

Table S1. Percentage distribution of suitable areas for *Leptopilina japonica* under different climate scenarios and two intervals (2021-2040 and 2041-2060), modeled using the Random Forest algorithm.

Countries or Territories	Baseline	Moderated scenario (SSP2-4.5)		Pessimistic scenario (SSP5-8.5)	
		2021-2040	2041-2060	2021-2040	2041-2060
Afghanistan	3.9	2.2	2.2	2.4	1.6
Albania	0	4.2	4.2	2.4	2.4
Algeria	0	0.0	0.0	0.0	0.1
Angola	10.7	10.9	10.9	10.6	9.9
Argentina	7.2	3.8	3.8	4.3	2.2
Australia	3.6	0.0	25.7	0.0	29.35
Azerbaijan	100.0	100.0	100.0	100.0	100.0
Bangladesh	0.5	0.0	0.0	0.1	0.0
Belarus	0.9	15.2	15.2	8.4	32.4
Benin	0.0	0.0	0.0	0.0	0.0
Bhutan	0.0	0.0	0.0	0.0	0.0
Bolivia	11.5	3.4	3.4	3.4	1.6
Botswana	11.4	5.2	5.2	6.6	4.3
Brazil	68.2	47.8	47.8	54.0	42.6
Bulgaria	0.0	8.2	8.2	5.0	9.0
Burkina Faso	0.0	0.0	0.0	0.0	0.0
Cameroon	6.1	27.0	27.0	19.6	26.8
Canada	19.6	22.9	22.9	22.2	22.3
Central African Republic	16.2	31.4	31.4	26.0	33.8
Chad	3.7	11.7	11.7	6.2	9.6
Chile	0.1	0.1	0.1	0.0	0.0
China	4.2	1.1	1.1	1.5	0.8
Democratic Republic of the Congo	76.5	92.6	92.6	91.9	85.5
East Timor	0.0	0.0	0.0	0.0	0.0
Egypt	100.0	100.0	100.0	100.0	100.0
Equatorial Guinea	4.1	7.0	7.0	0.7	8.5
Fiji	9.2	5.7	7.3	6.2	6.6
Finland	0.0	0.1	0.1	0.0	0.1
France	0.0	0.0	0.0	0.0	0.0
Gabon	1.0	4.1	4.1	3.1	3.4
Gambia	20.4	29.0	29.0	27.8	30.1
Georgia	83.6	88.7	88.7	87.9	89.5
Ghana	0.0	0.0	0.0	0.0	0.0
Greece	34.3	45.1	45.1	39.0	50.3
Guinea	2.5	5.2	5.2	4.0	4.6
Guinea Bissau	28.8	31.6	31.6	30.6	32.1
Honduras	0.0	0.0	0.0	0.0	0.0
Iceland	0.2	11.6	11.6	8.0	12.7
India	0.1	0.0	0.0	0.0	0.0
Indonesia	0.0	0.0	0.0	0.0	0.0
Iran	64.6	61.3	61.3	62.1	57.6

Iraq	100.0	100.0	100.0	100.0	100.0
Ireland	0.0	0.0	0.0	0.0	0.0
Italy	0.0	0.0	0.0	0.0	0.0
Ivory Coast	0.0	0.0	0.0	0.0	0.0
Japan	0.0	0.0	0.0	0.0	0.0
Kazakhstan	10.6	20.2	20.2	18.5	25.2
Kyrgyzstan	0.0	0.0	0.0	0.0	0.0
Laos	33.1	0.3	0.3	2.1	2.2
Lesotho	0.0	0.0	0.0	0.0	0.0
Liberia	0.0	0.0	0.0	0.0	0.0
Libya	18.6	27.8	27.8	26.7	33.9
Macedonia	0.0	0.2	0.2	0.1	0.2
Madagascar	0.0	0.0	0.0	0.0	0.0
Maldives	0.0	0.0	0.0	0.0	0.0
Mali	0.0	0.0	0.0	0.0	0.0
Malta	0.0	0.0	0.0	0.0	0.0
Mauritania	0.1	0.1	0.1	0.1	0.2
Mexico	12.1	8.9	8.9	9.0	7.5
Moldova	0.0	0.0	0.0	0.0	0.0
Mongolia	6.3	3.6	3.6	4.3	2.9
Montenegro	0.0	18.4	18.4	0.0	21.9
Morocco	0.0	0.0	0.0	0.0	0.0
Mozambique	1.7	0.5	0.5	0.6	0.4
Myanmar	16.7	0.4	0.4	0.7	0.3
Namibia	10.4	2.6	2.6	3.3	1.7
Nepal	0.0	0.0	0.0	0.0	0.0
Nicaragua	0.0	0.0	0.0	0.0	0.0
Niger	0.0	0.1	0.1	0.1	0.1
Nigeria	5.6	12.0	12.0	10.4	14.6
North Korea	4.4	0.4	0.4	2.0	0.1
Norway	0.0	0.1	0.1	0.1	0.1
Oman	5.8	0.0	0.0	0.0	0.0
Pakistan	0.0	0.0	0.0	0.0	0.0
Palau	0.0	0.0	0.0	0.0	0.0
Philippines	0.0	0.0	0.0	0.0	0.0
Portugal	0.0	0.0	0.0	0.0	0.0
Republic of Congo	27.5	37.8	37.8	33.3	31.4
Republic of Serbia	0.1	6.5	6.5	1.1	7.2
Romania	0.0	38.8	38.8	28.4	39.3
Russia	4.6	7.3	7.3	7.0	8.5
Senegal	15.0	20.6	20.6	19.1	22.2
Sierra Leone	0.0	0.1	0.1	0.0	0.1
South Africa	17.3	12.5	12.5	14.0	11.8
South Korea	27.0	25.4	25.4	23.2	20.8
Spain	0.0	0.0	0.0	0.0	0.0
Sri Lanka	0.0	0.0	0.0	0.0	0.0
Sudan	37.5	52.3	52.3	46.7	51.9
Swaziland	0.0	0.0	0.0	0.0	0.0
Sweden	0.0	0.0	0.0	0.0	0.0

Syria	100.0	100.0	100.0	100.0	100.0
Taiwan	0.0	0.0	0.0	0.0	0.0
Tajikistan	0.0	0.0	0.0	0.0	0.0
Thailand	0.0	0.0	0.0	0.0	0.0
Togo	0.0	0.0	0.0	0.0	0.0
Tunisia	0.0	0.1	0.1	0.0	0.1
Turkey	72.3	95.7	95.7	94.0	98.4
Turkmenistan	74.7	82.3	82.3	82.2	80.2
Ukraine	12.9	18.5	18.5	19.2	23.7
United Arab Emirates	17.8	8.2	8.2	6.2	3.6
United Kingdom	0.0	0.0	0.0	0.0	0.0
United States of America	7.3	6.3	6.3	6.6	6.1
Uzbekistan	39.4	54.6	54.6	52.6	49.9
Vietnam	0.0	0.0	0.0	0.0	0.0
Yemen	100.0	100.0	100.0	100.0	100.0
Zambia	20.5	37.2	37.2	14.5	14.5
Zimbabwe	16.9	15.4	15.4	13.5	17.8
French Polynesia	0.0	0.0	0.0	0.0	0.0
French Southern and Antarctic Lands	56.3	83.9	83.9	12.6	100.0
Greenland					
Guernsey	0.0	0.0	0.0	0.0	0.0
Hong Kong S.A.R.					
Jersey	0.0	0.0	0.0	0.0	0.0
Macao S.A.R	0.0	0.0	0.0	0.0	0.0
Saint Helena	0.0	0.0	0.0	0.0	0.0
Saint Pierre and Miquelon	0.0	0.0	0.0	0.0	0.0
Siachen Glacier	0.0	0.0	0.0	0.0	0.0
Western Sahara	0.0	0.0	0.0	0.0	0.0

Table S2. Percentage distribution of suitable areas for *Pachycrepoideus vindemmiae* under different climate scenarios and two intervals (2021-2040 and 2041-2060), modeled using the Random Forest algorithm.

Countries or Territory	Baseline	Moderated scenario (SSP2-4.5)		Pessimistic scenario (SSP5-8.5)	
		2021-2040	2041-2060	2021-2040	2041-2060
Afghanistan	23.9	7.7	6.6	6.5	4.0
Albania	0.0	0.0	0.2	0.1	1.6
Algeria	0.0	0.0	0.0	0.0	0.0
Angola	0.4	0.1	0.1	0.0	0.0

Argentina	11.4	7.1	4.4	3.7	2.2
Australia	0.0	0.0	0.0	0.0	0.0
Azerbaijan	100.0	100.0	100.0	100.0	100.0
Bangladesh	6.6	2.9	1.7	2.1	0.5
Belarus	0.0	0.0	0.0	0.6	1.4
Benin	1.5	8.8	18.4	3.2	15.4
Bhutan	0.2	0.0	0.0	0.0	0.0
Bolivia	3.7	1.8	1.8	1.6	1.6
Botswana	10.8	8.1	7.3	7.1	5.1
Brazil	75.1	59.8	52.6	55.2	46.0
Bulgaria	0.0	0.0	0.0	0.0	4.2
Burkina Faso	0.0	0.0	0.0	0.0	0.0
Cameroon	99.3	99.9	98.6	99.1	96.9
Canada	13.8	14.4	13.2	12.6	9.0
Central African Republic	99.9	100.0	99.9	100.0	99.1
Chad	31.0	63.3	78.8	78.6	90.6
Chile	0.0	0.1	0.0	0.0	0.0
China	9.9	5.9	3.1	3.7	1.5
Democratic Re- public of the Congo	0.4	0.4	0.4	0.4	0.4
East Timor	0.0	0.0	0.0	0.0	0.0
Egypt	17.5	1.6	66.7	8.1	91.6
Equatorial Guinea	100.0	100.0	100.0	100.0	100.0
Fiji	9.5	13.8	14.6	14.9	11.3
Finland	0.0	0.0	0.0	0.0	0.0
France	0.0	0.0	0.0	0.0	0.0
Gabon	99.6	77.8	60.9	70.1	47.1
Gambia	39.7	83.2	93.1	91.5	98.9
Georgia	67.2	78.9	86.0	84.2	91.4
Ghana	0.0	7.2	2.4	0.0	0.2
Greece	0.1	0.1	0.1	0.1	0.2
Guinea	36.0	43.7	45.8	44.9	45.2
Guinea Bissau	74.3	99.0	100.0	100.0	100.0

Honduras	0.0	0.0	0.0	0.0	0.0
Iceland	0.0	0.0	0.0	0.4	1.9
India	2.4	0.4	0.2	0.3	0.1
Indonesia	0.0	0.0	0.0	0.0	0.0
Iran	90.6	78.1	75.4	77.1	71.8
Iraq	100.0	100.0	100.0	100.0	100.0
Ireland	0.0	0.0	0.0	0.0	0.0
Italy	0.0	0.0	0.0	0.0	0.0
Ivory Coast	0.2	0.3	0.3	0.3	0.2
Japan	12.8	9.6	19.2	20.8	5.0
Kazakhstan	43.6	51.6	49.5	46.2	39.9
Kyrgyzstan	8.9	0.4	0.0	0.0	0.0
Laos	0.0	0.0	0.0	0.0	0.0
Lesotho	0.0	0.0	0.0	0.0	0.0
Liberia	2.9	12.4	15.4	12.4	16.9
Libya	2.0	2.6	4.0	3.3	4.4
Macedonia	0.0	0.0	0.0	0.0	0.0
Madagascar	0.0	0.0	0.0	0.0	0.0
Maldives	0.0	0.0	0.0	0.0	0.0
Mali	0.0	0.0	0.0	0.0	0.2
Malta	0.0	0.0	0.0	0.0	0.0
Mauritania	2.0	5.7	8.1	6.2	9.9
Mexico	20.5	17.1	15.0	16.2	13.4
Moldova	95.9	100.0	100.0	100.0	100.0
Mongolia	18.3	15.7	13.8	14.9	11.50
Montenegro	0.0	0.0	0.0	0.0	0.0
Morocco	0.0	0.0	0.1	0.0	0.9
Mozambique	3.2	2.1	1.5	1.5	1.0
Myanmar	3.1	0.5	0.4	0.4	0.3
Namibia	5.6	2.5	2.1	2.2	1.8
Nepal	0.0	0.0	0.0	0.0	0.0
Nicaragua	0.0	0.0	0.0	0.0	0.0
Niger	2.9	12.6	17.0	11.7	20.5

Nigeria	77.1	88.8	90.4	85.5	90.0
North Korea	1.2	0.0	0.0	0.0	0.0
Norway	0.0	0.0	0.0	0.0	0.0
Oman	100.0	13.2	10.4	13.2	10.2
Pakistan	4.1	0.8	0.3	0.3	0.1
Palau	0.0	0.0	0.0	0.0	0.0
Philippines	0.4	0.0	48.9	0.0	0.0
Portugal	0.0	0.0	0.0	0.0	0.0
Republic of Congo	62.8	18.6	7.4	12.6	4.7
Republic of Serbia	0.0	0.0	0.2	0.0	3.3
Romania	0.0	0.0	0.0	4.2	28.5
Russia	12.7	20.7	22.8	16.0	17.3
Senegal	37.8	63.2	73.9	68.4	81.5
Sierra Leone	62.0	80.5	81.6	77.6	81.0
South Africa	19.8	16.3	14.8	16.0	13.7
South Korea	44.9	37.4	34.0	34.5	23.7
Spain	0.0	0.0	0.0	0.0	0.0
Sri Lanka	1.7	0.2	0.0	0.0	0.0
Sudan	79.7	98.6	100.0	100.0	100.0
Swaziland	0.0	0.0	0.0	0.0	0.0
Sweden	0.0	0.0	0.0	0.0	0.0
Syria	100.0	100.0	100.0	100.0	100.0
Taiwan	0.0	0.0	0.0	0.0	0.0
Tajikistan	0.0	0.0	0.0	0.0	0.0
Thailand	0.0	0.0	0.0	0.0	0.0
Togo	0.0	0.2	0.6	0.8	2.0
Tunisia	0.0	0.0	0.0	0.0	0.0
Turkey	81.9	91.1	92.0	90.4	89.8
Turkmenistan	85.0	80.6	80.1	79.9	75.6
Ukraine	14.6	37.7	40.0	31.5	42.2
United Arab Emirates	100.0	72.8	47.4	72.8	30.1
United Kingdom	0.0	0.0	0.0	0.0	0.0

United States of America	9.4	7.7	7.2	7.3	6.4
Uzbekistan	88.9	85.6	83.9	83.0	71.3
Vietnam	0.6	0.1	0.0	0.0	0.0
Yemen	100.0	100.0	94.0	96.6	84.3
Zambia	0.0	0.0	0.0	0.0	0.0
Zimbabwe	3.6	0.3	0.1	0.0	0.0
French Polynesia	100.0	0.0	0.0	0.0	0.0
French Southern and Antarctic Lands	20.0	0.0	0.0	0.0	0.0
Greenland	28.3	48.4	53.3	38.9	41.0
Guernsey	0.0	0.0	0.0	0.0	0.0
Hong Kong S.A.R.	0.0	0.0	0.0	0.0	0.0
Jersey	0.0	0.0	0.0	0.0	0.0
Macao S.A.R	0.0	0.0	0.0	0.0	0.0
Saint Helena	0.0	0.0	0.0	0.0	0.0
Saint Pierre and Miquelon	0.0	0.0	0.0	0.0	0.0
Siachen Glacier	0.0	0.0	0.0	0.0	0.0
Western Sahara	0.0	0.0	0.6	0.1	1.9

Table S3. Percentage distribution of suitable areas for *Trichopria drosophilae* under different climate scenarios and two intervals (2021-2040 and 2041-2060), modeled using the Random Forest algorithm.

Countries or Territory	Baseline	Moderated scenario (SSP2-4.5)		Pessimistic scenario (SSP5-8.5)	
		2021-2040	2041-2060	2021-2040	2041-2060
Afghanistan	8.4	5.6	5.2	5.4	4.9
Albania	0.0	0.0	0.1	0.0	0.2
Algeria	0.0	0.0	0.0	0.0	0.0
Angola	63.7	63.3	62.7	62.5	59.8
Argentina	67.9	68.1	67.4	73.6	65.4
Australia	0.0	0.0	0.0	0.0	0.0
Azerbaijan	99.8	100.0	100.0	100.0	100.0
Bangladesh	0.8	0.2	0.1	0.2	0.0
Belarus	0.0	0.5	9.7	4.8	28.8

Benin	0.1	0.1	0.0	0.0	0.1
Bhutan	0.3	0.2	0.1	0.2	0.0
Bolivia	45.5	27.0	22.3	28.4	19.4
Botswana	47.8	43.3	40.7	42.2	37.0
Brazil	96.7	89.3	85.3	88.4	81.9
Bulgaria	0.0	0.6	0.2	0.0	0.6
Burkina Faso	0.0	0.0	0.0	0.0	0.0
Cameroon	69.1	79.3	79.5	78.3	82.9
Canada	19.1	18.6	18.1	18.5	17.3
Central African Republic	85.9	96.8	95.0	93.7	92.8
Chad	57.1	82.4	86.2	81.5	87.4
Chile	0.0	0.0	0.0	0.0	0.0
China	11.6	6.7	5.0	6.1	4.1
Democratic Re- public of the Congo	36.7	1.7	1.7	1.7	1.7
East Timor	0.0	0.0	0.0	0.0	0.0
Egypt	100.0	100.0	100.0	100.0	100.0
Equatorial Guinea	24.3	63.7	66.1	41.3	33.9
Fiji	35.2	35.5	34.4	34.9	33.5
Finland	0.0	0.0	0.0	0.0	0.0
France	0.0	0.0	0.0	0.0	0.0
Gabon	90.8	74.0	73.6	74.3	48.8
Gambia	44.6	48.0	49.2	48.2	48.7
Georgia	86.1	90.8	91.1	91.2	92.2
Ghana	0.0	0.0	0.0	0.0	0.0
Greece	19.1	24.3	25.1	23.5	28.3
Guinea	46.9	48.9	48.7	48.2	47.9
Guinea Bissau	0.0	0.0	0.0	0.0	0.0
Honduras	0.0	0.0	0.0	0.0	0.0
Iceland	0.0	0.2	3.2	0.2	3.8
India	0.3	0.0	0.0	0.0	0.0
Indonesia	0.0	0.0	0.0	0.0	0.0
Iran	68.6	62.4	57.8	61.6	51.4

Iraq	100.0	100.0	100.0	100.0	100.0
Ireland					
Italy	0.0	0.0	0.0	0.0	0.0
Ivory Coast	0.0	0.0	0.0	0.0	0.0
Japan	0.0	0.0	0.0	0.0	0.0
Kazakhstan	17.6	26.5	27.0	25.1	26.9
Kyrgyzstan	1.5	0.8	0.6	0.7	0.5
Laos	100.0	100.0	100.0	100.0	100.0
Lesotho	0.0	0.0	0.0	0.0	0.0
Liberia	0.0	0.0	0.0	0.0	0.0
Libya	35.7	41.8	42.3	42.3	44.7
Macedonia	0.0	0.0	0.0	0.0	0.0
Madagascar	0.0	0.0	0.0	0.0	0.0
Maldives	0.0	0.0	0.0	0.0	0.0
Mali	0.0	0.0	0.0	0.0	0.0
Malta	0.0	0.0	0.0	0.0	0.0
Mauritania	0.7	1.5	2.0	1.0	1.9
Mexico	32.1	25.6	22.8	25.0	20.8
Moldova	0.0	100.0	100.0	100.0	100.0
Mongolia	87.0	25.4	18.8	20.9	18.1
Montenegro	0.0	0.0	0.0	0.0	0.0
Morocco	0.0	0.0	0.0	0.0	0.0
Mozambique	40.3	22.6	19.9	22.7	19.0
Myanmar	53.7	42.8	36.2	41.4	30.6
Namibia	56.5	52.1	51.6	51.6	47.9
Nepal	0.0	0.0	0.0	0.0	0.0
Nicaragua	0.0	0.0	0.0	0.0	0.0
Niger	0.1	9.2	11.1	5.9	14.9
Nigeria	20.9	30.1	31.7	28.2	34.5
North Korea	10.9	8.8	8.3	8.8	7.2
Norway	0.0	0.0	0.0	0.0	0.0
Oman	10.3	10.2	10.2	10.2	10.1
Pakistan	0.0	0.0	0.0	0.0	0.0

Palau	0.0	0.0	0.0	0.0	0.0
Philippines	0.0	0.0	0.0	0.0	0.0
Portugal	0.0	0.0	0.0	0.0	0.0
Republic of Congo	92.4	30.2	26.4	30.0	16.9
Republic of Serbia	0.0	0.0	1.2	0.0	1.8
Romania	0.0	2.5	2.5	0.0	2.5
Russia	5.7	7.2	7.1	.74.	8.5
Senegal	37.2	43.6	46.2	42.6	46.3
Sierra Leone	16.7	14.6	12.2	13.8	9.5
South Africa	26.7	23.2	21.0	22.9	19.6
South Korea	88.6	81.2	71.3	79.9	60.9
Spain	0.0	0.0	0.0	0.0	0.0
Sri Lanka	0.0	0.0	0.0	0.0	0.0
Sudan	99.8	100.0	100.0	100.0	100.0
Swaziland	0.0	0.0	0.0	0.0	0.0
Sweden	0.0	0.0	0.0	0.0	0.0
Syria	100.0	100.0	100.0	100.0	100.0
Taiwan	0.0	0.0	0.0	0.0	0.0
Tajikistan	0.6	0.4	0.3	0.4	0.3
Thailand	75.9	63.6	47.6	61.7	56.1
Togo	0.0	0.0	0.0	0.0	0.0
Tunisia	0.0	0.0	0.0	0.0	0.0
Turkey	93.2	95.3	95.2	95.7	96.7
Turkmenistan	90.5	85.2	79.3	82.1	74.7
Ukraine	10.5	15.5	20.0	17.3	25.0
United Arab Emirates	58.4	36.1	34.0	35.6	29.2
United Kingdom	0.0	0.0	0.0	0.0	0.0
United States of America	14.4	12.9	12.4	12.7	11.9
Uzbekistan	52.3	39.6	35.4	35.8	30.2
Vietnam	98.5	98.1	97.7	98.2	97.6
Yemen	100.0	100.0	100.0	100.0	100.0

Zambia	32.4	45.2	45.2	45.2	45.2
Zimbabwe	56.3	51.2	51.6	49.8	50.2
French Polynesia	0.0	0.0	0.0	0.0	0.0
French Southern and Antarctic Lands	49.6	0.0	0.0	0.0	0.0
Greenland	7.4	15.1	16.2	15.4	19.3
Guernsey					
Hong Kong S.A.R.	0.0	0.0	0.0	0.0	0.0
Jersey	0.0	0.0	0.0	0.0	0.0
Macao S.A.R	0.0	0.0	0.0	0.0	0.0
Saint Helena	0.0	0.0	0.0	0.0	0.0
Saint Pierre and Miquelon	0.0	0.0	0.0	0.0	4.5
Siachen Glacier	0.0	0.0	0.0	0.0	0.0
Western Sahara	0.0	0.0	0.0	0.0	0.0