

**Table S1.** Climatic and edaphic patterns of target species.

| ID  | Species                                        | General characteristics of the populations                                                                                                                                                                                                                                                                           |
|-----|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AR  | <i>P. arizonica</i>                            | The populations of the species are along the Sierra Madre Occidental, exist at altitudes ranging from 2,000–2,800 m and receive between 500–650 mm of annual precipitation. The species grows well on deep, well-drained soils in moderately dry to mesic forest with light winter frost occurring [32,33].          |
| ARc | <i>P. arizonica</i> var. <i>cooperi</i>        | The populations of the species are in the state of Durango, but scattered northward in the Sierra Madre Occidental into Chihuahua and Sonora. This species exists at altitudes ranging from 2,400–2,800 m and receive between 500–600 mm of annual precipitation [32,33].                                            |
| AYa | <i>P. ayacahuite</i> var. <i>ayacahuite</i>    | These trees occur in the mountains of southern Mexico to Guatemala in all kinds of sites and grow at altitudes ranging from 2,000–3,200 m. This species harbors on well-drained, moist, loamy soils [33].                                                                                                            |
| AYv | <i>P. ayacahuite</i> var. <i>veitchii</i>      | The species is distributed in the Central Mexico. It is found at altitudes ranging from 2,000–3,000 m and grows well on moist, shady, cool sites [33].                                                                                                                                                               |
| CEb | <i>P. cembroides</i> subsp. <i>bicolor</i>     | The population of the species occur along the US-Mexico border. They exist at altitudes from 1,500–2,400 m where the rainfall ranges from 300–500 mm annually [33].                                                                                                                                                  |
| CEc | <i>P. cembroides</i> subsp. <i>cembroides</i>  | This species occurs in the Sierras Madre Occidental and Oriental. Their populations grow in the altitudinal range from 1,500–2,800 m, with annual precipitation varying from 380–650 mm, and exist in a transition zone between (semi-)desert plateau and valleys and more mesic coniferous montane forests [32,33]. |
| CEl | <i>P. cembroides</i> subsp. <i>lagunae</i>     | This species is found in Baja California Sur in the Sierra de la Laguna, exists at elevations from 1,200–2,000 m, and receive between 500–600 mm of annual precipitation. Trees grow on semi-arid slopes [32,33].                                                                                                    |
| CEo | <i>P. cembroides</i> subsp. <i>orizabensis</i> | The populations of the species are found in the Orizaba (Veracruz), Tlaxcala, and Puebla states. They exist at altitudes from 2,300–2,600 m, where the climate is rather cool and humid, on the rocky mountains [33].                                                                                                |
| CH  | <i>P. chiapensis</i>                           | This species is found in the eastern and southern of Mexico. Trees grow at elevations from 500 to 2,250 m, on soils well-drained sandy clays, and rainfall ranges from 1,500 to 3,000 mm annually [33].                                                                                                              |
| DE  | <i>P. devoniana</i>                            | The populations of the species from central Mexico to central Guatemala in warm-temperature zones. The trees grow on soils of volcanic origin with annual precipitation 1,000–1,500 mm. Its altitude range is 1,500–2,500 m [32,33].                                                                                 |

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| DO | <i>P. douglasiana</i>    | These trees occur in the mountains of Mexico's Great Cross Range and grow at altitudes ranging from 1,500–2,500 m, with annual rainfall averaging about 1,000 mm. This species harbors in warm to temperate climatic zones on well-drained [32,33].                                                                                                                                                    |
| DU | <i>P. durangensis</i>    | The species is distributed in the northwestern ranges of the Sierra Madre Occidental, where the climate is warm-temperate but with cold spells during the short winter at the higher elevations. It is found at altitudes ranging from 2,000–2,500 m, grows on shallow, rocky soils, and receives about 600 mm of annual precipitation [32,33].                                                        |
| EN | <i>P. engelmannii</i>    | This species occurs in the northwestern Sierra Madre Occidental. Their populations grow in the altitudinal range from 2,000–2,500 m, with annual precipitation varying from 400–500 mm, and exist on drier slopes and ridges. The climate is temperate, and above 2000 m frost and snow are common in winter [32,33].                                                                                  |
| HA | <i>P. hartwegii</i>      | The populations of the species are found in the mountains with a height of about 2,800 m, where the climate is rather cold, with heavy frost and snow during several months and often high winds. The species grows on soils from volcanic and granitic rock of various depths but is often poor in nutrients [32,33].                                                                                 |
| JE | <i>P. jeffreyi</i>       | This species is found in Baja California Norte. Trees grow at elevations from 1,500–3,000 m, on thin soil or even in crevices of bare granite rock, and rainfall ranges from 300–500 mm annually [32,33].                                                                                                                                                                                              |
| LA | <i>P. lawsonii</i>       | The populations of the species occur in the east-west Volcanic Axis and southward of the Sierra Madre del Sur. The trees grow on mountains with annual precipitation of 600–1,500 mm. Its altitude range is 1,300–2,500 m [33].                                                                                                                                                                        |
| LE | <i>P. leiophylla</i>     | The species harbors the mountains from northwestern Mexico, southward along the Sierra Madre Occidental, the Eje Neovolcánico Transversal, and in the Sierra Madre del Sur. The species grows at altitudes ranging from 2,200–2,800 m, with annual rainfall ranging from 700–1,950 mm, and harbors on deep, well-drained soils derived from various, but usually volcanic or metamorphic rock [32,33]. |
| MM | <i>P. maximartinezii</i> | The species is found in a few spots in Durango and Zacatecas states, at altitudes ranging from 1,900–2,200 m, grows on rocky and shallow soils, and receives about 700–800 mm annually [32,33].                                                                                                                                                                                                        |
| MA | <i>P. maximinoi</i>      | This species occurs in a wide distribution in Mexico and grows in the altitudinal range from 600–2,400, with annual precipitation varying from 800–1,500 m. Their populations exist on a variety of soils under various climatic conditions [32,33].                                                                                                                                                   |

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|----|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MO | <i>P. montezumae</i>   | The populations of the species are found in the mountains of the Great Cross Range of Mexico and extend northward along the Sierra Madre Oriental. These occur at altitudes from 2,000–3,200 m, where the climate is warm-temperate to cold-temperate, and the rainfall ranging 800–1,000 mm. The species grows on dry to arid sites [33]. |
| QU | <i>P. quadrifolia</i>  | This species is found in Baja California Norte. Trees grow at elevations from 1,200–2,500 m, on semi-desert and chaparral scrub zones, where the rainfall ranges from 500–600 mm annually [32,33].                                                                                                                                         |
| ST | <i>P. strobiformis</i> | The populations of the species harbor along the Sierra Madre Occidental, exist at altitudes ranging from 2,000–3,500 m. The species grows on moist and cool sites with deep, humus-rich though often rocky soils [32,33].                                                                                                                  |
| TE | <i>P. teocote</i>      | These trees occur in a very broad range in Mexico and grow at elevations of 1,000–1,300 m, with annual rainfall ranging from 600–900 mm and an average annual temperature from 23–26 °C. The trees state on relatively dry sites with shallow soils [32,33].                                                                               |

**Table S2.** Minimum requirements for genetic conservation units.

| Requirement     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Species         | <p>The species has been recognized as target tree species for conservation. There is one of the following conservation purposes for the unit:</p> <p>Purpose 1: maintain genetic diversity in large tree populations.</p> <p>Purpose 2: conserve specific adaptive or other traits in marginal or scattered tree populations.</p> <p>Purpose 3: conserve rare or endangered tree species with populations consisting of a small number of remaining individuals.</p>                                                                                                                                                      |
| Population size | <p>This requirement depends on the conservation objective. The number of trees is verified based on NFLI data:</p> <p>Objective 1: If the unit is to maintain genetic diversity of species, the conservation unit must consists of 500 or more reproducing trees.</p> <p>Objective 2: If the unit is to conserve specific adaptive or other traits in marginal or scattered tree populations, the unit must harbor a minimum of 50 reproducing trees.</p> <p>Objective 3: If the unit is to conserve remaining populations of rare or endangered species, it must harbor a minimum of 15 unrelated reproducing trees.</p> |
| Management      | <p>Forest management is applied for target species within the unit for:</p> <p>Purpose 1: ensure the continued existence of tree populations.</p> <p>Purpose 2: provide favorable conditions for growth and natural regeneration.</p>                                                                                                                                                                                                                                                                                                                                                                                     |
| Monitoring      | <p>Regeneration success is assessed every five or ten years, and to update the management plan.</p> <p>Monitoring the units to evaluate their objective status.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

**Table S3.** Previous genetic studies or provenance or progeny trials reviewed.

| Species | Molecular              | Provenance | Progeny |
|---------|------------------------|------------|---------|
| AR      | [17,22,38–41]          | –          | –       |
| AY      | [21,23,42–48]          | [49]       | [49,50] |
| CE      | [24,25,39,44,51–54]    | [55–57]    | –       |
| CH      | [42,43,48,58,59]       | [12]       | –       |
| DE      | [44]                   | [60]       | –       |
| DO      | [26,61]                | –          | –       |
| DU      | [22,39–41,54]          | –          | –       |
| EN      | [27,39,41,62]          | [63]       | –       |
| HA      | [28,41,64–69]          | [70–72]    | –       |
| LE      | [39,44,29]             | [60,73–75] | [51]    |
| MA      | [61]                   | [77–82]    | [81]    |
| MO      | [44,26,83–86]          | [72]       | –       |
| ST      | [42,45,46,48,21,87,88] | –          | –       |
| TE      | [44,54]                | [12,81,89] | [81,89] |

<sup>1</sup> AR: *Pinus arizonica* and *P. arizonica* var. *cooperi*, AY: *P. ayacahuite* vars. *ayacahuite* and *veitchii*, CE: *P. cembroides* subsps. *bicolor*, *cembroides*, *lagunae* and *orizabensis*, CH: *P. chiapensis*, DE: *P. devoniana*, DO: *P. douglasiana*, DU: *P. durangensis*, EN: *P. engelmannii*, HA: *P. hartwegii*, LE: *P. leiophylla*, MA: *P. maximinoi*, MO: *P. montezumae*, ST: *P. strobiformis*, and TE: *P. teocote*.

**Table S4.** Proposed conservation units for the target species.

| Genetic zone                                          | Propose | Protected area                   | Locality/State                                      |
|-------------------------------------------------------|---------|----------------------------------|-----------------------------------------------------|
| <i>P. arizonica</i>                                   |         |                                  |                                                     |
| III.1                                                 | C1.2    | –                                | El Bajío del Sol, Ejido El Largo Maderal, Chihuahua |
| III.1                                                 | C1.1    | Tutuaca                          | Bajío del Cochi, Teomohachi, Chihuahua              |
| III.2                                                 | C1.2    | –                                | Última Agua, Balleza, Chihuahua                     |
| III.3                                                 | C1.2    | –                                | El Girón, Tepehuanes, Durango                       |
| III.4                                                 | C3.2    | C.A.D.N.R. 043 Estado de Nayarit | Valparaíso, Zacatecas                               |
| V.1                                                   | C3.1    | C.A.D.N.R. 004 Don Martín        | Múzquiz, Coahuila                                   |
| V.3                                                   | C3.2    | –                                | Aramberri, Nuevo León                               |
| <i>P. arizonica</i> var. <i>cooperi</i>               |         |                                  |                                                     |
| III.2                                                 | C3.2    | –                                | Guadalupe y Calvo, Chihuahua                        |
| III.3                                                 | C1.1    | C.A.D.N.R. 043 Estado de Nayarit | El Rosillo, Pueblo Nuevo, Durango                   |
| III.3                                                 | C3.1    | C.A.D.N.R. 043 Estado de Nayarit | Mezquital, Durango                                  |
| III.4                                                 | C3.2    | –                                | San Dimas                                           |
| <i>P. ayacahuite</i> var. <i>ayacahuite</i>           |         |                                  |                                                     |
| XII.3                                                 | C3.2    | El Chico                         | Mineral El Chico, Hidalgo                           |
| XII.4                                                 | C3.2    | –                                | Zimatlán de Alvarez                                 |
| XII.5                                                 | C2.2    | –                                | San Rafael, Estado de México                        |
| <i>P. ayacahuite</i> var. <i>veitchii</i>             |         |                                  |                                                     |
| X.3                                                   | C2.2    | –                                | Ajuchitlán del Progreso, Guerrero                   |
| X.3                                                   | C2.2    | –                                | Ixtlán, Oaxaca                                      |
| <i>P. cembroides</i> subsp. <i>bicolor/cembroides</i> |         |                                  |                                                     |
| III.1                                                 | C1.1    | Papigochic                       | Mesa Azul, Bilaguchi, Guerrero, Chihuahua           |
| III.1                                                 | C3.1    | Janos                            | Janos, Chihuahua                                    |
| III.2                                                 | C1.2    | –                                | Guanaceví, Durango                                  |
| III.2                                                 | C1.2    | –                                | Balleza, Chihuahua                                  |
| III.3                                                 | C1.1    | C.A.D.N.R. 043 Estado de Nayarit | El Divisadero, Durango                              |
| III.3                                                 | C1.2    | –                                | Santiago Papasquiaro, Durango                       |
| III.4                                                 | C1.2    | –                                | San Antonio de la Huertas, Zacatecas                |
| III.4                                                 | C3.1    | C.A.D.N.R. 043 Estado de Nayarit | Valparaíso, Zacatecas                               |
| III.4                                                 | C3.1    | C.A.D.N.R. 043 Estado de Nayarit | Villanueva, Zacatecas                               |
| V.1                                                   | C3.1    | C.A.D.N.R. 004 Don Martín        | Bledos, Villa de Reyes, San Luis Potosí             |
| V.1                                                   | C3.1    | Maderas del Carmen               | Tierra Blanca, Guanajuato                           |
| V.2                                                   | C1.2    | –                                | Ocampo, Coahuila                                    |
| V.3                                                   | C1.1    | C.A.D.N.R. 026 Bajo Río San Juan | Galeana, Nuevo León                                 |
| V.3                                                   | C3.2    | –                                | General Zaragoza, Nuevo León                        |
| IX.2                                                  | C1.2    | –                                | Bledos, Villa de Reyes, San Luis Potosí             |
| <i>P. cembroides</i> subsp. <i>bicolor</i>            |         |                                  |                                                     |
| I.1                                                   | C3.2    | –                                | Tecate, Baja California                             |
| IV.1                                                  | C3.1    | Janos                            | Janos, Chihuahua                                    |
| <i>P. cembroides</i> subsp. <i>cembroides</i>         |         |                                  |                                                     |
| V.3                                                   | C1.1    | Los Mármoles                     | Zimapán, Hidalgo                                    |
| IX.2                                                  | C1.2    | –                                | Tierra Blanca, Guanajuato                           |

|                                                |      |                                  |                                           |
|------------------------------------------------|------|----------------------------------|-------------------------------------------|
| X.3                                            | C3.2 | –                                | El Carmen Tequexquitla, Tlaxcala          |
| <i>P. cembroides</i> subsp. <i>lagunae</i>     |      |                                  |                                           |
| I.2                                            | C2.1 | Sierra La Laguna                 | Vereda a la Palma, Baja California Sur    |
| <i>P. cembroides</i> subsp. <i>orizabensis</i> |      |                                  |                                           |
| X.3                                            | C2.2 | –                                | Ajalpan, Puebla                           |
| <i>P. chiapensis</i>                           |      |                                  |                                           |
| XII.5                                          | C2.2 | –                                | Talea de Castro, Oaxaca                   |
| <i>P. devoniana</i>                            |      |                                  |                                           |
| III.4                                          | C3.2 | –                                | Pueblo Nuevo, Durango                     |
| III.4                                          | C3.1 | C.A.D.N.R. 043 Estado de Nayarit | La Yesca, Nayarit                         |
| IX.2                                           | C3.1 | Sierra Gorda de Guanajuato       | San Luis de la Paz, Guanajuato            |
| X.1                                            | C3.1 | La Primavera                     | Tlajomulco de Zuñiga, Jalisco             |
| X.1                                            | C3.2 | –                                | Tapalpa, Jalisco                          |
| X.2                                            | C2.2 | –                                | Nuevo San Juan Parangaricutiro, Michoacán |
| X.3                                            | C2.2 | –                                | Huasca de Ocampo, Hidalgo                 |
| X.3                                            | C3.1 | Mariposa Monarca                 | Senguio, Michoacán                        |
| XII.1                                          | C3.1 | C.A.D.N.R. 043 Estado de Nayarit | Cuautla, Jalisco                          |
| XII.2                                          | C3.2 | –                                | Tecalitlan, Jalisco                       |
| XII.3                                          | C2.2 | –                                | Chilpancingo de los Bravo, Guerrero       |
| XII.4                                          | C3.2 | –                                | San Juan Quiahije, Oaxaca                 |
| XII.5                                          | C3.2 | –                                | Santa Maria Quiegolani, Oaxaca            |
| XIV.1                                          | C3.1 | Lagunas de Montebello            | La Trinitaria, Chiapas                    |
| <i>P. douglasiana</i>                          |      |                                  |                                           |
| III.1                                          | C3.1 | Tutuaca                          | Temosachi, Chihuahua                      |
| III.2                                          | C3.2 | –                                | Guazapares, Chihuahua                     |
| III.3                                          | C3.1 | C.A.D.N.R. 043 Estado de Nayarit | Súchil, Durango                           |
| III.4                                          | C1.2 | –                                | El Carrizo, Concordia, Sinaloa            |
| III.4                                          | C1.2 | –                                | Huajicori, Nayarit                        |
| III.4                                          | C3.1 | C.A.D.N.R. 043 Estado de Nayarit | La Yesca, Nayarit                         |
| X.1                                            | C1.1 | Sierra de Quila                  | Sierra de Quila, Tecolotlán, Jalisco      |
| X.1                                            | C1.2 | –                                | Tapalpa, Michoacán                        |
| XII.1                                          | C3.1 | Sierra de Manantlán              | Cuautitlán de García Barragán, Jalisco    |
| XII.2                                          | C3.2 | –                                | Tecalitlán, Jalisco                       |
| XII.3                                          | C3.2 | –                                | Chilpancingo de los Bravo, Guerrero       |
| XII.5                                          | C3.2 | –                                | San Juan Quiotepec, Oaxaca                |
| XV.1                                           | C3.2 | –                                | San Miguel Chimalapa, Oaxaca              |
| <i>P. durangensis</i>                          |      |                                  |                                           |
| III.1                                          | C1.1 | Tutuaca                          | Cordón del 45, Teomohachi, Chihuahua      |
| III.1                                          | C1.2 | –                                | La Piedrera, Chihuahua                    |
| III.2                                          | C1.2 | –                                | Mesa de Carrera, Ocampo, Chihuahua        |
| III.2                                          | C1.2 | –                                | Panteón, Guachochi, Chihuahua             |
| III.3                                          | C1.1 | Cerro Mohinora                   | Guadalupe y Calvo, Chihuahua              |
| III.3                                          | C1.2 | –                                | La Joyita, Santiago Papasquiaro, Durango  |
| III.4                                          | C1.1 | C.A.D.N.R. 043 Estado de Nayarit | El Oso, Pueblo Nuevo, Durango             |
| III.4                                          | C3.1 | C.A.D.N.R. 043 Estado de Nayarit | Mezquitic, Jalisco                        |

|                       |      |                                  |                                                   |
|-----------------------|------|----------------------------------|---------------------------------------------------|
| X.1                   | C3.2 | –                                | Gómez Farías, Jalisco                             |
| <i>P. engelmannii</i> |      |                                  |                                                   |
| III.1                 | C1.2 | –                                | El Largo Maderal, Chihuahua                       |
| III.1                 | C1.1 | Papigochic                       | Zarupa, Chihuahua                                 |
| III.2                 | C1.2 | –                                | Guachochi, Chihuahua                              |
| III.3                 | C1.1 | C.A.D.N.R. 043 Estado de Nayarit | Pueblo Nuevo, Durango                             |
| III.3                 | C1.2 | –                                | Santiago Papasquiaro, Durango                     |
| III.3                 | C1.1 | Cerro Mohinora                   | Balleza – Chihuahua, Chihuahua                    |
| III.4                 | C3.1 | C.A.D.N.R. 043 Estado de Nayarit | Valparaíso, Zacatecas                             |
| III.4                 | C3.2 | –                                | La Yesca, Nayarit                                 |
| V.1                   | C3.1 | C.A.D.N.R. 004 Don Martín        | Zaragoza, Coahuila                                |
| X.1                   | C3.1 | Sierra de Quila                  | Tecolotlán, Jalisco                               |
| XII.4                 | C3.2 | –                                | Santa María Lachixío, Oaxaca                      |
| <i>P. hartwegii</i>   |      |                                  |                                                   |
| V.3                   | C2.1 | C.A.D.N.R. 026 Bajo Río San Juan | Sierra de la Marta, Arteaga, Coahuila             |
| V.3                   | C2.2 | –                                | Peña Nevada, Zaragoza/Dr. Arroyo, Nuevo León      |
| X.2                   | C2.1 | Pico de Tancítaro                | Parque Nacional Pico de Tancítaro, Michoacán      |
| X.3                   | C2.1 | Nevado de Toluca                 | Volcán Nevado de Toluca, Toluca, Estado de México |
| X.3                   | C2.1 | Pico de Orizaba                  | Pico de Orizaba, Veracruz                         |
| XII.3                 | C3.2 | –                                | Coyuca de Benitez, Guerrero                       |
| XII.4                 | C3.2 | –                                | Zimatlán de Alvarez, Oaxaca                       |
| XII.5                 | C2.2 | –                                | Llano Grande, Amatlán, Oaxaca                     |
| <i>P. jeffreyi</i>    |      |                                  |                                                   |
| I.1                   | C3.2 | –                                | Ensenada, Baja California                         |
| I.1                   | C3.1 | Sierra de San Pedro Mártir       | Ensenada, Baja California                         |
| <i>P. lawsonii</i>    |      |                                  |                                                   |
| X.2                   | C2.2 | –                                | Erongarícuaro, Michoacán                          |
| X.3                   | C3.2 | –                                | Valle de Bravo, Estado de México                  |
| XII.1                 | C3.2 | –                                | Mascota, Jalisco                                  |
| XII.2                 | C3.2 | –                                | Coyuca de Catalan, Guerrero                       |
| XII.3                 | C3.2 | –                                | San Martín Peras, Oaxaca                          |
| XII.4                 | C3.2 | –                                | Zimatlán de Álvarez, Oaxaca                       |
| XII.5                 | C3.2 | –                                | San Andrés Solaga, Oaxaca                         |
| <i>P. leiophylla</i>  |      |                                  |                                                   |
| III.1                 | C1.2 | –                                | Santiago Papasquiaro, Durango                     |
| III.1                 | C1.1 | Janos                            | Sierra de San Luis, Janos, Chihuahua              |
| III.2                 | C1.2 | –                                | Guachochi, Chihuahua                              |
| III.2                 | C1.1 | Cascada de Bassaseachic          | Camino a Basaseachic, Chihuahua                   |
| III.2                 | C1.2 | –                                | San Juanito, Bocoyna, Chihuahua                   |
| III.3                 | C1.2 | –                                | Santiago Papasquiaro-Topia, Durango               |
| III.3                 | C1.2 | –                                | Puente de Mimbres, Durango                        |
| III.3                 | C1.1 | C.A.D.N.R. 043 Estado de Nayarit | Paraje la Flor, Durango                           |
| III.4                 | C1.1 | C.A.D.N.R. 001 Pabellón          | Sierra Fría, Aguascalientes                       |
| III.4                 | C1.1 | C.A.D.N.R. 043 Estado de Nayarit | Camino a Mezquitic, Bolaños, Jalisco              |
| III.4                 | C1.1 | C.A.D.N.R. 043 Estado de Nayarit | San Manuel, Durango                               |

|                          |      |                                                                                |                                                    |
|--------------------------|------|--------------------------------------------------------------------------------|----------------------------------------------------|
| X.1                      | C1.2 | –                                                                              | Tapalpa, Atemajac de Brizuela, Jalisco             |
| X.2                      | C1.2 | –                                                                              | Nuevo Parangaricutiro, Michoacán                   |
| X.3                      | C1.2 | –                                                                              | El Maguey, Michoacán                               |
| X.3                      | C1.1 | Iztaccíhuatl-Popocatepetl                                                      | Tlamacas, Estado de México                         |
| X.3                      | C1.1 | La Montaña Malinche o Matlalcuéyatl                                            | La Malinche, Tlaxcala                              |
| XII.1                    | C3.2 | –                                                                              | Talpa de Allende, Jalisco                          |
| XII.3                    | C3.2 | –                                                                              | Ajuchitlán del Progreso, Guerrero                  |
| XII.4                    | C1.2 | –                                                                              | Yosoñama, Oaxaca                                   |
| XII.5                    | C1.2 | –                                                                              | Tlahuitoltepec, Oaxaca                             |
| <i>P. maximartinezii</i> |      |                                                                                |                                                    |
| XII.5                    | C3.2 | –                                                                              | Santa Catarina Ixttepeji, Oaxaca                   |
| <i>P. maximinoi</i>      |      |                                                                                |                                                    |
| III.3                    | C3.2 | –                                                                              | Canelas, Durango                                   |
| III.4                    | C3.2 | –                                                                              | Concordia, Sinaloa                                 |
| III.4                    | C3.1 | C.A.D.N.R. 043 Estado de Nayarit                                               | Mezquitic, Jalisco                                 |
| X.1                      | C3.2 | –                                                                              | San Gabriel, Jalisco                               |
| X.3                      | C3.2 | –                                                                              | Tlalpujahuá, Michoacán                             |
| XII.1                    | C2.2 | –                                                                              | Carretera hacia El Tuito, Cabo Corrientes, Jalisco |
| XII.2                    | C3.2 | –                                                                              | Tumbiscatío, Michoacán                             |
| XII.3                    | C2.2 | –                                                                              | Paraíso, Atoyac de Álvarez, Guerrero               |
| XII.4                    | C2.2 | –                                                                              | San Mateo Piñas, Oaxaca                            |
| XIV.1                    | C2.1 | Lagunas de Montebello                                                          | Lagunas de Monte Bello, La Trinitaria, Chiapas     |
| XIV.2                    | C3.2 | –                                                                              | Las Margaritas, Chiapas                            |
| XV.1                     | C2.2 | –                                                                              | Jiquilpan, Motozintla, Chiapas                     |
| <i>P. montezumae</i>     |      |                                                                                |                                                    |
| V.3                      | C3.1 | Sierra Gorda                                                                   | Pinal de Amoles, Querétaro                         |
| X.2                      | C2.2 | –                                                                              | Pantzingo, Michoacán                               |
| X.3                      | C2.1 | Z.P.F.T.C.C. de los ríos Valle de Bravo, Malacatepec, Tilostoc y Temascaltepec | Malacatepec, Estado de México                      |
| X.3                      | C2.1 | La Montaña Malinche o Matlalcuéyatl                                            | La Malinche, Tlaxcala                              |
| X.3                      | C2.1 | Corredor Biológico Chichinautzin                                               | Cuernavaca, Morelos                                |
| XII.1                    | C3.2 | –                                                                              | Mascota, Jalisco                                   |
| XII.3                    | C3.2 | –                                                                              | Leonardo Bravo, Guerrero                           |
| XII.4                    | C3.2 | –                                                                              | Villa Sola de Vega, Oaxaca                         |
| XII.5                    | C3.2 | –                                                                              | Santiago Laxopa, Oaxaca                            |
| XIV.1                    | C3.2 | –                                                                              | San Cristóbal de Las Casas, Chiapas                |
| <i>P. quadrifolia</i>    |      |                                                                                |                                                    |
| I.1                      | C2.2 | –                                                                              | Tecate, Baja California                            |
| I.1                      | C3.1 | Constitución de 1857                                                           | Ensenada, Baja California                          |
| <i>P. strobiformis</i>   |      |                                                                                |                                                    |
| III.1                    | C2.2 | –                                                                              | Mesa del Campanero, Sonora                         |
| III.1                    | C2.2 | –                                                                              | na                                                 |
| III.2                    | C1.1 | Cascada de Basaseachi                                                          | Basaseachi, Chihuahua                              |
| III.2                    | C1.2 | –                                                                              | El Velgel, Chihuahua                               |
| III.3                    | C1.2 | –                                                                              | Cebollitas, Canelas                                |

|                   |      |                                  |                                                                       |
|-------------------|------|----------------------------------|-----------------------------------------------------------------------|
| III.3             | C1.1 | C.A.D.N.R. 043 Estado de Nayarit | Santa María Magdalena de Taxic-<br>ringa, Arroyo del Chino, Mezquital |
| III.4             | C2.2 | –                                | km 185, Pueblo Nuevo, Carr. 40, Du-<br>rango                          |
| V.3               | C2.1 | C.A.D.N.R. 026 Bajo Río San Juan | Los Lirios, Coahuila                                                  |
| XII.1             | C2.2 | –                                | El Cuale, Jalisco                                                     |
| <i>P. teocote</i> |      |                                  |                                                                       |
| III.2             | C3.2 | –                                | Guachochi, Chihuahua                                                  |
| III.3             | C1.2 | –                                | Alto de Penitentes, Santiago Papas-<br>quiaro, Durango                |
| III.3             | C1.1 | C.A.D.N.R. 043 Estado de Nayarit | Los Ejes, Durango                                                     |
| III.4             | C1.2 | –                                | El Salto, Durango                                                     |
| III.4             | C3.1 | C.A.D.N.R. 043 Estado de Nayarit | Valparaíso, Zacatecas                                                 |
| V.3               | C1.2 | –                                | Zacualtipán, Hidalgo                                                  |
| V.3               | C3.1 | Cumbres de Monterrey             | Santiago, Nuevo León                                                  |
| IX.2              | C3.1 | Sierra Gorda de Guanajuato       | San Luis de la Paz, Guanajuato                                        |
| X.2               | C3.2 | –                                | Charapan, Michoacán                                                   |
| X.3               | C1.1 | Mariposa Monarca                 | San José Allende, Estado de México                                    |
| X.3               | C3.2 | –                                | Mixquiapan, Veracruz                                                  |
| XII.3             | C3.2 | –                                | Leonardo Bravo, Guerrero                                              |
| XII.4             | C3.2 | –                                | Santa María del Rosario, Oaxaca                                       |
| XII.5             | C3.2 | –                                | San Carlos Yautepec, Oaxaca                                           |
| XIV.1             | C3.2 | –                                | Comitán de Domínguez                                                  |
| XV.1              | C3.1 | La Sepultura                     | Villa Corzo, Chiapas                                                  |

**Table S5.** Inventoried trees by genetic zone and species.

| Genetic zone | Trees National Forest Inventory (ni) |      |     |       |    |      |      |       |      |      |     |      |       |    |      |      |     |      |       |
|--------------|--------------------------------------|------|-----|-------|----|------|------|-------|------|------|-----|------|-------|----|------|------|-----|------|-------|
|              | AR <sup>1</sup>                      | ARc  | AY  | CE    | CH | DE   | DO   | DU    | EN   | HA   | JE  | LA   | LE    | MM | MA   | MO   | QU  | ST   | TE    |
| I.1          | -                                    | -    | -   | 25    | -  | -    | -    | -     | -    | -    | 171 | -    | -     | -  | -    | -    | 410 | -    | -     |
| I.2          | -                                    | -    | -   | 25    | -  | -    | -    | -     | -    | -    | -   | -    | -     | -  | -    | -    | -   | -    | -     |
| III.1        | 2455                                 | -    | -   | 5790  | -  | -    | 32   | 7010  | 1809 | -    | -   | -    | 1996  | -  | -    | -    | -   | 1087 | 13    |
| III.2        | 8137                                 | 28   | -   | 3307  | 3  | 6    | 439  | 9393  | 2226 | -    | -   | -    | 2678  | -  | 3    | -    | -   | 2557 | 217   |
| III.3        | 2495                                 | 1963 | -   | 2536  | 2  | 4    | 152  | 7701  | 1911 | -    | -   | -    | 5081  | -  | 84   | -    | 1   | 2373 | 6360  |
| III.4        | 78                                   | 128  | -   | 1458  | -  | 239  | 683  | 1247  | 793  | -    | -   | -    | 444   | 2  | 133  | -    | -   | 73   | 591   |
| IV.1         | -                                    | -    | -   | 51    | -  | -    | -    | 5     | -    | -    | -   | -    | -     | -  | -    | -    | -   | -    | -     |
| V.1          | 101                                  | -    | -   | 176   | -  | -    | -    | -     | 60   | -    | -   | -    | 1     | -  | -    | -    | 1   | -    | 1     |
| V.2          | 2                                    | -    | -   | 873   | -  | -    | -    | -     | -    | -    | -   | -    | -     | -  | -    | -    | -   | -    | -     |
| V.3          | 40                                   | -    | 9   | 3477  | 1  | 54   | -    | -     | 2    | 88   | -   | -    | -     | -  | -    | 99   | 1   | 20   | 685   |
| VIII.4       | -                                    | -    | -   | -     | -  | -    | -    | -     | -    | -    | -   | -    | -     | -  | -    | -    | -   | -    | 8     |
| IX.2         | -                                    | -    | -   | 1420  | -  | 42   | -    | 2     | -    | -    | -   | -    | -     | -  | -    | -    | -   | 1    | 34    |
| X.1          | -                                    | -    | -   | 13    | -  | 308  | 781  | 73    | 59   | 2    | -   | -    | 225   | -  | 346  | -    | -   | -    | 5     |
| X.2          | -                                    | -    | -   | -     | -  | 304  | -    | -     | -    | 154  | -   | 181  | 618   | -  | -    | 249  | -   | -    | 139   |
| X.3          | -                                    | -    | 67  | 56    | 16 | 202  | 3    | 2     | -    | 1513 | -   | 83   | 184   | -  | 38   | 829  | -   | -    | 910   |
| XII.1        | -                                    | -    | -   | -     | -  | 249  | 150  | -     | 1    | 11   | -   | 22   | 24    | -  | 48   | 30   | -   | 3    | -     |
| XII.2        | -                                    | -    | 7   | -     | 1  | 119  | 435  | -     | -    | 3    | -   | 72   | -     | 2  | 153  | -    | -   | -    | 3     |
| XII.3        | -                                    | -    | 163 | 7     | 1  | 53   | 93   | 2     | -    | 150  | -   | 203  | 69    | 2  | 124  | 68   | -   | -    | 545   |
| XII.4        | -                                    | -    | 30  | -     | -  | 167  | 18   | -     | 38   | 294  | -   | 602  | 71    | 1  | 428  | 340  | -   | -    | 987   |
| XII.5        | -                                    | 19   | 80  | 8     | 53 | 250  | 77   | -     | -    | 369  | -   | 131  | 165   | 25 | 13   | 167  | -   | -    | 619   |
| XIV.1        | -                                    | -    | 7   | 2     | -  | 269  | -    | -     | -    | -    | -   | -    | -     | -  | 170  | 52   | -   | -    | 96    |
| XIV.2        | -                                    | -    | -   | -     | -  | 5    | -    | -     | -    | -    | -   | -    | -     | 2  | 78   | 15   | -   | -    | 5     |
| XV.1         | -                                    | -    | -   | -     | -  | 6    | 25   | -     | -    | -    | -   | -    | -     | 1  | 56   | -    | -   | -    | 23    |
| Total        | 13308                                | 2138 | 363 | 19224 | 77 | 2277 | 2888 | 25435 | 6899 | 2584 | 171 | 1294 | 11556 | 35 | 1674 | 1849 | 413 | 6114 | 11241 |

<sup>1</sup> AR: *Pinus arizonica*, ARc: *P. arizonica* var. *cooperi*, AY: *P. ayacahuite* vars. *ayacahuite* and *veitchii*, CE: *P. cembroides* subsp. *bicolor*, *cembroides*, *lagunae* and *orizabensis*, CH: *P. chiapensis*, DE: *P. devoniana*, DO: *P. douglasiana*, DU: *P. durangensis*, EN: *P. engelmannii*, HA: *P. hartwegii*, JE: *P. jeffreyi*, LA: *P. lawsonii*, LE: *P. leiophylla*, MM = *P. maximartinezii*, MA: *P. maximinoi*, MO: *P. montezumae*, QU: *P. quadrifolia*, ST: *P. strobiformis*, and TE: *P. teocote*.

Table S6. Genetics characterization by genetic zone and species.

| Genetic<br>zone | Molecular Characterization |     |    |     |     |       |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|-----------------|----------------------------|-----|----|-----|-----|-------|-----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
|                 | (n <sub>mk</sub> )         |     |    |     |     |       |     |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|                 | AR <sup>1</sup>            | ARc | AY | AYa | AYv | CEb/c | CEl | CEo | CH | DE | DO | DU | EN | HA | JE | LA | LE | MM | MA | MO | QU | ST | TE |
| I.1             | -                          | -   | -  | -   | -   | -     | -   | -   | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| I.2             | -                          | -   | -  | -   | -   | -     | 5   | -   | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| III.1           | 46                         | -   | -  | -   | -   | 1     | -   | -   | -  | -  | 21 | 11 | -  | -  | -  | 4  | -  | -  | -  | -  | 1  | -  | -  |
| III.2           | 47                         | -   | -  | -   | -   | 6     | -   | -   | -  | -  | 24 | 18 | -  | -  | -  | 5  | -  | -  | -  | -  | 19 | -  | -  |
| III.3           | 25                         | 5   | -  | -   | -   | 5     | -   | -   | -  | -  | 24 | 7  | -  | -  | -  | 5  | -  | -  | -  | -  | 11 | 8  | -  |
| III.4           | -                          | -   | -  | -   | -   | -     | -   | -   | -  | -  | 2  | 3  | 3  | -  | -  | -  | 3  | -  | -  | -  | 4  | 1  | -  |
| IV.1            | -                          | -   | -  | -   | -   | -     | -   | -   | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| V.1             | -                          | -   | -  | -   | -   | -     | -   | -   | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| V.2             | -                          | -   | -  | -   | -   | 5     | -   | -   | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| V.3             | -                          | -   | 6  | -   | -   | 10    | -   | -   | 1  | -  | -  | -  | -  | 8  | -  | 0  | -  | -  | -  | -  | 11 | 2  | -  |
| VIII.4          | -                          | -   | -  | -   | -   | -     | -   | -   | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| IX.2            | -                          | -   | -  | -   | -   | 5     | -   | -   | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | 3  | -  | -  |
| X.1             | -                          | -   | -  | -   | -   | -     | -   | -   | -  | 5  | -  | -  | 1  | -  | -  | 1  | -  | -  | -  | -  | -  | -  | -  |
| X.2             | -                          | -   | -  | -   | -   | -     | -   | -   | -  | -  | -  | -  | 17 | -  | -  | 3  | -  | -  | 5  | -  | -  | -  | -  |
| X.3             | -                          | -   | 18 | 2   | 3   | -     | -   | 1   | 10 | 3  | 4  | -  | 12 | -  | -  | 4  | -  | -  | 22 | -  | -  | 4  | -  |
| XII.1           | -                          | -   | -  | -   | -   | -     | -   | -   | -  | 3  | -  | -  | -  | -  | -  | -  | -  | 5  | -  | -  | 2  | -  | -  |
| XII.2           | -                          | -   | -  | -   | -   | -     | -   | -   | -  | -  | -  | -  | -  | -  | -  | -  | -  | 1  | -  | -  | -  | -  | -  |
| XII.3           | -                          | -   | 1  | -   | -   | -     | -   | -   | 1  | -  | -  | -  | 1  | -  | -  | -  | -  | 4  | 2  | -  | -  | -  | -  |
| XII.4           | -                          | -   | 1  | -   | -   | -     | -   | -   | 4  | -  | -  | -  | -  | -  | -  | -  | -  | 11 | -  | -  | -  | -  | -  |
| XII.5           | -                          | -   | 3  | 1   | -   | -     | -   | -   | 22 | -  | -  | -  | 2  | -  | -  | 2  | -  | 2  | -  | -  | -  | -  | -  |
| XIV.1           | -                          | -   | 2  | 1   | -   | -     | -   | -   | 9  | -  | -  | -  | -  | -  | -  | -  | -  | 8  | 2  | -  | -  | -  | -  |
| XIV.2           | -                          | -   | -  | -   | -   | -     | -   | -   | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| XV.1            | -                          | -   | -  | -   | -   | -     | -   | -   | -  | -  | -  | -  | -  | -  | -  | -  | -  | 2  | -  | -  | -  | -  | -  |
| Total           | 118                        | 5   | 31 | 4   | 3   | 32    | 5   | 1   | 45 | 3  | 14 | 72 | 39 | 41 | 0  | 0  | 27 | 0  | 33 | 31 | 0  | 55 | 15 |

<sup>1</sup> AR: *Pinus arizonica*, ARc: *P. arizonica* var. *cooperi*, AY: *P. ayacahuite*, AYa: *P. ayacahuite* var. *ayacahuite*, AYv: *P. ayacahuite* var. *veitchii*, CEb/c: *P. cembroides* subsp. *bicolor*, and *cembroides*, CEl: *P. cembroides* subsp. *lagunae*, CEo: *P. cembroides* subsp. *orizabensis*, CH: *P. chiapensis*, DE: *P. devoniana*, DO: *P. douglasiana*, DU: *P. durangensis*, EN: *P. engelmannii*, HA: *P. hartwegii*, JE: *P. jeffreyi*, LA: *P. lawsonii*, LE: *P. leiophylla*, MM = *P. maximartinezii*, MA: *P. maximinoi*, MO: *P. montezumae*, QU: *P. quadrifolia*, ST: *P. strobiformis*, and TE: *P. teocote*.

Table S7. Germplasm production units by genetic zone and species.

| Genetic zone | Seed Stands<br>(n <sub>s</sub> ) |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | Progeny/Provenance Stands<br>(n <sub>is</sub> )/(n <sub>pt</sub> ) |     |     |    |    |    |     |     |     |    |     |     |     |     |     |     |     |
|--------------|----------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--------------------------------------------------------------------|-----|-----|----|----|----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|
|              | AR <sup>1</sup>                  | AY | CE | CH | DE | DO | DU | EN | HA | JE | LA | LE | MM | MA | MO | QU | TE | AR                                                                 | AYa | CE  | CH | DE | DO | DU  | EN  | HA  | JE | LA  | LE  | MM  | MA  | MO  | QU  | TE  |
| I.1          | -                                | -  | -  | -  | -  | -  | -  | -  | -  | 1  | -  | -  | -  | -  | -  | 1  | -  | -                                                                  | -   | -   | -  | -  | -  | -   | -   | -   | -  | -   | -   | -   | -   | -   | -   | -   |
| I.2          | -                                | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -                                                                  | -   | -   | -  | -  | -  | -   | -   | -   | -  | -   | -   | -   | -   | -   | -   |     |
| III.1        | 5                                | -  | -  | -  | -  | -  | 1  | 6  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -                                                                  | -   | -   | -  | -  | -  | -   | -   | -   | -  | -   | -   | -   | -   | -   | -   |     |
| III.2        | 10                               | -  | -  | -  | -  | -  | 14 | 3  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -                                                                  | -   | -   | -  | -  | -  | -   | -   | -   | -  | -   | -   | -   | -   | -   | -   |     |
| III.3        | 11                               | -  | -  | -  | -  | -  | 5  | 2  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -                                                                  | -   | -   | -  | -  | -  | -   | -   | -   | -  | -   | -   | -   | -   | -   | -   |     |
| III.4        | -                                | -  | -  | -  | -  | 1  | -  | -  | -  | -  | -  | 1  | -  | -  | -  | -  | -  | -                                                                  | -   | -   | -  | -  | -  | -   | -   | -   | -  | -   | -   | -   | -   | -   | -   |     |
| IV.1         | -                                | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -                                                                  | -   | -   | -  | -  | -  | -   | -   | -   | -  | -   | -   | -   | -   | -   | -   |     |
| V.1          | -                                | -  | -  | -  | -  | -  | -  | 1  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -                                                                  | -   | -   | -  | -  | -  | -   | -   | -   | -  | -   | -   | -   | -   | -   | -   |     |
| V.2          | -                                | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -                                                                  | -   | -   | -  | -  | -  | -   | -   | -   | -  | -   | -   | -   | -   | -   | -   |     |
| V.3          | -                                | 1  | -  | -  | -  | -  | -  | -  | 1  | -  | -  | -  | -  | -  | -  | -  | -  | -                                                                  | 1/1 | 0/1 | -  | -  | -  | -   | -   | -   | -  | -   | -   | 0/2 | -   | -   | -   |     |
| VIII.4       | -                                | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -                                                                  | -   | -   | -  | -  | -  | -   | -   | -   | -  | -   | -   | -   | -   | -   | -   |     |
| IX.2         | -                                | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -                                                                  | -   | -   | -  | -  | -  | -   | -   | -   | -  | -   | -   | -   | -   | -   | -   |     |
| X.1          | -                                | -  | -  | -  | 1  | 2  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -                                                                  | -   | -   | -  | -  | -  | -   | -   | -   | -  | -   | -   | -   | -   | -   | -   |     |
| X.2          | -                                | -  | -  | -  | 1  | -  | -  | -  | -  | -  | 1  | 1  | -  | -  | 1  | -  | -  | -                                                                  | -   | -   | -  | -  | -  | -   | 0/3 | -   | -  | -   | -   | -   | 0/2 | -   | -   |     |
| X.3          | -                                | -  | -  | 1  | -  | -  | -  | -  | 1  | -  | -  | -  | -  | -  | 4  | -  | 1  | -                                                                  | -   | 0/2 | -  | -  | -  | 0/1 | -   | -   | -  | 1/2 | -   | 2/2 | -   | -   | 3/3 |     |
| XII.1        | -                                | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -                                                                  | -   | -   | -  | -  | -  | -   | -   | -   | -  | -   | -   | -   | -   | -   | -   |     |
| XII.2        | -                                | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -                                                                  | -   | -   | -  | -  | -  | -   | -   | -   | -  | -   | -   | -   | -   | -   | -   |     |
| XII.3        | -                                | -  | -  | -  | 1  | -  | -  | -  | -  | -  | -  | -  | -  | 1  | 1  | -  | -  | -                                                                  | -   | -   | -  | -  | -  | -   | -   | -   | -  | -   | -   | -   | -   | -   | -   |     |
| XII.4        | -                                | -  | -  | -  | 1  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | 1  | -                                                                  | -   | -   | -  | -  | -  | -   | -   | -   | -  | -   | -   | -   | -   | -   | -   |     |
| XII.5        | -                                | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -                                                                  | -   | -   | -  | -  | -  | -   | -   | -   | -  | -   | -   | -   | -   | -   | -   |     |
| XIV.1        | -                                | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -                                                                  | -   | -   | -  | -  | -  | -   | -   | -   | -  | -   | -   | -   | -   | -   | -   |     |
| XIV.2        | -                                | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -                                                                  | -   | -   | -  | -  | -  | -   | -   | -   | -  | -   | -   | -   | -   | -   | -   |     |
| XV.1         | -                                | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | 1  | -  | -  | -  | -                                                                  | -   | -   | -  | -  | -  | -   | -   | -   | -  | -   | -   | -   | -   | -   | -   |     |
| Total        | 26                               | 1  | 0  | 1  | 4  | 3  | 20 | 12 | 2  | 1  | 1  | 2  | 0  | 2  | 6  | 1  | 2  | 0                                                                  | 1/1 | 0/3 | 0  | 0  | 0  | 0   | 0/1 | 0/3 | 0  | 0   | 1/2 | 0   | 2/4 | 0/2 | 0   | 3/3 |

<sup>1</sup> AR: *P. arizonica*, AY: *Pinus ayacahuite*, AYa: *P. ayacahuite* var. *ayacahuite*, CE: *P. cembroides*, CH: *P. chiapensis*, DE: *P. devoniana*, DO: *P. douglasiana*, DU: *P. durangensis*, EN: *P. engelmannii*, HA: *P. hartwegii*, JE: *P. jeffreyi*, LA: *P. lawsonii*, LE: *P. leiophylla*, MM = *P. maximartinezii*, MA: *P. maximinoi*, MO: *P. montezumae*, QU: *P. quadrifolia*, TE: *P. teocote*.

**Table S8.** Germplasm orchards by genetic zone and species.

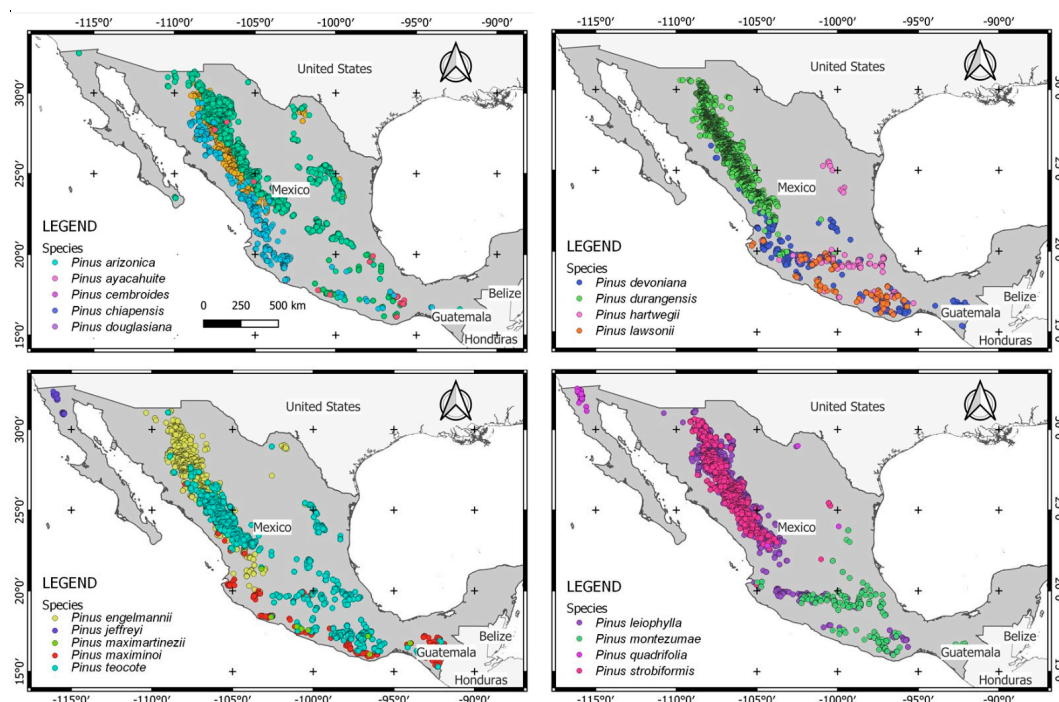
| Genetic<br>zone | Seed Orchards      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|-----------------|--------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
|                 | (n <sub>so</sub> ) |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|                 | AR <sup>1</sup>    | AY | CE | CH | DE | DO | DU | EN | HA | JE | LA | LE | MM | MA | MO | QU | TE |
| I.1             | -                  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| I.2             | -                  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| III.1           | 1                  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| III.2           | 1                  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| III.3           | -                  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| III.4           | -                  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| IV.1            | -                  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| V.1             | -                  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| V.2             | -                  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| V.3             | -                  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| VIII.4          | -                  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| IX.2            | -                  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| X.1             | -                  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| X.2             | -                  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| X.3             | -                  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | 1  | -  | -  | -  | -  | -  |
| XII.1           | -                  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| XII.2           | -                  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| XII.3           | -                  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| XII.4           | -                  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| XII.5           | -                  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| XIV.1           | -                  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| XIV.2           | -                  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| XV.1            | -                  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| Total           | 2                  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0  | 0  | 0  | 0  |

<sup>1</sup> AR: *P. arizonica*, AY: *Pinus ayacahuite*, CE: *P. cembroides*, CH: *P. chiapensis*, DE: *P. devoniana*, DO: *P. douglasiana*, DU: *P. durangensis*, EN: *P. engelmannii*, HA: *P. hartwegii*, JE: *P. jeffreyi*, LA: *P. lawsonii*, LE: *P. leiophylla*, MM = *P. maximartinezii*, MA: *P. maximinoi*, MO: *P. montezumae*, QU: *P. quadrifolia*, TE: *P. teocote*.

**Table S9.** Conservation units by genetic zone and species.

| Genetic<br>zone | Gene Conservation Units |     |     |     |       |     |     |     |     |    |    |    |    |    |    |    |    |    |    |     |    |    |    |    |
|-----------------|-------------------------|-----|-----|-----|-------|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|----|-----|----|----|----|----|
|                 | (n <sub>g</sub> )       |     |     |     |       |     |     |     |     |    |    |    |    |    |    |    |    |    |    |     |    |    |    |    |
|                 | AR <sup>1</sup>         | ARc | AYa | AYv | CEb/c | CEb | CEc | CEl | CEo | CH | DE | DO | DU | EN | HA | JE | LA | LE | MM | MAM | MO | QU | ST | TE |
| I.1             | -                       | -   | -   | -   | -     | 1   | -   | -   | -   | -  | -  | -  | -  | -  | -  | 2  | -  | -  | -  | -   | -  | 2  | -  | -  |
| I.2             | -                       | -   | -   | -   | -     | -   | -   | 1   | -   | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -   | -  | -  | -  | -  |
| III.1           | 2                       | -   | -   | -   | 2     | -   | -   | -   | -   | -  | -  | 1  | 2  | 2  | -  | -  | -  | 2  | -  | -   | -  | -  | 2  | -  |
| III.2           | 1                       | 1   | -   | -   | 2     | -   | -   | -   | -   | -  | -  | 1  | 2  | 1  | -  | -  | -  | 3  | -  | -   | -  | -  | 2  | 1  |
| III.3           | 1                       | 2   | -   | -   | 2     | -   | -   | -   | -   | -  | -  | 1  | 2  | 3  | -  | -  | -  | 3  | -  | 1   | -  | -  | 2  | 2  |
| III.4           | 1                       | 1   | -   | -   | 3     | -   | -   | -   | -   | -  | 2  | 3  | 2  | 2  | -  | -  | -  | 3  | -  | 2   | -  | -  | 1  | 2  |
| IV.1            | -                       | -   | -   | -   | -     | 1   | -   | -   | -   | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -   | -  | -  | -  | -  |
| V.1             | 1                       | -   | -   | -   | 2     | -   | -   | -   | -   | -  | -  | -  | -  | 1  | -  | -  | -  | -  | -  | -   | -  | -  | -  | -  |
| V.2             | -                       | -   | -   | -   | 1     | -   | -   | -   | -   | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -   | -  | -  | -  | -  |
| V.3             | 1                       | -   | -   | -   | 2     | -   | 1   | -   | -   | -  | -  | -  | -  | -  | 2  | -  | -  | -  | -  | -   | 1  | -  | 1  | 2  |
| IX.2            | -                       | -   | -   | -   | 1     | -   | 1   | -   | -   | -  | 1  | -  | -  | -  | -  | -  | -  | -  | -  | -   | -  | -  | -  | 1  |
| X.1             | -                       | -   | -   | -   | -     | -   | -   | -   | -   | -  | 2  | 2  | 1  | 1  | -  | -  | -  | 1  | -  | 1   | -  | -  | -  | -  |
| X.2             | -                       | -   | -   | -   | -     | -   | -   | -   | -   | -  | 1  | -  | -  | -  | 1  | -  | 1  | 1  | -  | -   | 1  | -  | -  | 1  |
| X.3             | -                       | -   | -   | 2   | -     | -   | 1   | -   | 1   | -  | 2  | -  | -  | -  | 2  | -  | 1  | 3  | -  | 1   | 3  | -  | -  | 2  |
| XII.1           | -                       | -   | -   | -   | -     | -   | -   | -   | -   | -  | 1  | 1  | -  | -  | -  | -  | 1  | 1  | -  | 1   | 1  | -  | 1  | -  |
| XII.2           | -                       | -   | -   | -   | -     | -   | -   | -   | -   | -  | 1  | 1  | -  | -  | -  | -  | 1  | -  | -  | 1   | -  | -  | -  | -  |
| XII.3           | -                       | -   | 1   | -   | -     | -   | -   | -   | -   | -  | 1  | 1  | -  | -  | 1  | -  | 1  | 1  | -  | 1   | 1  | -  | -  | 1  |
| XII.4           | -                       | -   | 1   | -   | -     | -   | -   | -   | -   | -  | 1  | -  | -  | 1  | 1  | -  | 1  | 1  | -  | 1   | 1  | -  | -  | 1  |
| XII.5           | -                       | -   | 1   | -   | -     | -   | -   | -   | -   | 1  | 1  | 1  | -  | -  | 1  | -  | 5  | 1  | 1  | -   | 1  | -  | -  | 1  |
| XIV.1           | -                       | -   | -   | -   | -     | -   | -   | -   | -   | -  | 1  | -  | -  | -  | -  | -  | -  | -  | -  | 1   | 1  | -  | -  | 1  |
| XIV.2           | -                       | -   | -   | -   | -     | -   | -   | -   | -   | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  | 1   | -  | -  | -  | -  |
| XV.1            | -                       | -   | -   | -   | -     | -   | -   | -   | -   | -  | -  | 1  | -  | -  | -  | -  | -  | -  | -  | 1   | -  | -  | -  | 1  |
| Total           | 7                       | 4   | 3   | 2   | 15    | 2   | 3   | 1   | 1   | 1  | 14 | 14 | 9  | 11 | 8  | 2  | 7  | 20 | 1  | 12  | 10 | 2  | 9  | 16 |

<sup>1</sup> AR: *Pinus arizonica*; ARc: *P. arizonica* var. *cooperi*; AYa: *P. ayacahuite* var. *ayacahuite*; AYv: *P. ayacahuite* var. *veitchii*; CEb/c: *P. cembroides* subsps. *bicolor*, and *cembroides*; CEb: *P. cembroides* subsp. *bicolor*; CEC: *P. cembroides* subsp. *cembroides*; CEL: *P. cembroides* subsp. *lagunae*; CEO: *P. cembroides* subsp. *orizabensis*; CH: *P. chiapensis*; DE: *P. devoniana*; DO: *P. douglasiana*; DU: *P. durangensis*; EN: *P. engelmannii*; HA: *P. hartwegii*; JE: *P. jeffreyi*; LA: *P. lawsonii*; LE: *P. leiophylla*; MM = *P. maximartinezii*; MA: *P. maximinoi*; MO: *P. montezumae*; QU: *P. quadrifolia*; ST: *P. strobiformis*; and TE: *P. teocote*.



**Figure S1.** Species distribution in Mexico using data from the NFLI.

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