provide a robust spatial scientific basis for prioritizing in situ conservation, targeted habitat restoration, and anthropogenic disturbance regulation to support the long-term persistence of these irreplaceable wild fruit germplasm resources under accelerating global climate change.

As shown in Figure 3, habitat area declined progressively over time under each fixed scenario, with maximum reductions of $8,244 \times 10^3$ km² for *Malus sieversii* and $12,894 \times 10^3$ km² for *Prunus cerasifera* under SSP585 by the 2070s. Across all scenarios, habitat area increased marginally for both species in the 2030s (3.09%, 0.52%, and 0.64% for *Malus sieversii*; 5.00%, 3.27%, and 2.89% for *Prunus cerasifera* under SSP126, SSP245, and SSP585, respectively). By the 2050s, only SSP126 and SSP245 showed slight gains for *Malus sieversii* (1.44%, 0.54%), while all scenarios except SSP126 showed habitat loss for *Prunus cerasifera*. By the 2070s, significant habitat loss was observed across all scenarios, with reductions of 1.25%, 4.29%, and 7.27% for *Malus sieversii* and 2.08%, 7.03%, and 9.48% for *Prunus cerasifera* under SSP126, SSP245, and SSP585, respectively. The exacerbated drought and heat stress under high-emission scenarios disproportionately intensified habitat degradation for both species, with *Prunus cerasifera* exhibiting greater vulnerability to climate change due to its narrower climatic and soil niche.

(3) The article states in the Abstract section that "under the high-emission SSP585 scenario by the 2070s, the suitable habitat area is projected to decline by $7.579 \times 10^3 \text{ km}^2$ for *Malus sieversii* and $9.883 \times 10^3 \text{ km}^2$ for *Prunus cerasifera* relative to the baseline"; while in the 4.5 section, it states "habitat area declined progressively over time under each fixed scenario, with maximum reductions of $8.244 \times 10^3 \text{ km}^2$ for *Malus sieversii* and $12.894 \times 10^3 \text{ km}^2$ for *Prunus cerasifera* under SSP585 by the 2070s".

The above inconsistent statements were identified with the help of the Large Language Model DeepSeek-v4.1 Flash.

[1] 10.3390/f17040470

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