

## ANEXO I

**Tabla 9: Valor de importancia de las familias acompañantes de las *Zamiaceas* en áreas abiertas**

Localidades: CH02 El gavilán, CH03 San Miguel, CH05 Agua fría, CH06 La fabrica vieja.

| Familias sp arbustivas | Sitios presentes | Densidad / ha | Cobertura / ha | Frecuencia | Densidad % | Cobertura % | Frecuencia % | Valor de Importancia % |
|------------------------|------------------|---------------|----------------|------------|------------|-------------|--------------|------------------------|
| ZAMIACEAE              | 4                | 6903          | 2822           | 1          | 8          | 21          | 4            | 11                     |
| EBENACEAE              | 4                | 1033          | 2074           | 1          | 1          | 16          | 4            | 7                      |
| LEGUMINOSAE            | 4                | 4235          | 1428           | 1          | 5          | 11          | 4            | 6                      |
| ULMACEAE               | 4                | 1785          | 1399           | 1          | 2          | 11          | 4            | 5                      |
| RHAMNACEAE             | 4                | 695           | 1210           | 1          | 1          | 9           | 4            | 5                      |
| EUPHORBIACEAE          | 2                | 5560          | 451            | 1          | 6          | 3           | 2            | 4                      |
| FAM47                  | 1                | 6500          | 404            | 0          | 7          | 3           | 1            | 4                      |
| CACTACEAE              | 4                | 735           | 598            | 1          | 1          | 5           | 4            | 3                      |
| ACANTHACEAE            | 3                | 4875          | 118            | 1          | 5          | 1           | 3            | 3                      |
| GRAMINEAE              | 1                | 6875          | 24             | 0          | 8          | 0           | 1            | 3                      |
| CONVOLVULACEAE         | 3                | 2625          | 172            | 1          | 3          | 1           | 3            | 2                      |
| BORAGINACEAE           | 4                | 1470          | 197            | 1          | 2          | 1           | 4            | 2                      |
| RUTACEAE               | 4                | 1170          | 201            | 1          | 1          | 2           | 4            | 2                      |
| FAM58                  | 1                | 5000          | 13             | 0          | 5          | 0           | 1            | 2                      |
| COMMELINACEAE          | 1                | 2500          | 291            | 0          | 3          | 2           | 1            | 2                      |
| ASTERACEAE             | 2                | 3250          | 30             | 1          | 4          | 0           | 2            | 2                      |
| POLYPODIACEAE          | 1                | 2750          | 220            | 0          | 3          | 2           | 1            | 2                      |
| FAM46                  | 1                | 2750          | 127            | 0          | 3          | 1           | 1            | 2                      |
| BERBERIDACEAE          | 3                | 195           | 230            | 1          | 0          | 2           | 3            | 2                      |
| NYCTAGINACEAE          | 2                | 2250          | 57             | 1          | 2          | 0           | 2            | 2                      |
| FAM51                  | 1                | 2625          | 114            | 0          | 3          | 1           | 1            | 2                      |
| FAM45                  | 1                | 2250          | 143            | 0          | 2          | 1           | 1            | 2                      |
| MALVACEAE              | 1                | 2375          | 108            | 0          | 3          | 1           | 1            | 1                      |
| URTICACEAE             | 1                | 2500          | 4              | 0          | 3          | 0           | 1            | 1                      |
| OLEACEAE               | 3                | 205           | 62             | 1          | 0          | 0           | 3            | 1                      |
| MIMOSACEAE             | 2                | 655           | 102            | 1          | 1          | 1           | 2            | 1                      |

Distribución y Relaciones Ecológicas del chamal *Dioon edule* var *angustifolium* en La Sierra de San Carlos Tamaulipas  
Anexos

|                |   |      |     |   |   |   |   |   |   |   |
|----------------|---|------|-----|---|---|---|---|---|---|---|
| FAM59          | 1 | 2000 | 2   | 0 | 2 | 0 | 0 | 0 | 1 | 1 |
| FAGACEAE       | 2 | 8    | 132 | 1 | 0 | 1 | 0 | 1 | 2 | 1 |
| FAM57          | 1 | 1750 | 4   | 0 | 2 | 0 | 0 | 0 | 1 | 1 |
| FAM48          | 1 | 1125 | 57  | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| POLIGALACEAE   | 1 | 1375 | 9   | 0 | 2 | 0 | 0 | 0 | 1 | 1 |
| LAURACEAE      | 2 | 380  | 15  | 1 | 0 | 0 | 0 | 0 | 2 | 1 |
| FAM56          | 1 | 1250 | 14  | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| FAM53          | 1 | 1000 | 11  | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| SAPINDACEAE    | 1 | 500  | 76  | 0 | 1 | 0 | 1 | 1 | 1 | 1 |
| FAM49          | 1 | 875  | 8   | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| FAM62          | 1 | 875  | 3   | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| FAM33          | 1 | 750  | 5   | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| FAM61          | 1 | 750  | 0   | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| PORTULACACEAE  | 1 | 375  | 40  | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| FAM63          | 1 | 625  | 1   | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| FAM26          | 1 | 530  | 3   | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| FAM60          | 1 | 500  | 0   | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| FAM34          | 1 | 375  | 3   | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| FAM24          | 1 | 250  | 9   | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| FAM54          | 1 | 250  | 6   | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| FAM29          | 1 | 250  | 1   | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| FAM52          | 1 | 125  | 16  | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| VERBENACEAE    | 1 | 125  | 12  | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| FAM69          | 1 | 125  | 12  | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| FLACOURTIACEAE | 1 | 20   | 26  | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| LABIATAE       | 1 | 125  | 9   | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| RUBIACEAE      | 1 | 15   | 23  | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| FAM28          | 1 | 125  | 6   | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| FAM31          | 1 | 125  | 3   | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| FAM25          | 1 | 125  | 3   | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| FAM30          | 1 | 125  | 2   | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| FAM32          | 1 | 125  | 1   | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| FAM50          | 1 | 125  | 1   | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| VITACEAE       | 1 | 125  | 1   | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| FAM55          | 1 | 125  | 0   | 0 | 0 | 0 | 0 | 0 | 1 | 0 |

|                |   |    |    |   |   |   |   |   |
|----------------|---|----|----|---|---|---|---|---|
| COMPOSITAE     | 1 | 20 | 10 | 0 | 0 | 0 | 1 | 0 |
| LILIACEAE      | 1 | 5  | 8  | 0 | 0 | 0 | 1 | 0 |
| FAM27          | 1 | 5  | 6  | 0 | 0 | 0 | 1 | 0 |
| ZYGOPHYLLACEAE | 1 | 5  | 1  | 0 | 0 | 0 | 1 | 0 |

**Tabla 10: Valor de importancia de las especies acompañantes de *Dioon edule* var *angustifolium* en áreas abiertas**

| N. Científico                                | N. regional            | Familia       | Sit. pres. | D / ha | Cob. / ha | Fr. | D% | Cob.% | Fr.% | VI% |
|--|------------------------|---------------|------------|--------|-----------|-----|----|-------|------|-----|
| <i>Dioon edule</i> var. <i>angustifolium</i> | Chamal                 | ZAMIACEAE     | 4          | 6903   | 2822      | 1   | 8  | 21    | 3    | 11  |
| <i>Diospyros texana</i>                      | Chapote blanco         | EBENACEAE     | 4          | 978    | 1827      | 1   | 1  | 14    | 3    | 6   |
| <i>Celtis pallida</i>                        | Granjeno               | ULMACEAE      | 4          | 1770   | 1213      | 1   | 2  | 9     | 3    | 5   |
| <i>Cordia hookeri</i>                        | Brasil                 | RHAMNACEAE    | 4          | 415    | 1183      | 1   | 0  | 9     | 3    | 4   |
| INCERTAE SAEDIS 553                          | Zacate                 | FAM47         | 1          | 6500   | 404       | 0   | 7  | 3     | 1    | 4   |
| <i>Acacia rigidula</i>                       | Gavia                  | LEGUMINOSAE   | 3          | 1995   | 749       | 1   | 2  | 6     | 2    | 3   |
| <i>Croton torreyanus</i>                     | Paillo                 | EUPHORBIACEAE | 2          | 4275   | 191       | 1   | 5  | 1     | 1    | 2   |
| <i>Opuntia lindheimeri</i>                   | Nopal                  | CACTACEAE     | 4          | 520    | 528       | 1   | 1  | 4     | 3    | 2   |
| INCERTAE SAEDIS 718                          | Amor seco              | FAM58         | 1          | 5000   | 13        | 0   | 5  | 0     | 1    | 2   |
| <i>Pellaea ovata</i>                         |                        | POLYPODIACEAE | 1          | 2750   | 220       | 0   | 3  | 2     | 1    | 2   |
| <i>Eragrostis</i> sp                         | Zacate pata de gallina | GRAMINEAE     | 1          | 4000   | 14        | 0   | 4  | 0     | 1    | 2   |
| <i>Commelina</i> sp                          |                        | COMMELINACEAE | 1          | 2250   | 235       | 0   | 2  | 2     | 1    | 2   |
| INCERTAE SAEDIS 548                          | Zacate                 | FAM46         | 1          | 2750   | 127       | 0   | 3  | 1     | 1    | 2   |
| <i>Havardia pallens</i>                      | Tenaza                 | LEGUMINOSAE   | 2          | 515    | 355       | 1   | 1  | 3     | 1    | 2   |
| INCERTAE SAEDIS 581                          | Zacate                 | FAM51         | 1          | 2625   | 114       | 0   | 3  | 1     | 1    | 1   |
| <i>Tetramerium hispidum</i>                  |                        | ACANTHACEAE   | 1          | 3000   | 52        | 0   | 3  | 0     | 1    | 1   |
| INCERTAE SAEDIS 543                          | Zacate                 | FAM45         | 1          | 2250   | 143       | 0   | 2  | 1     | 1    | 1   |
| <i>Berberis chochocco</i>                    | Palo amarillo          | BERBERIDACEAE | 3          | 195    | 230       | 1   | 0  | 2     | 2    | 1   |
| <i>Zanthoxylum fagara</i>                    | Colima                 | RUTACEAE      | 4          | 155    | 148       | 1   | 0  | 1     | 3    | 1   |
| <i>Urtica</i> sp                             | Ortigailla             | URTICACEAE    | 1          | 2500   | 4         | 0   | 3  | 0     | 1    | 1   |
| <i>Allionia incarnata</i>                    |                        | NYCTAGINACEAE | 1          | 2125   | 49        | 0   | 2  | 0     | 1    | 1   |
| <i>Bernardia myricaefolia</i>                |                        | EUPHORBIACEAE | 1          | 785    | 236       | 0   | 1  | 2     | 1    | 1   |
| <i>Diospyros palmeri</i>                     | Chapote prieto         | EBENACEAE     | 2          | 40     | 242       | 1   | 0  | 2     | 1    | 1   |
| <i>Cordia boissieri</i>                      | Anacahuilla            | BORAGINACEAE  | 3          | 70     | 141       | 1   | 0  | 1     | 2    | 1   |

|                                  |                 |                |   |      |     |   |   |   |   |   |
|----------------------------------|-----------------|----------------|---|------|-----|---|---|---|---|---|
| <i>Heliotropium curassavicum</i> |                 | BORAGINACEAE   | 2 | 1375 | 21  | 1 | 2 | 0 | 1 | 1 |
| <i>Evolvulus alsinoides</i>      |                 | CONVOLVULACEAE | 1 | 1625 | 56  | 0 | 2 | 0 | 1 | 1 |
| INCERTAE SAEDIS 719              | Malva           | FAM59          | 1 | 2000 | 2   | 0 | 2 | 0 | 1 | 1 |
| <i>Parthenium confertum</i>      |                 | ASTERACEAE     | 2 | 1375 | 6   | 1 | 2 | 0 | 1 | 1 |
| <i>Amyris madrensis</i>          | Barreta china   | RUTACEAE       | 2 | 1015 | 53  | 1 | 1 | 0 | 1 | 1 |
| <i>Panicum sp</i>                | Zacate estrella | GRAMINEAE      | 1 | 1875 | 8   | 0 | 2 | 0 | 1 | 1 |
| <i>Ambrosia psilostachya</i>     | Yerbajo         | ASTERACEAE     | 1 | 1750 | 23  | 0 | 2 | 0 | 1 | 1 |
| <i>Opuntia leptocaulis</i>       | Tasajillo       | CACTACEAE      | 3 | 215  | 70  | 1 | 0 | 1 | 2 | 1 |
| <i>Forestiera angustifolia</i>   | Panalero        | OLEACEAE       | 3 | 205  | 62  | 1 | 0 | 0 | 2 | 1 |
| INCERTAE SAEDIS 717              | Pega ropa       | FAM57          | 1 | 1750 | 4   | 0 | 2 | 0 | 1 | 1 |
| <i>Mimosa malacophylla</i>       | Charrasquillo   | LEGUMINOSAE    | 2 | 625  | 55  | 1 | 1 | 0 | 1 | 1 |
| <i>Siphonoglossa sp</i>          |                 | ACANTHACEAE    | 1 | 1125 | 63  | 0 | 1 | 0 | 1 | 1 |
| INCERTAE SAEDIS 559              | Zacate          | FAM48          | 1 | 1125 | 57  | 0 | 1 | 0 | 1 | 1 |
| <i>Acacia farnesiana</i>         | Huizache        | LEGUMINOSAE    | 2 | 195  | 96  | 1 | 0 | 1 | 1 | 1 |
| <i>Polygala sp</i>               |                 | POLIGALACEAE   | 1 | 1375 | 9   | 0 | 2 | 0 | 1 | 1 |
| INCERTAE SAEDIS 715              |                 | FAM56          | 1 | 1250 | 14  | 0 | 1 | 0 | 1 | 1 |
| <i>Celtis reticulata</i>         | Palo blanco     | ULMACEAE       | 1 | 15   | 186 | 0 | 0 | 1 | 1 | 1 |
| <i>Ipomoea purpurea</i>          | Hiedra          | CONVOLVULACEAE | 1 | 500  | 84  | 0 | 1 | 1 | 1 | 1 |
| INCERTAE SAEDIS 711              |                 | FAM53          | 1 | 1000 | 11  | 0 | 1 | 0 | 1 | 1 |
| <i>Mimosa sp</i>                 | Uña de gato     | MIMOSACEAE     | 2 | 30   | 59  | 1 | 0 | 0 | 1 | 1 |
| <i>Digitaria californica</i>     | Zacate de perro | GRAMINEAE      | 1 | 1000 | 3   | 0 | 1 | 0 | 1 | 1 |
| <i>Litsea glaucescens</i>        |                 | LAURACEAE      | 2 | 255  | 14  | 1 | 0 | 0 | 1 | 1 |
| INCERTAE SAEDIS 562              | Yerbajo         | FAM49          | 1 | 875  | 8   | 0 | 1 | 0 | 1 | 1 |
| <i>Mimosa quadrivallis</i>       |                 | MIMOSACEAE     | 1 | 625  | 43  | 0 | 1 | 0 | 1 | 1 |
| INCERTAE SAEDIS 728              |                 | FAM62          | 1 | 875  | 3   | 0 | 1 | 0 | 1 | 1 |
| <i>Quercus sp 460</i>            | Encino          | FAGACEAE       | 1 | 3    | 126 | 0 | 0 | 1 | 1 | 1 |
| INCERTAE SAEDIS 451              |                 | FAM33          | 1 | 750  | 5   | 0 | 1 | 0 | 1 | 1 |
| <i>Elytraria imbricata</i>       |                 | ACANTHACEAE    | 1 | 750  | 3   | 0 | 1 | 0 | 1 | 0 |
| INCERTAE SAEDIS 723              |                 | FAM61          | 1 | 750  | 0   | 0 | 1 | 0 | 1 | 0 |
| <i>Abutilon sp 549</i>           |                 | MALVACEAE      | 1 | 500  | 36  | 0 | 1 | 0 | 1 | 0 |
| <i>Ipomoea sp</i>                |                 | CONVOLVULACEAE | 1 | 500  | 32  | 0 | 1 | 0 | 1 | 0 |
| <i>Talinum angustissimum</i>     |                 | PORTULACACEAE  | 1 | 375  | 40  | 0 | 0 | 0 | 1 | 0 |
| INCERTAE SAEDIS 729              |                 | FAM63          | 1 | 625  | 1   | 0 | 1 | 0 | 1 | 0 |
| INCERTAE SAEDIS 430              | Chicalote       | FAM26          | 1 | 530  | 3   | 0 | 1 | 0 | 1 | 0 |
| <i>Anoda sp</i>                  |                 | MALVACEAE      | 1 | 375  | 24  | 0 | 0 | 0 | 1 | 0 |

|                                 |            |                |   |     |    |   |   |   |   |   |
|---------------------------------|------------|----------------|---|-----|----|---|---|---|---|---|
| <i>Commelina coelestis</i>      |            | COMMELINACEAE  | 1 | 125 | 55 | 0 | 0 | 0 | 1 | 0 |
| <i>Serjania</i> sp 597          |            | SAPINDACEAE    | 1 | 125 | 55 | 0 | 0 | 0 | 1 | 0 |
| INCERTAE SAEDIS 722             |            | FAM60          | 1 | 500 | 0  | 0 | 1 | 0 | 1 | 0 |
| <i>Karwinskia humboldtiana</i>  | Tullidor   | RHAMNACEAE     | 1 | 280 | 27 | 0 | 0 | 0 | 1 | 0 |
| <i>Galactia striata</i>         |            | LEGUMINOSAE    | 1 | 250 | 28 | 0 | 0 | 0 | 1 | 0 |
| <i>Acalypha</i> sp              |            | EUPHORBIACEAE  | 1 | 375 | 4  | 0 | 0 | 0 | 1 | 0 |
| INCERTAE SAEDIS 453             |            | FAM34          | 1 | 375 | 3  | 0 | 0 | 0 | 1 | 0 |
| <i>Senna lindheimeriana</i>     |            | LEGUMINOSAE    | 1 | 125 | 32 | 0 | 0 | 0 | 1 | 0 |
| INCERTAE SAEDIS 425             |            | FAM24          | 1 | 250 | 9  | 0 | 0 | 0 | 1 | 0 |
| <i>Abutilon incanum</i>         |            | MALVACEAE      | 1 | 250 | 8  | 0 | 0 | 0 | 1 | 0 |
| <i>Abutilon</i> sp 554          |            | MALVACEAE      | 1 | 250 | 8  | 0 | 0 | 0 | 1 | 0 |
| INCERTAE SAEDIS 712             | Sacasil    | FAM54          | 1 | 250 | 6  | 0 | 0 | 0 | 1 | 0 |
| <i>Eysenhardtia polystachya</i> | Vara dulce | LEGUMINOSAE    | 1 | 75  | 29 | 0 | 0 | 0 | 1 | 0 |
| <i>Ehretia anacua</i>           | Anacua     | BORAGINACEAE   | 1 | 25  | 35 | 0 | 0 | 0 | 1 | 0 |
| <i>Acacia berlandieri</i>       | Huajillo   | LEGUMINOSAE    | 1 | 55  | 31 | 0 | 0 | 0 | 1 | 0 |
| <i>Sphaerolobos</i> sp          |            | MALVACEAE      | 1 | 125 | 20 | 0 | 0 | 0 | 1 | 0 |
| <i>Serjania</i> sp 620          |            | SAPINDACEAE    | 1 | 125 | 20 | 0 | 0 | 0 | 1 | 0 |
| INCERTAE SAEDIS 444             |            | FAM29          | 1 | 250 | 1  | 0 | 0 | 0 | 1 | 0 |
| INCERTAE SAEDIS 567             |            | MALVACEAE      | 1 | 250 | 1  | 0 | 0 | 0 | 1 | 0 |
| <i>Croton</i> sp 582            |            | EUPHORBIACEAE  | 1 | 125 | 19 | 0 | 0 | 0 | 1 | 0 |
| <i>Urvillea ulmaceae</i>        | Ortigailla | SAPINDACEAE    | 1 | 250 | 1  | 0 | 0 | 0 | 1 | 0 |
| INCERTAE SAEDIS 710             |            | FAM52          | 1 | 125 | 16 | 0 | 0 | 0 | 1 | 0 |
| <i>Sapoteca medii</i>           |            | LEGUMINOSAE    | 1 | 125 | 16 | 0 | 0 | 0 | 1 | 0 |
| <i>Phyllanthus</i> sp           |            | VERBENACEAE    | 1 | 125 | 12 | 0 | 0 | 0 | 1 | 0 |
| INCERTAE SAEDIS 623             |            | FAM69          | 1 | 125 | 12 | 0 | 0 | 0 | 1 | 0 |
| <i>Phaseolus</i> sp             |            | LEGUMINOSAE    | 1 | 125 | 11 | 0 | 0 | 0 | 1 | 0 |
| <i>Xylosma flexuosum</i>        |            | FLACOURTIACEAE | 1 | 20  | 26 | 0 | 0 | 0 | 1 | 0 |
| <i>Salvia</i> sp 592            |            | LABIATAE       | 1 | 125 | 9  | 0 | 0 | 0 | 1 | 0 |
| <i>Abutilon</i> sp 575          |            | MALVACEAE      | 1 | 125 | 7  | 0 | 0 | 0 | 1 | 0 |
| <i>Acletochloa</i> sp           |            | NYCTAGINACEAE  | 1 | 125 | 7  | 0 | 0 | 0 | 1 | 0 |
| <i>Calliandra eriophylla</i>    |            | LEGUMINOSAE    | 1 | 125 | 7  | 0 | 0 | 0 | 1 | 0 |
| <i>Randia laetevirens</i>       | Crucillo   | RUBIACEAE      | 1 | 15  | 23 | 0 | 0 | 0 | 1 | 0 |
| INCERTAE SAEDIS 439             | Pega ropa  | FAM28          | 1 | 125 | 6  | 0 | 0 | 0 | 1 | 0 |
| INCERTAE SAEDIS 446             |            | FAM31          | 1 | 125 | 3  | 0 | 0 | 0 | 1 | 0 |
| INCERTAE SAEDIS 426             | Poleo      | FAM25          | 1 | 125 | 3  | 0 | 0 | 0 | 1 | 0 |

Distribución y Relaciones Ecológicas del charmal *Dioon edule* var *angustifolium* en La Sierra de San Carlos Tamaulipas  
Anexos

|                               |                  |                |   |     |    |   |   |   |   |   |
|-------------------------------|------------------|----------------|---|-----|----|---|---|---|---|---|
| INCERTAE SAEDIS 445           |                  | FAM30          | 1 | 125 | 2  | 0 | 0 | 0 | 1 | 0 |
| <i>Sphaeralcea coccinea</i>   |                  | MALVACEAE      | 1 | 125 | 2  | 0 | 0 | 0 | 1 | 0 |
| INCERTAE SAEDIS 585           |                  | MALVACEAE      | 1 | 125 | 1  | 0 | 0 | 0 | 1 | 0 |
| INCERTAE SAEDIS 450           |                  | FAM32          | 1 | 125 | 1  | 0 | 0 | 0 | 1 | 0 |
| INCERTAE SAEDIS 568           |                  | FAM50          | 1 | 125 | 1  | 0 | 0 | 0 | 1 | 0 |
| <i>Litsea</i> sp 576          |                  | LAURACEAE      | 1 | 125 | 1  | 0 | 0 | 0 | 1 | 0 |
| <i>Tradescantia</i> sp        |                  | COMMELINACEAE  | 1 | 125 | 1  | 0 | 0 | 0 | 1 | 0 |
| <i>Malvastrum</i> sp          |                  | MALVACEAE      | 1 | 125 | 1  | 0 | 0 | 0 | 1 | 0 |
| <i>Cissus sicyoides</i>       | Enredadera       | VITACEAE       | 1 | 125 | 1  | 0 | 0 | 0 | 1 | 0 |
| INCERTAE SAEDIS 586           |                  | ASTERACEAE     | 1 | 125 | 1  | 0 | 0 | 0 | 1 | 0 |
| INCERTAE SAEDIS 713           |                  | FAM55          | 1 | 125 | 0  | 0 | 0 | 0 | 1 | 0 |
| <i>Anoda cristata</i>         |                  | MALVACEAE      | 1 | 125 | 0  | 0 | 0 | 0 | 1 | 0 |
| <i>Stevia</i> sp              |                  | COMPOSITAE     | 1 | 20  | 10 | 0 | 0 | 0 | 1 | 0 |
| <i>Yucca</i> sp               | Palma pita       | LILIACEAE      | 1 | 5   | 8  | 0 | 0 | 0 | 1 | 0 |
| <i>Quercus</i> sp 607         | Encino amarillo  | FAGACEAE       | 1 | 5   | 7  | 0 | 0 | 0 | 1 | 0 |
| <i>Diospyros</i> sp 232       | Chapote manzano  | EBENACEAE      | 1 | 15  | 5  | 0 | 0 | 0 | 1 | 0 |
| INCERTAE SAEDIS 437           | Palo amarillo    | FAM27          | 1 | 5   | 6  | 0 | 0 | 0 | 1 | 0 |
| <i>Parkinsonia aculeata</i>   | Retama           | LEGUMINOSAE    | 1 | 5   | 6  | 0 | 0 | 0 | 1 | 0 |
| <i>Ebanopsis ebano</i>        | Ébano            | LEGUMINOSAE    | 1 | 10  | 5  | 0 | 0 | 0 | 1 | 0 |
| <i>Prosopis fevigata</i>      | Mezquite         | LEGUMINOSAE    | 1 | 5   | 5  | 0 | 0 | 0 | 1 | 0 |
| <i>Caesalpinia mexicana</i>   | Hierba del potro | LEGUMINOSAE    | 1 | 5   | 2  | 0 | 0 | 0 | 1 | 0 |
| <i>Guaiacum angustifolium</i> | Guayacán         | ZYGOPHYLLACEAE | 1 | 5   | 1  | 0 | 0 | 0 | 1 | 0 |

**Tabla 11: Valor de importancia de las familias acompañantes de las *Zamiaceas* en áreas cerradas**

Localidades: CH01 El Gavilán, CH04 Santa Martha, CH07 Carricitos, CH08 Ejido San Carlos

| Familias sp<br>arbutivas | Sitios<br>presentes | Densidad /<br>ha | Cobertura /<br>ha | Frecuencia /<br>ha | Densidad<br>% | Cobertura<br>% | Frecuencia<br>% | Valor de<br>Importancia % |
|--------------------------|---------------------|------------------|-------------------|--------------------|---------------|----------------|-----------------|---------------------------|
| LEGUMINOSAE              | 4                   | 14228            | 5501              | 1                  | 7             | 29             | 4               | 14                        |
| EBENACEAE                | 4                   | 1300             | 2550              | 1                  | 1             | 14             | 4               | 6                         |
| ACANTHACEAE              | 2                   | 23000            | 559               | 1                  | 12            | 3              | 2               | 6                         |
| ZAMIACEAE                | 4                   | 3745             | 1798              | 1                  | 2             | 10             | 4               | 5                         |
| EUPHORBIACEAE            | 3                   | 17875            | 515               | 1                  | 9             | 3              | 3               | 5                         |
| MALVACEAE                | 3                   | 17520            | 171               | 1                  | 9             | 1              | 3               | 4                         |
| RUTACEAE                 | 4                   | 983              | 1220              | 1                  | 1             | 7              | 4               | 4                         |
| ULMACEAE                 | 4                   | 440              | 655               | 1                  | 0             | 4              | 4               | 3                         |
| MALPIGHIACEAE            | 1                   | 7500             | 401               | 0                  | 4             | 2              | 1               | 2                         |
| FAM07                    | 1                   | 11125            | 29                | 0                  | 6             | 0              | 1               | 2                         |
| FAM02                    | 1                   | 10375            | 32                | 0                  | 5             | 0              | 1               | 2                         |
| ASTERACEAE               | 1                   | 10375            | 22                | 0                  | 5             | 0              | 1               | 2                         |
| OLEACEAE                 | 3                   | 270              | 657               | 1                  | 0             | 4              | 3               | 2                         |
| FAM06                    | 1                   | 7875             | 29                | 0                  | 4             | 0              | 1               | 2                         |
| RHAMNACEAE               | 4                   | 78               | 210               | 1                  | 0             | 1              | 4               | 2                         |
| FAGACEAE                 | 1                   | 15               | 728               | 0                  | 0             | 4              | 1               | 2                         |
| BERBERIDACEAE            | 3                   | 110              | 295               | 1                  | 0             | 2              | 3               | 1                         |
| FAM44                    | 1                   | 500              | 583               | 0                  | 0             | 3              | 1               | 1                         |
| FAM01                    | 1                   | 5875             | 40                | 0                  | 3             | 0              | 1               | 1                         |
| ANACARDIACEAE            | 2                   | 25               | 366               | 1                  | 0             | 2              | 2               | 1                         |
| LAURACEAE                | 1                   | 65               | 521               | 0                  | 0             | 3              | 1               | 1                         |
| CACTACEAE                | 3                   | 315              | 131               | 1                  | 0             | 1              | 3               | 1                         |
| BORAGINACEAE             | 2                   | 55               | 300               | 1                  | 0             | 2              | 2               | 1                         |
| FAM05                    | 1                   | 4000             | 25                | 0                  | 2             | 0              | 1               | 1                         |
| FAM68                    | 1                   | 4125             | 7                 | 0                  | 2             | 0              | 1               | 1                         |
| FAM09                    | 1                   | 3250             | 11                | 0                  | 2             | 0              | 1               | 1                         |
| FAM16                    | 1                   | 3125             | 13                | 0                  | 2             | 0              | 1               | 1                         |
| GRAMINEAE                | 2                   | 1375             | 6                 | 1                  | 1             | 0              | 2               | 1                         |
| FAM03                    | 1                   | 2875             | 6                 | 0                  | 2             | 0              | 1               | 1                         |
| ASCLEPIADACEAE           | 1                   | 875              | 196               | 0                  | 0             | 1              | 1               | 1                         |

|               |   |      |     |   |   |   |   |   |   |   |
|---------------|---|------|-----|---|---|---|---|---|---|---|
| FAM14         | 1 | 1625 | 118 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| FAM35         | 1 | 1250 | 140 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| FAM74         | 1 | 2500 | 2   | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| FAM69         | 1 | 2375 | 3   | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| FAM15         | 1 | 2125 | 14  | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| FAM75         | 1 | 2250 | 2   | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| VERBENACEAE   | 1 | 250  | 191 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| FAM71         | 1 | 1750 | 14  | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| FAM65         | 1 | 1750 | 4   | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| FAM66         | 1 | 1500 | 14  | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| FAM36         | 1 | 1250 | 34  | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| FAM64         | 1 | 1250 | 33  | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| FAM08         | 1 | 1375 | 7   | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| FAM72         | 1 | 1375 | 4   | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| RUBIACEAE     | 1 | 60   | 126 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| SAPINDACEAE   | 1 | 125  | 119 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| FAM22         | 1 | 1250 | 4   | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| FAM73         | 1 | 1125 | 8   | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| FAM70         | 1 | 1125 | 1   | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| POLYPODIACEAE | 1 | 1000 | 6   | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| FAM13         | 1 | 1000 | 3   | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| FAM24         | 1 | 1000 | 2   | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| FAM41         | 1 | 125  | 75  | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| LABIATAE      | 1 | 875  | 1   | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FAM67         | 1 | 750  | 10  | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FAM21         | 1 | 750  | 3   | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FAM20         | 1 | 750  | 2   | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FAM76         | 1 | 750  | 2   | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FAM10         | 1 | 750  | 2   | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FAM18         | 1 | 625  | 3   | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FAM37         | 1 | 625  | 2   | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FAM12         | 1 | 85   | 52  | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FAM40         | 1 | 250  | 32  | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FAM04         | 1 | 500  | 5   | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FAM23         | 1 | 500  | 3   | 0 | 0 | 0 | 0 | 0 | 0 | 0 |



|                |   |     |    |   |   |   |   |   |   |
|----------------|---|-----|----|---|---|---|---|---|---|
| FAM19          | 1 | 500 | 1  | 0 | 0 | 0 | 0 | 1 | 0 |
| FLACOURTIACEAE | 1 | 15  | 31 | 0 | 0 | 0 | 0 | 1 | 0 |
| FAM42          | 1 | 125 | 18 | 0 | 0 | 0 | 0 | 1 | 0 |
| COMPOSITAE     | 1 | 15  | 18 | 0 | 0 | 0 | 0 | 1 | 0 |
| FAM39          | 1 | 125 | 0  | 0 | 0 | 0 | 0 | 1 | 0 |
| FAM38          | 1 | 125 | 0  | 0 | 0 | 0 | 0 | 1 | 0 |
| FAM11          | 1 | 25  | 4  | 0 | 0 | 0 | 0 | 1 | 0 |
| ZYGOPHYLLACEAE | 1 | 10  | 1  | 0 | 0 | 0 | 0 | 1 | 0 |
| FAM17          | 1 | 5   | 1  | 0 | 0 | 0 | 0 | 1 | 0 |

**Tabla 12 Valor de importancia de las especies acompañantes de *Dioon edule* var *angustifolium* en áreas cerradas**

| N. Científico                                | N. regional       | Familia       | Sitios pres | D / ha  | Cob./ha | Fr. | D. % | Cob.% | Fr.% | VI% |
|--|-------------------|---------------|-------------|---------|---------|-----|------|-------|------|-----|
| <i>Diospyros texana</i>                      | Chapote manzano   | EBENACEAE     | 3.0         | 1237.5  | 2272.9  | 0.8 | 0.6  | 12.2  | 2.2  | 5.0 |
| <i>Dioon edule</i> var. <i>angustifolium</i> | Chamal            | ZAMIACEAE     | 4.0         | 3745.0  | 1797.9  | 1.0 | 2.0  | 9.6   | 2.9  | 4.8 |
| <i>Ebanopsis ebano</i>                       | Ébano             | LEGUMINOSAE   | 2.0         | 352.5   | 2002.3  | 0.5 | 0.2  | 10.7  | 1.4  | 4.1 |
| <i>Ruellia</i> sp 501                        |                   | ACANTHACEAE   | 1.0         | 16500.0 | 483.2   | 0.3 | 8.6  | 2.6   | 0.7  | 4.0 |
| <i>Acacia berlandieri</i>                    | Huajillo          | LEGUMINOSAE   | 2.0         | 595.0   | 1723.6  | 0.5 | 0.3  | 9.2   | 1.4  | 3.7 |
| <i>Havardia pallens</i>                      | Tenaza            | LEGUMINOSAE   | 4.0         | 412.5   | 880.0   | 1.0 | 0.2  | 4.7   | 2.9  | 2.6 |
| <i>Sida physocalyx</i>                       | Malva             | MALVACEAE     | 2.0         | 11125.0 | 28.5    | 0.5 | 5.8  | 0.2   | 1.4  | 2.5 |
| <i>Melipighia glabra</i>                     |                   | MALPIGHIACEAE | 1.0         | 7500.0  | 401.3   | 0.3 | 3.9  | 2.1   | 0.7  | 2.3 |
| <i>Mimosa malacophylla</i>                   |                   | LEGUMINOSAE   | 2.0         | 5375.0  | 458.9   | 0.5 | 2.8  | 2.5   | 1.4  | 2.2 |
| <i>Incertae saedis</i> 206                   |                   | FAM07         | 1.0         | 11125.0 | 29.2    | 0.3 | 5.8  | 0.2   | 0.7  | 2.2 |
| <i>Celtis pallida</i>                        | Granjeno          | ULMACEAE      | 4.0         | 435.0   | 647.5   | 1.0 | 0.2  | 3.5   | 2.9  | 2.2 |
| <i>Incertae saedis</i> 201                   |                   | FAM02         | 1.0         | 10375.0 | 31.6    | 0.3 | 5.4  | 0.2   | 0.7  | 2.1 |
| <i>Zanthoxylum fagara</i>                    | Collima           | RUTACEAE      | 4.0         | 445.0   | 526.5   | 1.0 | 0.2  | 2.8   | 2.9  | 2.0 |
| <i>Forestiera angustifolia</i>               | Panalero          | OLEACEAE      | 3.0         | 265.0   | 519.6   | 0.8 | 0.1  | 2.8   | 2.2  | 1.7 |
| <i>Incertae saedis</i> 205                   |                   | FAM06         | 1.0         | 7875.0  | 28.7    | 0.3 | 4.1  | 0.2   | 0.7  | 1.7 |
| <i>Quercus</i> sp 234                        | Encino            | FAGACEAE      | 1.0         | 15.0    | 727.7   | 0.3 | 0.0  | 3.9   | 0.7  | 1.5 |
| <i>Calyptocarpus</i> sp                      | Amor seco         | ASTERACEAE    | 1.0         | 6750.0  | 16.0    | 0.3 | 3.5  | 0.1   | 0.7  | 1.4 |
| <i>Tragia ramosa</i>                         | Ortigailla        | EUPHORBIACEAE | 1.0         | 4375.0  | 233.6   | 0.3 | 2.3  | 1.2   | 0.7  | 1.4 |
| <i>Incertae saedis</i> 525                   | Cuacha de gallina | FAM44         | 1.0         | 500.0   | 582.8   | 0.3 | 0.3  | 3.1   | 0.7  | 1.4 |
| <i>Incertae saedis</i> 200                   |                   | FAM01         | 1.0         | 5875.0  | 39.6    | 0.3 | 3.1  | 0.2   | 0.7  | 1.3 |
| <i>Condalia hookeri</i>                      | Brasil            | RHAMNACEAE    | 4.0         | 52.5    | 170.6   | 1.0 | 0.0  | 0.9   | 2.9  | 1.3 |
| <i>Berberis chochocco</i>                    | Palo amarillo     | BERBERIDACEAE | 3.0         | 110.0   | 294.7   | 0.8 | 0.1  | 1.6   | 2.2  | 1.3 |
| <i>Anoda cristata</i>                        |                   | MALVACEAE     | 2.0         | 3500.0  | 80.6    | 0.5 | 1.8  | 0.4   | 1.4  | 1.2 |
| <i>Phoebe tampicensis</i>                    | Mahuira           | LAURACEAE     | 1.0         | 65.0    | 520.6   | 0.3 | 0.0  | 2.8   | 0.7  | 1.2 |
| <i>Croton</i> sp 803                         |                   | EUPHORBIACEAE | 1.0         | 4875.0  | 35.7    | 0.3 | 2.6  | 0.2   | 0.7  | 1.2 |
| <i>Cordia boissieri</i>                      | Anacahuita        | BORAGINACEAE  | 2.0         | 55.0    | 299.9   | 0.5 | 0.0  | 1.6   | 1.4  | 1.0 |
| <i>Croton cortesianus</i>                    | Palillo           | EUPHORBIACEAE | 1.0         | 3000.0  | 142.5   | 0.3 | 1.6  | 0.8   | 0.7  | 1.0 |
| <i>Incertae saedis</i> 204                   |                   | FAM05         | 1.0         | 4000.0  | 25.0    | 0.3 | 2.1  | 0.1   | 0.7  | 1.0 |
| <i>Incertae saedis</i> 800                   | Zacate            | FAM68         | 1.0         | 4125.0  | 6.7     | 0.3 | 2.2  | 0.0   | 0.7  | 1.0 |
| <i>Esenbeckia berlandieri</i>                | Limoncillo        | RUTACEAE      | 2.0         | 57.5    | 266.3   | 0.5 | 0.0  | 1.4   | 1.4  | 1.0 |
| <i>Opuntia lindheimeri</i>                   | Nopal             | CACTACEAE     | 3.0         | 260.0   | 97.2    | 0.8 | 0.1  | 0.5   | 2.2  | 0.9 |

|                             |                 |                |     |        |       |     |     |     |     |     |
|-----------------------------|-----------------|----------------|-----|--------|-------|-----|-----|-----|-----|-----|
| <i>Ruellia</i> sp 765       | Malvón          | ACANTHACEAE    | 1.0 | 3250.0 | 65.7  | 0.3 | 1.7 | 0.4 | 0.7 | 0.9 |
| <i>Helietta parvifolia</i>  | Barreta blanca  | RUTACEAE       | 1.0 | 330.0  | 338.7 | 0.3 | 0.2 | 1.8 | 0.7 | 0.9 |
| <i>Bidens</i> sp            |                 | ASTERACEAE     | 1.0 | 3625.0 | 6.5   | 0.3 | 1.9 | 0.0 | 0.7 | 0.9 |
| <i>Pistacia texana</i>      | Lantrisco       | ANACARDIACEAE  | 1.0 | 20.0   | 353.8 | 0.3 | 0.0 | 1.9 | 0.7 | 0.9 |
| <i>Tragia</i> sp            | Ortigailla      | EUPHORBIACEAE  | 1.0 | 3500.0 | 4.1   | 0.3 | 1.8 | 0.0 | 0.7 | 0.9 |
| <i>Acacia rigidula</i>      | Gavia           | LEGUMINOSAE    | 2.0 | 165.0  | 190.9 | 0.5 | 0.1 | 1.0 | 1.4 | 0.8 |
| <i>Cracca</i> sp            |                 | LEGUMINOSAE    | 1.0 | 3375.0 | 4.1   | 0.3 | 1.8 | 0.0 | 0.7 | 0.8 |
| <i>Incirtae saedis</i> 209  |                 | FAM09          | 1.0 | 3250.0 | 11.2  | 0.3 | 1.7 | 0.1 | 0.7 | 0.8 |
| <i>Incirtae saedis</i> 217  |                 | FAM16          | 1.0 | 3125.0 | 12.8  | 0.3 | 1.6 | 0.1 | 0.7 | 0.8 |
| <i>Croton</i> sp 506        | Palillo         | EUPHORBIACEAE  | 1.0 | 2125.0 | 98.7  | 0.3 | 1.1 | 0.5 | 0.7 | 0.8 |
| <i>Incirtae saedis</i> 202  |                 | FAM03          | 1.0 | 2875.0 | 6.2   | 0.3 | 1.5 | 0.0 | 0.7 | 0.8 |
| <i>Cynanchum barbigerum</i> |                 | ASCLEPIADACEAE | 1.0 | 875.0  | 196.2 | 0.3 | 0.5 | 1.0 | 0.7 | 0.7 |
| <i>Incirtae saedis</i> 215  |                 | FAM14          | 1.0 | 1625.0 | 118.2 | 0.3 | 0.9 | 0.6 | 0.7 | 0.7 |
| <i>Setaria leucopila</i>    | Zacate cadillo  | GRAMINEAE      | 2.0 | 1375.0 | 6.5   | 0.5 | 0.7 | 0.0 | 1.4 | 0.7 |
| <i>Coursetiaibaea</i> sp    |                 | LEGUMINOSAE    | 1.0 | 2750.0 | 3.7   | 0.3 | 1.4 | 0.0 | 0.7 | 0.7 |
| <i>Acacia farnesiana</i>    | Huizache        | LEGUMINOSAE    | 1.0 | 1057.5 | 165.2 | 0.3 | 0.6 | 0.9 | 0.7 | 0.7 |
| <i>Incirtae saedis</i> 502  |                 | FAM35          | 1.0 | 1250.0 | 140.1 | 0.3 | 0.7 | 0.7 | 0.7 | 0.7 |
| <i>Carlownrightia</i> sp    | Verdolagón      | ACANTHACEAE    | 1.0 | 2625.0 | 4.7   | 0.3 | 1.4 | 0.0 | 0.7 | 0.7 |
| <i>Incirtae saedis</i> 812  |                 | FAM74          | 1.0 | 2500.0 | 1.8   | 0.3 | 1.3 | 0.0 | 0.7 | 0.7 |
| <i>Incirtae saedis</i> 802  |                 | FAM69          | 1.0 | 2375.0 | 2.8   | 0.3 | 1.2 | 0.0 | 0.7 | 0.7 |
| <i>Incirtae saedis</i> 216  |                 | FAM15          | 1.0 | 2125.0 | 14.5  | 0.3 | 1.1 | 0.1 | 0.7 | 0.6 |
| <i>Incirtae saedis</i> 813  |                 | FAM75          | 1.0 | 2250.0 | 1.6   | 0.3 | 1.2 | 0.0 | 0.7 | 0.6 |
| <i>Lantana macropoda</i>    |                 | VERBENACEAE    | 1.0 | 250.0  | 190.9 | 0.3 | 0.1 | 1.0 | 0.7 | 0.6 |
| <i>Sida filicaulis</i>      | Ortigailla      | MALVACEAE      | 1.0 | 2125.0 | 4.9   | 0.3 | 1.1 | 0.0 | 0.7 | 0.6 |
| <i>Diospyros</i> sp 232     | Chapote manzano | EBENACEAE      | 1.0 | 52.5   | 201.4 | 0.3 | 0.0 | 1.1 | 0.7 | 0.6 |
| <i>Incirtae saedis</i> 806  | Enredadera      | FAM71          | 1.0 | 1750.0 | 13.6  | 0.3 | 0.9 | 0.1 | 0.7 | 0.6 |
| <i>Incirtae saedis</i> 773  | Tule            | FAM65          | 1.0 | 1750.0 | 4.4   | 0.3 | 0.9 | 0.0 | 0.7 | 0.6 |
| <i>Opuntia leptocaulis</i>  | Tasajillo       | CACTACEAE      | 2.0 | 55.0   | 33.4  | 0.5 | 0.0 | 0.2 | 1.4 | 0.5 |
| <i>Incirtae saedis</i> 774  |                 | FAM66          | 1.0 | 1500.0 | 14.5  | 0.3 | 0.8 | 0.1 | 0.7 | 0.5 |
| <i>Incirtae saedis</i> 508  | Zacate pelillo  | FAM36          | 1.0 | 1250.0 | 34.0  | 0.3 | 0.7 | 0.2 | 0.7 | 0.5 |
| <i>Incirtae saedis</i> 764  |                 | FAM64          | 1.0 | 1250.0 | 32.7  | 0.3 | 0.7 | 0.2 | 0.7 | 0.5 |
| <i>Incirtae saedis</i> 207  |                 | FAM08          | 1.0 | 1375.0 | 6.6   | 0.3 | 0.7 | 0.0 | 0.7 | 0.5 |
| <i>Incirtae saedis</i> 809  |                 | FAM72          | 1.0 | 1375.0 | 4.3   | 0.3 | 0.7 | 0.0 | 0.7 | 0.5 |
| <i>Fraxinus greggii</i>     | Candelilla      | OLEACEAE       | 1.0 | 5.0    | 137.1 | 0.3 | 0.0 | 0.7 | 0.7 | 0.5 |
| <i>Randia laetevirens</i>   | Crucillo        | RUBIACEAE      | 1.0 | 60.0   | 126.4 | 0.3 | 0.0 | 0.7 | 0.7 | 0.5 |

|                                |                  |                |     |        |       |     |     |     |     |     |
|--------------------------------|------------------|----------------|-----|--------|-------|-----|-----|-----|-----|-----|
| <i>Serjania</i> sp 522         |                  | SAPINDACEAE    | 1.0 | 125.0  | 118.8 | 0.3 | 0.1 | 0.6 | 0.7 | 0.5 |
| <i>Incertae saedis</i> 223     |                  | FAM22          | 1.0 | 1250.0 | 4.3   | 0.3 | 0.7 | 0.0 | 0.7 | 0.5 |
| <i>Incertae saedis</i> 810     | Cenizo           | FAM73          | 1.0 | 1125.0 | 8.1   | 0.3 | 0.6 | 0.0 | 0.7 | 0.5 |
| <i>Incertae saedis</i> 805     |                  | FAM70          | 1.0 | 1125.0 | 1.4   | 0.3 | 0.6 | 0.0 | 0.7 | 0.4 |
| <i>Amyris madreensis</i>       | Barreta china    | RUTACEAE       | 1.0 | 150.0  | 88.9  | 0.3 | 0.1 | 0.5 | 0.7 | 0.4 |
| <i>Notholaena</i> sp           | Helecho          | POLYPODIACEAE  | 1.0 | 1000.0 | 5.6   | 0.3 | 0.5 | 0.0 | 0.7 | 0.4 |
| <i>Incertae saedis</i> 214     |                  | FAM13          | 1.0 | 1000.0 | 3.2   | 0.3 | 0.5 | 0.0 | 0.7 | 0.4 |
| <i>Incertae saedis</i> 225     |                  | FAM24          | 1.0 | 1000.0 | 1.5   | 0.3 | 0.5 | 0.0 | 0.7 | 0.4 |
| <i>Incertae saedis</i> 515     |                  | FAM41          | 1.0 | 125.0  | 75.2  | 0.3 | 0.1 | 0.4 | 0.7 | 0.4 |
| <i>Salvia</i> sp 811           |                  | LABIATAE       | 1.0 | 875.0  | 1.5   | 0.3 | 0.5 | 0.0 | 0.7 | 0.4 |
| <i>Incertae saedis</i> 776     | Hierba azul      | FAM67          | 1.0 | 750.0  | 9.5   | 0.3 | 0.4 | 0.1 | 0.7 | 0.4 |
| <i>Diospyros palmeri</i>       | Chapote prieto   | EBENACEAE      | 1.0 | 10.0   | 75.6  | 0.3 | 0.0 | 0.4 | 0.7 | 0.4 |
| <i>Incertae saedis</i> 222     |                  | FAM21          | 1.0 | 750.0  | 2.6   | 0.3 | 0.4 | 0.0 | 0.7 | 0.4 |
| <i>Incertae saedis</i> 221     |                  | FAM20          | 1.0 | 750.0  | 2.0   | 0.3 | 0.4 | 0.0 | 0.7 | 0.4 |
| <i>Incertae saedis</i> 815     |                  | FAM76          | 1.0 | 750.0  | 1.7   | 0.3 | 0.4 | 0.0 | 0.7 | 0.4 |
| <i>Incertae saedis</i> 210     |                  | FAM10          | 1.0 | 750.0  | 1.6   | 0.3 | 0.4 | 0.0 | 0.7 | 0.4 |
| <i>Incertae saedis</i> 526     |                  | MALVACEAE      | 1.0 | 250.0  | 45.4  | 0.3 | 0.1 | 0.2 | 0.7 | 0.4 |
| <i>Acacia roemeriana</i>       | Palo de arco     | LEGUMINOSAE    | 1.0 | 10.0   | 66.4  | 0.3 | 0.0 | 0.4 | 0.7 | 0.4 |
| <i>Ruellia nudiflora</i>       |                  | ACANTHACEAE    | 1.0 | 625.0  | 5.7   | 0.3 | 0.3 | 0.0 | 0.7 | 0.4 |
| <i>Incertae saedis</i> 219     |                  | FAM18          | 1.0 | 625.0  | 2.8   | 0.3 | 0.3 | 0.0 | 0.7 | 0.4 |
| <i>Incertae saedis</i> 509     |                  | FAM37          | 1.0 | 625.0  | 1.6   | 0.3 | 0.3 | 0.0 | 0.7 | 0.4 |
| <i>Incertae saedis</i> 213     |                  | FAM12          | 1.0 | 85.0   | 52.3  | 0.3 | 0.0 | 0.3 | 0.7 | 0.3 |
| <i>Incertae saedis</i> 513     |                  | FAM40          | 1.0 | 250.0  | 32.0  | 0.3 | 0.1 | 0.2 | 0.7 | 0.3 |
| <i>Incertae saedis</i> 203     |                  | FAM04          | 1.0 | 500.0  | 5.0   | 0.3 | 0.3 | 0.0 | 0.7 | 0.3 |
| <i>Incertae saedis</i> 224     |                  | FAM23          | 1.0 | 500.0  | 2.9   | 0.3 | 0.3 | 0.0 | 0.7 | 0.3 |
| <i>Incertae saedis</i> 220     |                  | FAM19          | 1.0 | 500.0  | 1.2   | 0.3 | 0.3 | 0.0 | 0.7 | 0.3 |
| <i>Malvastrum</i> sp           | Sacasil          | MALVACEAE      | 1.0 | 500.0  | 0.9   | 0.3 | 0.3 | 0.0 | 0.7 | 0.3 |
| <i>Karwinskia humboldtiana</i> | Tullidor         | RHAMNACEAE     | 1.0 | 25.0   | 39.2  | 0.3 | 0.0 | 0.2 | 0.7 | 0.3 |
| <i>Xylosma flexuosum</i>       | Crucillo         | FLACOURTIACEAE | 1.0 | 15.0   | 30.9  | 0.3 | 0.0 | 0.2 | 0.7 | 0.3 |
| <i>Incertae saedis</i> 519     |                  | FAM42          | 1.0 | 125.0  | 17.7  | 0.3 | 0.1 | 0.1 | 0.7 | 0.3 |
| <i>Stevia</i> sp               | Jara             | COMPOSITAE     | 1.0 | 15.0   | 18.0  | 0.3 | 0.0 | 0.1 | 0.7 | 0.3 |
| <i>Caesalpinia mexicana</i>    | Hierba del potro | LEGUMINOSAE    | 1.0 | 135.0  | 6.2   | 0.3 | 0.1 | 0.0 | 0.7 | 0.3 |
| <i>Incertae saedis</i> 511     |                  | FAM39          | 1.0 | 125.0  | 0.5   | 0.3 | 0.1 | 0.0 | 0.7 | 0.3 |
| <i>Rhus virens</i>             | Agrito           | ANACARDIACEAE  | 1.0 | 5.0    | 12.0  | 0.3 | 0.0 | 0.1 | 0.7 | 0.3 |
| <i>Incertae saedis</i> 510     |                  | FAM38          | 1.0 | 125.0  | 0.2   | 0.3 | 0.1 | 0.0 | 0.7 | 0.3 |

|                               |             |                |     |      |      |     |     |     |     |     |
|-------------------------------|-------------|----------------|-----|------|------|-----|-----|-----|-----|-----|
| <i>Sphaeralcea</i> sp         |             |                | 1.0 | 20.0 | 10.3 | 0.3 | 0.0 | 0.1 | 0.7 | 0.3 |
| <i>Cellis reticulata</i>      | Palo blanco |                | 1.0 | 5.0  | 7.2  | 0.3 | 0.0 | 0.0 | 0.7 | 0.3 |
| <i>Incertae saedis 211</i>    |             |                | 1.0 | 25.0 | 4.2  | 0.3 | 0.0 | 0.0 | 0.7 | 0.3 |
| <i>Guaiacum angustifolium</i> | Guayacán    | ZYGOPHYLLACEAE | 1.0 | 10.0 | 1.3  | 0.3 | 0.0 | 0.0 | 0.7 | 0.2 |
| <i>Incertae saedis 218</i>    |             | FAM17          | 1.0 | 5.0  | 0.6  | 0.3 | 0.0 | 0.0 | 0.7 | 0.2 |

## ANEXO II

**Tabla 12: Perfil A, A max. e Índice de equitatividad de las especies acompañantes de *Dioon edule* var *angustifolium* en áreas abiertas**

| Altura | N. sp. | Nom. de sp                                   | Nom. regional          | Familia       | d / ha | pi      | Lnpi  | pi*Lnpi |
|--------|--------|--|------------------------|---------------|--------|---------|-------|---------|
| 0-6.5  | 1      | <i>Abutilon incanum</i>                      |                        | MALVACEAE     | 250    | 0.00274 | -5.90 | -0.0162 |
| 0-6.5  | 2      | <i>Abutilon</i> sp 549                       |                        | MALVACEAE     | 500    | 0.00549 | -5.21 | -0.0286 |
| 0-6.5  | 3      | <i>Abutilon</i> sp 554                       |                        | MALVACEAE     | 250    | 0.00274 | -5.90 | -0.0162 |
| 0-6.5  | 4      | <i>Abutilon</i> sp 575                       |                        | MALVACEAE     | 125    | 0.00137 | -6.59 | -0.0090 |
| 0-6.5  | 5      | <i>Acacia berlandieri</i>                    | Huajillo               | LEGUMINOSAE   | 55     | 0.00060 | -7.41 | -0.0045 |
| 0-6.5  | 6      | <i>Acacia farnesiana</i>                     | Huizache               | LEGUMINOSAE   | 195    | 0.00214 | -6.15 | -0.0132 |
| 0-6.5  | 7      | <i>Acacia rigidula</i>                       | Gavia                  | LEGUMINOSAE   | 1995   | 0.02190 | -3.82 | -0.0837 |
| 0-6.5  | 9      | <i>Acalypha</i> sp                           |                        | EUPHORBIACEAE | 375    | 0.00412 | -5.49 | -0.0226 |
| 0-6.5  | 10     | <i>Acleisanthes</i> sp                       |                        | NYCTAGINACEAE | 125    | 0.00137 | -6.59 | -0.0090 |
| 0-6.5  | 11     | <i>Allionia incarnata</i>                    |                        | NYCTAGINACEAE | 2125   | 0.02332 | -3.76 | -0.0877 |
| 0-6.5  | 12     | <i>Ambrosia psilostachya</i>                 | Yerbajo                | ASTERACEAE    | 1750   | 0.01921 | -3.95 | -0.0759 |
| 0-6.5  | 13     | <i>Amyris madrensis</i>                      | Barreta china          | RUTACEAE      | 1015   | 0.01114 | -4.50 | -0.0501 |
| 0-6.5  | 14     | <i>Anoda cristata</i>                        |                        | MALVACEAE     | 125    | 0.00137 | -6.59 | -0.0090 |
| 0-6.5  | 15     | <i>Anoda</i> sp                              |                        | MALVACEAE     | 375    | 0.00412 | -5.49 | -0.0226 |
| 0-6.5  | 16     | <i>Berberis chochocco</i>                    | Palo amarillo          | BERBERIDACEAE | 195    | 0.00214 | -6.15 | -0.0132 |
| 0-6.5  | 17     | <i>Bernardia myricaefolia</i>                |                        | EUPHORBIACEAE | 785    | 0.00862 | -4.75 | -0.0410 |
| 0-6.5  | 19     | <i>Caesalpinia mexicana</i>                  | Hierba del potro       | LEGUMINOSAE   | 5      | 0.00005 | -9.81 | -0.0005 |
| 0-6.5  | 21     | <i>Calliandra eriophylla</i>                 |                        | LEGUMINOSAE   | 125    | 0.00137 | -6.59 | -0.0090 |
| 0-6.5  | 23     | <i>Celtis pallida</i>                        | Granjeno               | ULMACEAE      | 1770   | 0.01943 | -3.94 | -0.0766 |
| 0-6.5  | 24     | <i>Celtis reticulata</i>                     | Palo blanco            | ULMACEAE      | 10     | 0.00011 | -9.12 | -0.0010 |
| 0-6.5  | 25     | <i>Cissus sicyoides</i>                      | Enredadera             | VITACEAE      | 125    | 0.00137 | -6.59 | -0.0090 |
| 0-6.5  | 26     | <i>Commelina coelestis</i>                   |                        | COMMELINACEAE | 125    | 0.00137 | -6.59 | -0.0090 |
| 0-6.5  | 27     | <i>Commelina</i> sp                          |                        | COMMELINACEAE | 2250   | 0.02470 | -3.70 | -0.0914 |
| 0-6.5  | 28     | <i>Condalia hookeri</i>                      | Brasil                 | RHAMNACEAE    | 405    | 0.00445 | -5.42 | -0.0241 |
| 0-6.5  | 29     | <i>Cordia boissieri</i>                      | Anacahuita             | BORAGINACEAE  | 70     | 0.00077 | -7.17 | -0.0055 |
| 0-6.5  | 34     | <i>Croton</i> sp 582                         |                        | EUPHORBIACEAE | 125    | 0.00137 | -6.59 | -0.0090 |
| 0-6.5  | 36     | <i>Croton torreyanus</i>                     | Palillo                | EUPHORBIACEAE | 4275   | 0.04692 | -3.06 | -0.1436 |
| 0-6.5  | 38     | <i>Digitaria californica</i>                 | Zacate de perro        | GRAMINEAE     | 1000   | 0.01098 | -4.51 | -0.0495 |
| 0-6.5  | 39     | <i>Dioon edule</i> var. <i>angustifolium</i> | Chamal                 | ZAMIACEAE     | 6902.5 | 0.07576 | -2.58 | -0.1955 |
| 0-6.5  | 40     | <i>Diospyros palmeri</i>                     | Chapote prieto         | EBENACEAE     | 37.5   | 0.00041 | -7.80 | -0.0032 |
| 0-6.5  | 41     | <i>Diospyros</i> sp 232                      | Chapote manzano        | EBENACEAE     | 15     | 0.00016 | -8.71 | -0.0014 |
| 0-6.5  | 42     | <i>Diospyros texana</i>                      | Chapote blanco         | EBENACEAE     | 975    | 0.01070 | -4.54 | -0.0486 |
| 0-6.5  | 43     | <i>Ebanopsis ebano</i>                       | Ébano                  | LEGUMINOSAE   | 10     | 0.00011 | -9.12 | -0.0010 |
| 0-6.5  | 44     | <i>Ehretia anacua</i>                        | Anacua                 | BORAGINACEAE  | 25     | 0.00027 | -8.20 | -0.0023 |
| 0-6.5  | 45     | <i>Elytraria imbricata</i>                   |                        | ACANTHACEAE   | 750    | 0.00823 | -4.80 | -0.0395 |
| 0-6.5  | 46     | <i>Eragrostis</i> sp                         | Zacate pata de gallina | GRAMINEAE     | 4000   | 0.04391 | -3.13 | -0.1372 |

|       |     |                                  |               |                |      |         |       |         |
|-------|-----|----------------------------------|---------------|----------------|------|---------|-------|---------|
| 0-6.5 | 48  | <i>Evolvulus alsinoides</i>      |               | CONVOLVULACEAE | 1625 | 0.01784 | -4.03 | -0.0718 |
| 0-6.5 | 49  | <i>Eysenhardtia polystachya</i>  | Vara dulce    | LEGUMINOSAE    | 75   | 0.00082 | -7.10 | -0.0058 |
| 0-6.5 | 50  | <i>Forestiera angustifolia</i>   | Panalero      | OLEACEAE       | 205  | 0.00225 | -6.10 | -0.0137 |
| 0-6.5 | 52  | <i>Galactia striata</i>          |               | LEGUMINOSAE    | 250  | 0.00274 | -5.90 | -0.0162 |
| 0-6.5 | 53  | <i>Guaiacum angustifolium</i>    | Guayacán      | ZYGOPHYLLACEAE | 5    | 0.00005 | -9.81 | -0.0005 |
| 0-6.5 | 54  | <i>Havardia pallens</i>          | Tenaza        | LEGUMINOSAE    | 515  | 0.00565 | -5.18 | -0.0293 |
| 0-6.5 | 56  | <i>Heliotropium curassavicum</i> |               | BORAGINACEAE   | 1375 | 0.01509 | -4.19 | -0.0633 |
| 0-6.5 | 81  | <i>Incertae saedis 425</i>       |               | FAM24          | 250  | 0.00274 | -5.90 | -0.0162 |
| 0-6.5 | 82  | <i>Incertae saedis 426</i>       | Poleo         | FAM25          | 125  | 0.00137 | -6.59 | -0.0090 |
| 0-6.5 | 83  | <i>Incertae saedis 430</i>       | Chicalote     | FAM26          | 530  | 0.00582 | -5.15 | -0.0299 |
| 0-6.5 | 84  | <i>Incertae saedis 437</i>       | Palo amarillo | FAM27          | 5    | 0.00005 | -9.81 | -0.0005 |
| 0-6.5 | 85  | <i>Incertae saedis 439</i>       | Pega ropa     | FAM28          | 125  | 0.00137 | -6.59 | -0.0090 |
| 0-6.5 | 86  | <i>Incertae saedis 444</i>       |               | FAM29          | 250  | 0.00274 | -5.90 | -0.0162 |
| 0-6.5 | 87  | <i>Incertae saedis 445</i>       |               | FAM30          | 125  | 0.00137 | -6.59 | -0.0090 |
| 0-6.5 | 88  | <i>Incertae saedis 446</i>       |               | FAM31          | 125  | 0.00137 | -6.59 | -0.0090 |
| 0-6.5 | 89  | <i>Incertae saedis 450</i>       |               | FAM32          | 125  | 0.00137 | -6.59 | -0.0090 |
| 0-6.5 | 90  | <i>Incertae saedis 451</i>       |               | FAM33          | 750  | 0.00823 | -4.80 | -0.0395 |
| 0-6.5 | 91  | <i>Incertae saedis 453</i>       |               | FAM34          | 375  | 0.00412 | -5.49 | -0.0226 |
| 0-6.5 | 102 | <i>Incertae saedis 543</i>       | Zacate        | FAM45          | 2250 | 0.02470 | -3.70 | -0.0914 |
| 0-6.5 | 103 | <i>Incertae saedis 548</i>       | Zacate        | FAM46          | 2750 | 0.03018 | -3.50 | -0.1057 |
| 0-6.5 | 104 | <i>Incertae saedis 553</i>       | Zacate        | FAM47          | 6500 | 0.07135 | -2.64 | -0.1884 |
| 0-6.5 | 105 | <i>Incertae saedis 559</i>       | Zacate        | FAM48          | 1125 | 0.01235 | -4.39 | -0.0543 |
| 0-6.5 | 106 | <i>Incertae saedis 562</i>       | Yerbajo       | FAM49          | 875  | 0.00960 | -4.65 | -0.0446 |
| 0-6.5 | 107 | <i>Incertae saedis 567</i>       |               | MALVACEAE      | 250  | 0.00274 | -5.90 | -0.0162 |
| 0-6.5 | 108 | <i>Incertae saedis 568</i>       |               | FAM50          | 125  | 0.00137 | -6.59 | -0.0090 |
| 0-6.5 | 109 | <i>Incertae saedis 581</i>       | Zacate        | FAM51          | 2625 | 0.02881 | -3.55 | -0.1022 |
| 0-6.5 | 110 | <i>Incertae saedis 585</i>       |               | MALVACEAE      | 125  | 0.00137 | -6.59 | -0.0090 |
| 0-6.5 | 111 | <i>Incertae saedis 586</i>       |               | ASTERACEAE     | 125  | 0.00137 | -6.59 | -0.0090 |
| 0-6.5 | 112 | <i>Incertae saedis 623</i>       |               | FAM69          | 125  | 0.00137 | -6.59 | -0.0090 |
| 0-6.5 | 113 | <i>Incertae saedis 710</i>       |               | FAM52          | 125  | 0.00137 | -6.59 | -0.0090 |
| 0-6.5 | 114 | <i>Incertae saedis 711</i>       |               | FAM53          | 1000 | 0.01098 | -4.51 | -0.0495 |
| 0-6.5 | 115 | <i>Incertae saedis 712</i>       | Sacasil       | FAM54          | 250  | 0.00274 | -5.90 | -0.0162 |
| 0-6.5 | 116 | <i>Incertae saedis 713</i>       |               | FAM55          | 125  | 0.00137 | -6.59 | -0.0090 |
| 0-6.5 | 117 | <i>Incertae saedis 715</i>       |               | FAM56          | 1250 | 0.01372 | -4.29 | -0.0588 |
| 0-6.5 | 118 | <i>Incertae saedis 717</i>       | Pega ropa     | FAM57          | 1750 | 0.01921 | -3.95 | -0.0759 |
| 0-6.5 | 119 | <i>Incertae saedis 718</i>       | Amor seco     | FAM58          | 5000 | 0.05488 | -2.90 | -0.1593 |
| 0-6.5 | 120 | <i>Incertae saedis 719</i>       | Malva         | FAM59          | 2000 | 0.02195 | -3.82 | -0.0838 |
| 0-6.5 | 121 | <i>Incertae saedis 722</i>       |               | FAM60          | 500  | 0.00549 | -5.21 | -0.0286 |
| 0-6.5 | 122 | <i>Incertae saedis 723</i>       |               | FAM61          | 750  | 0.00823 | -4.80 | -0.0395 |
| 0-6.5 | 123 | <i>Incertae saedis 728</i>       |               | FAM62          | 875  | 0.00960 | -4.65 | -0.0446 |
| 0-6.5 | 124 | <i>Incertae saedis 729</i>       |               | FAM63          | 625  | 0.00686 | -4.98 | -0.0342 |
| 0-6.5 | 138 | <i>Ipomoea purpurea</i>          | Hiedra        | CONVOLVULACEAE | 500  | 0.00549 | -5.21 | -0.0286 |
| 0-6.5 | 140 | <i>Ipomoea sp</i>                |               | CONVOLVULACEAE | 500  | 0.00549 | -5.21 | -0.0286 |
| 0-6.5 | 141 | <i>Karwinskia humboldtiana</i>   | Tullidor      | RHAMNACEAE     | 280  | 0.00307 | -5.78 | -0.0178 |
| 0-6.5 | 143 | <i>Litsea glaucescens</i>        |               | LAURACEAE      | 255  | 0.00280 | -5.88 | -0.0165 |
| 0-6.5 | 144 | <i>Litsea sp 576</i>             |               | LAURACEAE      | 125  | 0.00137 | -6.59 | -0.0090 |

Distribución y Relaciones Ecológicas del chamal *Dioon edule* var *angustifolium* en La Sierra de San Carlos Tamaulipas

Anexos

|           |     |                              |                 |                |       |         |       |         |
|-----------|-----|------------------------------|-----------------|----------------|-------|---------|-------|---------|
| 0-6.5     | 146 | <i>Malvastrum</i> sp         |                 | MALVACEAE      | 125   | 0.00137 | -6.59 | -0.0090 |
| 0-6.5     | 147 | <i>Mimosa malacophylla</i>   | Charrasquillo   | LEGUMINOSAE    | 625   | 0.00686 | -4.98 | -0.0342 |
| 0-6.5     | 148 | <i>Mimosa quadrivalvis</i>   |                 | MIMOSACEAE     | 625   | 0.00686 | -4.98 | -0.0342 |
| 0-6.5     | 149 | <i>Mimosa</i> sp             | Uña de gato     | MIMOSACEAE     | 30    | 0.00033 | -8.02 | -0.0026 |
| 0-6.5     | 151 | <i>Opuntia leptocaulis</i>   | Tasajillo       | CACTACEAE      | 215   | 0.00236 | -6.05 | -0.0143 |
| 0-6.5     | 152 | <i>Opuntia lindheimeri</i>   | Nopal           | CACTACEAE      | 520   | 0.00571 | -5.17 | -0.0295 |
| 0-6.5     | 153 | <i>Panicum</i> sp            | Zacate estrella | GRAMINEAE      | 1875  | 0.02058 | -3.88 | -0.0799 |
| 0-6.5     | 154 | <i>Parkinsonia aculeata</i>  | Retama          | LEGUMINOSAE    | 5     | 0.00005 | -9.81 | -0.0005 |
| 0-6.5     | 155 | <i>Parthenium confertum</i>  |                 | ASTERACEAE     | 1375  | 0.01509 | -4.19 | -0.0633 |
| 0-6.5     | 156 | <i>Pellaea ovata</i>         |                 | POLYPODIACEAE  | 2750  | 0.03018 | -3.50 | -0.1057 |
| 0-6.5     | 157 | <i>Phaseolus</i> sp          |                 | LEGUMINOSAE    | 125   | 0.00137 | -6.59 | -0.0090 |
| 0-6.5     | 159 | <i>Phyla incisa</i>          |                 | VERBENACEAE    | 125   | 0.00137 | -6.59 | -0.0090 |
| 0-6.5     | 161 | <i>Polygala</i> sp           |                 | POLIGALACEAE   | 1375  | 0.01509 | -4.19 | -0.0633 |
| 0-6.5     | 162 | <i>Prosopis levigata</i>     | Mezquite        | LEGUMINOSAE    | 5     | 0.00005 | -9.81 | -0.0005 |
| 0-6.5     | 165 | <i>Quercus</i> sp 607        | Encino amarillo | FAGACEAE       | 5     | 0.00005 | -9.81 | -0.0005 |
| 0-6.5     | 166 | <i>Randia laetevirens</i>    | Crucillo        | RUBIACEAE      | 15    | 0.00016 | -8.71 | -0.0014 |
| 0-6.5     | 171 | <i>Salvia</i> sp 592         |                 | LABIATAE       | 125   | 0.00137 | -6.59 | -0.0090 |
| 0-6.5     | 173 | <i>Sapoteca medii</i>        |                 | LEGUMINOSAE    | 125   | 0.00137 | -6.59 | -0.0090 |
| 0-6.5     | 174 | <i>Senna lindheimeriana</i>  |                 | LEGUMINOSAE    | 125   | 0.00137 | -6.59 | -0.0090 |
| 0-6.5     | 176 | <i>Serjania</i> sp 597       |                 | SAPINDACEAE    | 125   | 0.00137 | -6.59 | -0.0090 |
| 0-6.5     | 177 | <i>Serjania</i> sp 620       |                 | SAPINDACEAE    | 125   | 0.00137 | -6.59 | -0.0090 |
| 0-6.5     | 181 | <i>Siphonoglossa</i> sp      |                 | ACANTHACEAE    | 1125  | 0.01235 | -4.39 | -0.0543 |
| 0-6.5     | 182 | <i>Sphaeralcea coccinea</i>  |                 | MALVACEAE      | 125   | 0.00137 | -6.59 | -0.0090 |
| 0-6.5     | 183 | <i>Sphaeralcea</i> sp        |                 | MALVACEAE      | 125   | 0.00137 | -6.59 | -0.0090 |
| 0-6.5     | 184 | <i>Stevia</i> sp             |                 | COMPOSITAE     | 20    | 0.00022 | -8.42 | -0.0018 |
| 0-6.5     | 185 | <i>Talinum angustissimum</i> |                 | PORTULACACEAE  | 375   | 0.00412 | -5.49 | -0.0226 |
| 0-6.5     | 186 | <i>Tetramerium hispidum</i>  |                 | ACANTHACEAE    | 3000  | 0.03293 | -3.41 | -0.1124 |
| 0-6.5     | 187 | <i>Tradescantia</i> sp       |                 | COMMELINACEAE  | 125   | 0.00137 | -6.59 | -0.0090 |
| 0-6.5     | 190 | <i>Urtica</i> sp             | Ortigailla      | URTICACEAE     | 2500  | 0.02744 | -3.60 | -0.0987 |
| 0-6.5     | 191 | <i>Urvillea ulmaceae</i>     | Ortigailla      | SAPINDACEAE    | 250   | 0.00274 | -5.90 | -0.0162 |
| 0-6.5     | 192 | <i>Xylosma flexuosum</i>     |                 | FLACOURTIACEAE | 20    | 0.00022 | -8.42 | -0.0018 |
| 0-6.5     | 193 | <i>Yucca</i> sp              | Palma pita      | LILIACEAE      | 5     | 0.00005 | -9.81 | -0.0005 |
| 0-6.5     | 194 | <i>Zanthoxylum fagara</i>    | Colima          | RUTACEAE       | 155   | 0.00170 | -6.38 | -0.0108 |
|           |     |                              |                 |                | 91105 |         |       |         |
|           |     |                              |                 |                |       |         |       |         |
|           |     |                              |                 |                |       |         |       |         |
| 6.51-10.4 | 24  | <i>Celtis reticulata</i>     | Palo blanco     | ULMACEAE       | 5     | 0.25000 | -1.39 | -0.3466 |
| 6.51-10.4 | 28  | <i>Condalia hookeri</i>      | Brasil          | RHAMNACEAE     | 10    | 0.50000 | -0.69 | -0.3466 |
| 6.51-10.4 | 40  | <i>Diospyros palmeri</i>     | Chapote prieto  | EBENACEAE      | 2.5   | 0.12500 | -2.08 | -0.2599 |
| 6.51-10.4 | 42  | <i>Diospyros texana</i>      | Chapote blanco  | EBENACEAE      | 2.5   | 0.12500 | -2.08 | -0.2599 |
|           |     |                              |                 |                | 20    |         |       |         |
|           |     |                              |                 |                |       |         |       |         |
|           |     |                              |                 |                |       |         |       |         |
| 10.41-13  | 164 | <i>Quercus</i> sp 460        | Encino          | FAGACEAE       | 2.5   | 1.00000 | 0.00  | 0.0000  |



|  |  |     |  |      |         |  |         |
|--|--|-----|--|------|---------|--|---------|
|  |  | 116 |  | 9112 | 3.00000 |  | -5.1398 |
|  |  |     |  | 7.5  |         |  |         |
|  |  |     |  | 2.5  |         |  |         |

|       |            |
|-------|------------|
| A     | 5.13980182 |
| A MAX | 5.85220248 |
| E     | 0.87826794 |

**Tabla 13: Perfil A, A max. e Índice de equitatividad de las especies acompañantes de *Dioon edule* var *angustifolium* en áreas cerradas**

| Altura m | N sp | Nombre de sp.                                | N. regional      | Familia        | d / ha | pi      | Lnpi  | pi*Lnpi |
|----------|------|--|------------------|----------------|--------|---------|-------|---------|
| 0-6.5    | 5    | <i>Acacia berlandieri</i>                    | Huajillo         | LEGUMINOSAE    | 590    | 0.00309 | -5.78 | -0.0178 |
| 0-6.5    | 6    | <i>Acacia farnesiana</i>                     | Huizache         | LEGUMINOSAE    | 1057.5 | 0.00553 | -5.20 | -0.0288 |
| 0-6.5    | 7    | <i>Acacia rigidula</i>                       | Gavia            | LEGUMINOSAE    | 165    | 0.00086 | -7.05 | -0.0061 |
| 0-6.5    | 8    | <i>Acacia roemeriana</i>                     | Palo de arco     | LEGUMINOSAE    | 10     | 0.00005 | -9.86 | -0.0005 |
| 0-6.5    | 13   | <i>Amyris madrensis</i>                      | Barreta china    | RUTACEAE       | 150    | 0.00078 | -7.15 | -0.0056 |
| 0-6.5    | 14   | <i>Anoda cristata</i>                        |                  | MALVACEAE      | 3500   | 0.01831 | -4.00 | -0.0732 |
| 0-6.5    | 16   | <i>Berberis chochocco</i>                    | Palo amarillo    | BERBERIDACEAE  | 110    | 0.00058 | -7.46 | -0.0043 |
| 0-6.5    | 18   | <i>Bidens</i> sp                             |                  | ASTERACEAE     | 3625   | 0.01896 | -3.97 | -0.0752 |
| 0-6.5    | 19   | <i>Caesalpinia mexicana</i>                  | Hierba del potro | LEGUMINOSAE    | 135    | 0.00071 | -7.26 | -0.0051 |
| 0-6.5    | 20   | <i>Calyptracarpus</i> sp                     | Amor seco        | ASTERACEAE     | 6750   | 0.03531 | -3.34 | -0.1181 |
| 0-6.5    | 22   | <i>Carlwrightia</i> sp                       | Verdolagón       | ACANTHACEAE    | 2625   | 0.01373 | -4.29 | -0.0589 |
| 0-6.5    | 23   | <i>Celtis pallida</i>                        | Granjeno         | ULMACEAE       | 435    | 0.00228 | -6.09 | -0.0138 |
| 0-6.5    | 24   | <i>Celtis reticulata</i>                     | Palo blanco      | ULMACEAE       | 5      | 0.00003 | -     | -0.0003 |
|          |      |  |                  |                |        |         | 10.55 |         |
| 0-6.5    | 28   | <i>Condalia hookeri</i>                      | Brasil           | RHAMNACEAE     | 47.5   | 0.00025 | -8.30 | -0.0021 |
| 0-6.5    | 29   | <i>Cordia boissieri</i>                      | Anacahuita       | BORAGINACEAE   | 55     | 0.00029 | -8.15 | -0.0023 |
| 0-6.5    | 30   | <i>Coursetiaibaea</i> sp                     |                  | LEGUMINOSAE    | 2750   | 0.01439 | -4.24 | -0.0610 |
| 0-6.5    | 31   | <i>Cracca</i> sp                             |                  | LEGUMINOSAE    | 3375   | 0.01766 | -4.04 | -0.0713 |
| 0-6.5    | 32   | <i>Croton cortesianus</i>                    | Palillo          | EUPHORBIACEAE  | 3000   | 0.01569 | -4.15 | -0.0652 |
| 0-6.5    | 33   | <i>Croton</i> sp 506                         | Palillo          | EUPHORBIACEAE  | 2125   | 0.01112 | -4.50 | -0.0500 |
| 0-6.5    | 35   | <i>Croton</i> sp 803                         |                  | EUPHORBIACEAE  | 4875   | 0.02550 | -3.67 | -0.0936 |
| 0-6.5    | 37   | <i>Cynanchum barbigerum</i>                  |                  | ASCLEPIADACEAE | 875    | 0.00458 | -5.39 | -0.0247 |
| 0-6.5    | 39   | <i>Dioon edule</i> var. <i>angustifolium</i> | Chamal           | ZAMIACEAE      | 3745   | 0.01959 | -3.93 | -0.0770 |
| 0-6.5    | 40   | <i>Diospyros palmeri</i>                     | Chapote prieto   | EBENACEAE      | 7.5    | 0.00004 | -     | -0.0004 |
|          |      |  |                  |                |        |         | 10.15 |         |
| 0-6.5    | 41   | <i>Diospyros</i> sp 232                      | Chapote manzano  | EBENACEAE      | 52.5   | 0.00027 | -8.20 | -0.0023 |
| 0-6.5    | 42   | <i>Diospyros texana</i>                      | Chapote manzano  | EBENACEAE      | 1237.5 | 0.00647 | -5.04 | -0.0326 |
| 0-6.5    | 43   | <i>Ebanopsis ebano</i>                       | Ébano            | LEGUMINOSAE    | 320    | 0.00167 | -6.39 | -0.0107 |
| 0-6.5    | 47   | <i>Esenbeckia</i>                            | Limoncillo       | RUTACEAE       | 57.5   | 0.00030 | -8.11 | -0.0024 |

|       |     |                                |                   |                |       |         |        |         |
|-------|-----|--------------------------------|-------------------|----------------|-------|---------|--------|---------|
|       |     | <i>berlandieri</i>             |                   |                |       |         |        |         |
| 0-6.5 | 50  | <i>Forestiera angustifolia</i> | Panalero          | OLEACEAE       | 265   | 0.00139 | -6.58  | -0.0091 |
| 0-6.5 | 51  | <i>Fraxinus greggii</i>        | Candelilla        | OLEACEAE       | 2.5   | 0.00001 | -11.24 | -0.0001 |
| 0-6.5 | 53  | <i>Guaiacum angustifolium</i>  | Guayacán          | ZYGOPHYLLACEAE | 10    | 0.00005 | -9.86  | -0.0005 |
| 0-6.5 | 54  | <i>Havardia pallens</i>        | Tenaza            | LEGUMINOSAE    | 410   | 0.00214 | -6.14  | -0.0132 |
| 0-6.5 | 55  | <i>Heliotta parvifolia</i>     | Barreta blanca    | RUTACEAE       | 330   | 0.00173 | -6.36  | -0.0110 |
| 0-6.5 | 57  | <i>Incertae saedis 200</i>     |                   | FAM01          | 5875  | 0.03074 | -3.48  | -0.1070 |
| 0-6.5 | 58  | <i>Incertae saedis 201</i>     |                   | FAM02          | 10375 | 0.05428 | -2.91  | -0.1581 |
| 0-6.5 | 59  | <i>Incertae saedis 202</i>     |                   | FAM03          | 2875  | 0.01504 | -4.20  | -0.0631 |
| 0-6.5 | 60  | <i>Incertae saedis 203</i>     |                   | FAM04          | 500   | 0.00262 | -5.95  | -0.0156 |
| 0-6.5 | 61  | <i>Incertae saedis 204</i>     |                   | FAM05          | 4000  | 0.02093 | -3.87  | -0.0809 |
| 0-6.5 | 62  | <i>Incertae saedis 205</i>     |                   | FAM06          | 7875  | 0.04120 | -3.19  | -0.1314 |
| 0-6.5 | 63  | <i>Incertae saedis 206</i>     |                   | FAM07          | 11125 | 0.05820 | -2.84  | -0.1655 |
| 0-6.5 | 64  | <i>Incertae saedis 207</i>     |                   | FAM08          | 1375  | 0.00719 | -4.93  | -0.0355 |
| 0-6.5 | 65  | <i>Incertae saedis 209</i>     |                   | FAM09          | 3250  | 0.01700 | -4.07  | -0.0693 |
| 0-6.5 | 66  | <i>Incertae saedis 210</i>     |                   | FAM10          | 750   | 0.00392 | -5.54  | -0.0217 |
| 0-6.5 | 67  | <i>Incertae saedis 211</i>     |                   | FAM11          | 25    | 0.00013 | -8.94  | -0.0012 |
| 0-6.5 | 68  | <i>Incertae saedis 213</i>     |                   | FAM12          | 85    | 0.00044 | -7.72  | -0.0034 |
| 0-6.5 | 69  | <i>Incertae saedis 214</i>     |                   | FAM13          | 1000  | 0.00523 | -5.25  | -0.0275 |
| 0-6.5 | 70  | <i>Incertae saedis 215</i>     |                   | FAM14          | 1625  | 0.00850 | -4.77  | -0.0405 |
| 0-6.5 | 71  | <i>Incertae saedis 216</i>     |                   | FAM15          | 2125  | 0.01112 | -4.50  | -0.0500 |
| 0-6.5 | 72  | <i>Incertae saedis 217</i>     |                   | FAM16          | 3125  | 0.01635 | -4.11  | -0.0673 |
| 0-6.5 | 73  | <i>Incertae saedis 218</i>     |                   | FAM17          | 5     | 0.00003 | -10.55 | -0.0003 |
| 0-6.5 | 74  | <i>Incertae saedis 219</i>     |                   | FAM18          | 625   | 0.00327 | -5.72  | -0.0187 |
| 0-6.5 | 75  | <i>Incertae saedis 220</i>     |                   | FAM19          | 500   | 0.00262 | -5.95  | -0.0156 |
| 0-6.5 | 76  | <i>Incertae saedis 221</i>     |                   | FAM20          | 750   | 0.00392 | -5.54  | -0.0217 |
| 0-6.5 | 77  | <i>Incertae saedis 222</i>     |                   | FAM21          | 750   | 0.00392 | -5.54  | -0.0217 |
| 0-6.5 | 78  | <i>Incertae saedis 223</i>     |                   | FAM22          | 1250  | 0.00654 | -5.03  | -0.0329 |
| 0-6.5 | 79  | <i>Incertae saedis 224</i>     |                   | FAM23          | 500   | 0.00262 | -5.95  | -0.0156 |
| 0-6.5 | 80  | <i>Incertae saedis 225</i>     |                   | FAM24          | 1000  | 0.00523 | -5.25  | -0.0275 |
| 0-6.5 | 92  | <i>Incertae saedis 502</i>     |                   | FAM35          | 1250  | 0.00654 | -5.03  | -0.0329 |
| 0-6.5 | 93  | <i>Incertae saedis 508</i>     | Zacate pelillo    | FAM36          | 1250  | 0.00654 | -5.03  | -0.0329 |
| 0-6.5 | 94  | <i>Incertae saedis 509</i>     |                   | FAM37          | 625   | 0.00327 | -5.72  | -0.0187 |
| 0-6.5 | 95  | <i>Incertae saedis 510</i>     |                   | FAM38          | 125   | 0.00065 | -7.33  | -0.0048 |
| 0-6.5 | 96  | <i>Incertae saedis 511</i>     |                   | FAM39          | 125   | 0.00065 | -7.33  | -0.0048 |
| 0-6.5 | 97  | <i>Incertae saedis 513</i>     |                   | FAM40          | 250   | 0.00131 | -6.64  | -0.0087 |
| 0-6.5 | 98  | <i>Incertae saedis 515</i>     |                   | FAM41          | 125   | 0.00065 | -7.33  | -0.0048 |
| 0-6.5 | 99  | <i>Incertae saedis 519</i>     |                   | FAM42          | 500   | 0.00262 | -5.95  | -0.0156 |
| 0-6.5 | 100 | <i>Incertae saedis 525</i>     | Cuacha de gallina | FAM44          | 500   | 0.00262 | -5.95  | -0.0156 |
| 0-6.5 | 101 | <i>Incertae saedis 526</i>     |                   | MALVACEAE      | 250   | 0.00131 | -6.64  | -0.0087 |
| 0-6.5 | 125 | <i>Incertae saedis 764</i>     |                   | FAM64          | 1250  | 0.00654 | -5.03  | -0.0329 |
| 0-6.5 | 126 | <i>Incertae saedis 773</i>     | Tule              | FAM65          | 1750  | 0.00916 | -4.69  | -0.0430 |
| 0-6.5 | 127 | <i>Incertae saedis 774</i>     |                   | FAM66          | 1500  | 0.00785 | -4.85  | -0.0380 |
| 0-6.5 | 128 | <i>Incertae saedis 776</i>     | Hierba azul       | FAM67          | 750   | 0.00392 | -5.54  | -0.0217 |
| 0-6.5 | 129 | <i>Incertae saedis 800</i>     | Zacate            | FAM68          | 4125  | 0.02158 | -3.84  | -0.0828 |

|           |     |                                |                |                |          |         |        |         |
|-----------|-----|--------------------------------|----------------|----------------|----------|---------|--------|---------|
| 0-6.5     | 130 | <i>Incertae saedis</i> 802     |                | FAM69          | 2375     | 0.01242 | -4.39  | -0.0545 |
| 0-6.5     | 131 | <i>Incertae saedis</i> 805     |                | FAM70          | 1125     | 0.00589 | -5.14  | -0.0302 |
| 0-6.5     | 132 | <i>Incertae saedis</i> 806     | Enredadera     | FAM71          | 1750     | 0.00916 | -4.69  | -0.0430 |
| 0-6.5     | 133 | <i>Incertae saedis</i> 809     |                | FAM72          | 1375     | 0.00719 | -4.93  | -0.0355 |
| 0-6.5     | 134 | <i>Incertae saedis</i> 810     | Cenizo         | FAM73          | 1125     | 0.00589 | -5.14  | -0.0302 |
| 0-6.5     | 135 | <i>Incertae saedis</i> 812     |                | FAM74          | 2500     | 0.01308 | -4.34  | -0.0567 |
| 0-6.5     | 136 | <i>Incertae saedis</i> 813     |                | FAM75          | 2250     | 0.01177 | -4.44  | -0.0523 |
| 0-6.5     | 137 | <i>Incertae saedis</i> 815     |                | FAM76          | 750      | 0.00392 | -5.54  | -0.0217 |
| 0-6.5     | 141 | <i>Karwinskia humboldtiana</i> | Tullidor       | RHAMNACEAE     | 25       | 0.00013 | -8.94  | -0.0012 |
| 0-6.5     | 142 | <i>Lantana macropoda</i>       |                | VERBENACEAE    | 250      | 0.00131 | -6.64  | -0.0087 |
| 0-6.5     | 145 | <i>Malpighia glabra</i>        |                | MALPIGHIACEAE  | 7500     | 0.03924 | -3.24  | -0.1271 |
| 0-6.5     | 146 | <i>Malvastrum</i> sp           | Sacasil        | MALVACEAE      | 500      | 0.00262 | -5.95  | -0.0156 |
| 0-6.5     | 147 | <i>Mimosa malacophylla</i>     |                | LEGUMINOSAE    | 5375     | 0.02812 | -3.57  | -0.1004 |
| 0-6.5     | 150 | <i>Notholaena</i> sp           | Helecho        | POLYPODIACEAE  | 1000     | 0.00523 | -5.25  | -0.0275 |
| 0-6.5     | 151 | <i>Opuntia leptocaulis</i>     | Tasajillo      | CACTACEAE      | 55       | 0.00029 | -8.15  | -0.0023 |
| 0-6.5     | 152 | <i>Opuntia lindheimeri</i>     | Nopal          | CACTACEAE      | 260      | 0.00136 | -6.60  | -0.0090 |
| 0-6.5     | 158 | <i>Phoebe tampicensis</i>      | Mahuira        | LAURACEAE      | 32.5     | 0.00017 | -8.68  | -0.0015 |
| 0-6.5     | 160 | <i>Pistacia texana</i>         | Lantrisco      | ANACARDIACEAE  | 20       | 0.00010 | -9.17  | -0.0010 |
| 0-6.5     | 163 | <i>Quercus</i> sp 234          | Encino         | FAGACEAE       | 7.5      | 0.00004 | -10.15 | -0.0004 |
| 0-6.5     | 166 | <i>Randia laetevirens</i>      | Crucillo       | RUBIACEAE      | 60       | 0.00031 | -8.07  | -0.0025 |
| 0-6.5     | 167 | <i>Rhus virens</i>             | Agrito         | ANACARDIACEAE  | 5        | 0.00003 | -10.55 | -0.0003 |
| 0-6.5     | 168 | <i>Ruellia nudiflora</i>       |                | ACANTHACEAE    | 625      | 0.00327 | -5.72  | -0.0187 |
| 0-6.5     | 169 | <i>Ruellia</i> sp 501          |                | ACANTHACEAE    | 16500    | 0.08632 | -2.45  | -0.2115 |
| 0-6.5     | 170 | <i>Ruellia</i> sp 765          | Malvón         | ACANTHACEAE    | 3250     | 0.01700 | -4.07  | -0.0693 |
| 0-6.5     | 172 | <i>Salvia</i> sp 811           |                | LABIATAE       | 875      | 0.00458 | -5.39  | -0.0247 |
| 0-6.5     | 175 | <i>Serjania</i> sp 522         |                | SAPINDACEAE    | 125      | 0.00065 | -7.33  | -0.0048 |
| 0-6.5     | 178 | <i>Setaria leucopila</i>       | Zacate cadillo | GRAMINEAE      | 1375     | 0.00719 | -4.93  | -0.0355 |
| 0-6.5     | 179 | <i>Sida filicaulis</i>         | Ortiguilla     | MALVACEAE      | 2125     | 0.01112 | -4.50  | -0.0500 |
| 0-6.5     | 180 | <i>Sida physocalyx</i>         | Malva          | MALVACEAE      | 11125    | 0.05820 | -2.84  | -0.1655 |
| 0-6.5     | 183 | <i>Sphaeralcea</i> sp          |                | MALVACEAE      | 20       | 0.00010 | -9.17  | -0.0010 |
| 0-6.5     | 184 | <i>Stevia</i> sp               | Jara           | COMPOSITAE     | 15       | 0.00008 | -9.45  | -0.0007 |
| 0-6.5     | 188 | <i>Tragia ramosa</i>           | Ortiguilla     | EUPHORBIACEAE  | 4375     | 0.02289 | -3.78  | -0.0865 |
| 0-6.5     | 189 | <i>Tragia</i> sp               | Ortiguilla     | EUPHORBIACEAE  | 3500     | 0.01831 | -4.00  | -0.0732 |
| 0-6.5     | 192 | <i>Xylosma flexuosum</i>       | Crucillo       | FLACOURTIACEAE | 15       | 0.00008 | -9.45  | -0.0007 |
| 0-6.5     | 194 | <i>Zanthoxylum fagara</i>      | Colima         | RUTACEAE       | 445      | 0.00233 | -6.06  | -0.0141 |
|           |     |                                |                |                | 191147.5 |         |        |         |
|           |     |                                |                |                |          |         |        |         |
|           |     |                                |                |                |          |         |        |         |
|           |     |                                |                |                |          |         |        |         |
| 6.51-10.4 | 5   | <i>Acacia berlandieri</i>      | Huajillo       | LEGUMINOSAE    | 5        | 0.06452 | -2.74  | -0.1768 |
| 6.51-10.4 | 28  | <i>Condalia hookeri</i>        | Brasil         | RHAMNACEAE     | 5        | 0.06452 | -2.74  | -0.1768 |
| 6.51-10.4 | 40  | <i>Diospyros palmeri</i>       | Chapote prieto | EBENACEAE      | 2.5      | 0.03226 | -3.43  | -0.1108 |
| 6.51-10.4 | 43  | <i>Ebanopsis ebano</i>         | Ébano          | LEGUMINOSAE    | 25       | 0.32258 | -1.13  | -0.3650 |
| 6.51-10.4 | 51  | <i>Fraxinus greggii</i>        | Candelilla     | OLEACEAE       | 2.5      | 0.03226 | -3.43  | -0.1108 |
| 6.51-10.4 | 54  | <i>Havardia pallens</i>        | Tenaza         | LEGUMINOSAE    | 2.5      | 0.03226 | -3.43  | -0.1108 |
| 6.51-10.4 | 158 | <i>Phoebe tampicensis</i>      | Mahuira        | LAURACEAE      | 32.5     | 0.41935 | -0.87  | -0.3644 |

Distribución y Relaciones Ecológicas del chamal *Dioon edule* var *angustifolium* en La Sierra de San Carlos Tamaulipas  
 Anexos

|           |     |                        |        |             |       |         |       |         |
|-----------|-----|------------------------|--------|-------------|-------|---------|-------|---------|
| 6.51-10.4 | 163 | <i>Quercus sp 234</i>  | Encino | FAGACEAE    | 2.5   | 0.03226 | -3.43 | -0.1108 |
|           |     |                        |        | 77.5        |       |         |       |         |
|           |     |                        |        |             |       |         |       |         |
|           |     |                        |        |             |       |         |       |         |
| 10.41-13  | 43  | <i>Ebanopsis ebano</i> | Ébano  | LEGUMINOSAE | 7.5   | 0.60000 | -0.51 | -0.3065 |
| 10.41-13  | 163 | <i>Quercus sp 234</i>  | Encino | FAGACEAE    | 5     | 0.40000 | -0.92 | -0.3665 |
|           |     | 107                    |        |             | 19123 |         |       | -6.0720 |
|           |     |                        |        |             | 7.5   |         |       |         |
|           |     |                        |        | 12.5        |       |         |       |         |

|       |            |
|-------|------------|
| A     | 6.0720     |
| A MAX | 5.77144112 |
| E     | 1.05207785 |

### ANEXO III

**Tabla 13: Valor de importancia por estratos de las especies acompañantes de *Dioon edule* var *angustifolium* en áreas abiertas**

| Especies                                     | Estratos | D/ha | Cobertura / ha | Fr | D% | Cob% | Fr% | VI% |
|--|----------|------|----------------|----|----|------|-----|-----|
| <i>Dioon edule</i> var. <i>angustifolium</i> | 1        | 6903 | 2822           | 0  | 8  | 22   | 1   | 11  |
| <i>Diospyros texana</i>                      | 3        | 978  | 1827           | 1  | 1  | 14   | 4   | 6   |
| <i>Celtis pallida</i>                        | 2        | 1770 | 1213           | 1  | 2  | 10   | 3   | 5   |
| <i>Condalia hookeri</i>                      | 2        | 415  | 1183           | 1  | 0  | 9    | 3   | 4   |
| <i>Incertae saedis 553</i>                   | 1        | 6500 | 404            | 0  | 8  | 3    | 1   | 4   |
| <i>Acacia rigidula</i>                       | 2        | 1995 | 749            | 1  | 2  | 6    | 3   | 4   |
| <i>Croton torreyanus</i>                     | 2        | 4275 | 191            | 1  | 5  | 2    | 3   | 3   |
| <i>Incertae saedis 718</i>                   | 1        | 5000 | 13             | 0  | 6  | 0    | 1   | 2   |
| <i>Pellaea ovata</i>                         | 1        | 2750 | 220            | 0  | 3  | 2    | 1   | 2   |
| <i>Opuntia lindheimeri</i>                   | 1        | 520  | 528            | 0  | 1  | 4    | 1   | 2   |
| <i>Eragrostis</i> sp                         | 1        | 4000 | 14             | 0  | 5  | 0    | 1   | 2   |
| <i>Commelina</i> sp                          | 1        | 2250 | 235            | 0  | 3  | 2    | 1   | 2   |
| <i>Incertae saedis 548</i>                   | 1        | 2750 | 127            | 0  | 3  | 1    | 1   | 2   |
| <i>Incertae saedis 581</i>                   | 1        | 2625 | 114            | 0  | 3  | 1    | 1   | 2   |
| <i>Tetramerium hispidum</i>                  | 1        | 3000 | 52             | 0  | 3  | 0    | 1   | 2   |
| <i>Incertae saedis 543</i>                   | 1        | 2250 | 143            | 0  | 3  | 1    | 1   | 2   |
| <i>Havardia pallens</i>                      | 1        | 515  | 355            | 0  | 1  | 3    | 1   | 2   |
| <i>Diospyros palmeri</i>                     | 2        | 40   | 242            | 1  | 0  | 2    | 3   | 1   |
| <i>Urtica</i> sp                             | 1        | 2500 | 4              | 0  | 3  | 0    | 1   | 1   |
| <i>Amyris madrensis</i>                      | 2        | 1015 | 53             | 1  | 1  | 0    | 3   | 1   |
| <i>Allionia inornata</i>                     | 1        | 2125 | 49             | 0  | 2  | 0    | 1   | 1   |
| <i>Bernardia myricaefolia</i>                | 1        | 785  | 236            | 0  | 1  | 2    | 1   | 1   |
| <i>Celtis reticulata</i>                     | 2        | 15   | 186            | 1  | 0  | 1    | 3   | 1   |
| <i>Incertae saedis 719</i>                   | 1        | 2000 | 2              | 0  | 2  | 0    | 1   | 1   |
| <i>Evolvulus alsinoides</i>                  | 1        | 1625 | 56             | 0  | 2  | 0    | 1   | 1   |
| <i>Acacia farnesiana</i>                     | 2        | 195  | 96             | 1  | 0  | 1    | 3   | 1   |
| <i>Panicum</i> sp                            | 1        | 1875 | 8              | 0  | 2  | 0    | 1   | 1   |
| <i>Panicum</i> sp                            | 1        | 1875 | 8              | 0  | 2  | 0    | 1   | 1   |
| <i>Ambrosia psilostachya</i>                 | 1        | 1750 | 23             | 0  | 2  | 0    | 1   | 1   |
| <i>Berberis chochocco</i>                    | 1        | 195  | 230            | 0  | 0  | 2    | 1   | 1   |
| <i>Incertae saedis 717</i>                   | 1        | 1750 | 4              | 0  | 2  | 0    | 1   | 1   |
| <i>Forestiera angustifolia</i>               | 2        | 205  | 62             | 1  | 0  | 0    | 3   | 1   |
| <i>Incertae saedis 430</i>                   | 2        | 530  | 3              | 1  | 1  | 0    | 3   | 1   |
| <i>Karwinskia humboldtiana</i>               | 2        | 280  | 27             | 1  | 0  | 0    | 3   | 1   |
| <i>Siphonoglossa</i> sp                      | 1        | 1125 | 63             | 0  | 1  | 0    | 1   | 1   |
| <i>Incertae saedis 559</i>                   | 1        | 1125 | 57             | 0  | 1  | 0    | 1   | 1   |
| <i>Heliotropium curassavicum</i>             | 1        | 1375 | 21             | 0  | 2  | 0    | 1   | 1   |
| <i>Litsea glaucescens</i>                    | 2        | 255  | 14             | 1  | 0  | 0    | 3   | 1   |
| <i>Polygala</i> sp                           | 1        | 1375 | 9              | 0  | 2  | 0    | 1   | 1   |
| <i>Parthenium confertum</i>                  | 1        | 1375 | 6              | 0  | 2  | 0    | 1   | 1   |
| <i>Incertae saedis 715</i>                   | 1        | 1250 | 14             | 0  | 1  | 0    | 1   | 1   |

Distribución y Relaciones Ecológicas del chamal *Dioon edule* var *angustifolium* en La Sierra de San Carlos Tamaulipas  
Anexos

|                                |   |      |     |   |   |   |   |   |
|--------------------------------|---|------|-----|---|---|---|---|---|
| <i>Zanthoxylum fagara</i>      | 1 | 155  | 148 | 0 | 0 | 1 | 1 | 1 |
| <i>Ipomoea purpurea</i>        | 1 | 500  | 84  | 0 | 1 | 1 | 1 | 1 |
| <i>Incertae saedis 711</i>     | 1 | 1000 | 11  | 0 | 1 | 0 | 1 | 1 |
| <i>Cordia boissieri</i>        | 1 | 70   | 141 | 0 | 0 | 1 | 1 | 1 |
| <i>Digitaria californica</i>   | 1 | 1000 | 3   | 0 | 1 | 0 | 1 | 1 |
| <i>Mimosa malacophylla</i>     | 1 | 625  | 55  | 0 | 1 | 0 | 1 | 1 |
| <i>Incertae saedis 562</i>     | 1 | 875  | 8   | 0 | 1 | 0 | 1 | 1 |
| <i>Incertae saedis 728</i>     | 1 | 875  | 3   | 0 | 1 | 0 | 1 | 1 |
| <i>Quercus sp 460</i>          | 1 | 3    | 126 | 0 | 0 | 1 | 1 | 1 |
| <i>Incertae saedis 451</i>     | 1 | 750  | 5   | 0 | 1 | 0 | 1 | 1 |
| <i>Elytraria imbricata</i>     | 1 | 750  | 3   | 0 | 1 | 0 | 1 | 1 |
| <i>Incertae saedis 723</i>     | 1 | 750  | 0   | 0 | 1 | 0 | 1 | 1 |
| <i>Abutilon sp 549</i>         | 1 | 500  | 36  | 0 | 1 | 0 | 1 | 1 |
| <i>Ipomoea sp</i>              | 1 | 500  | 32  | 0 | 1 | 0 | 1 | 1 |
| <i>Opuntia leptocaulis</i>     | 1 | 215  | 70  | 0 | 0 | 1 | 1 | 1 |
| <i>Talinum angustissimum</i>   | 1 | 375  | 40  | 0 | 0 | 0 | 1 | 1 |
| <i>Incertae saedis 729</i>     | 1 | 625  | 1   | 0 | 1 | 0 | 1 | 1 |
| <i>Anoda sp</i>                | 1 | 375  | 24  | 0 | 0 | 0 | 1 | 1 |
| <i>Commelina coelestis</i>     | 1 | 125  | 55  | 0 | 0 | 0 | 1 | 1 |
| <i>Serjania sp 597</i>         | 1 | 125  | 55  | 0 | 0 | 0 | 1 | 1 |
| <i>Incertae saedis 722</i>     | 1 | 500  | 0   | 0 | 1 | 0 | 1 | 1 |
| <i>Galactia striata</i>        | 1 | 250  | 28  | 0 | 0 | 0 | 1 | 1 |
| <i>Mimosa sp</i>               | 1 | 30   | 59  | 0 | 0 | 0 | 1 | 1 |
| <i>Acalypha sp</i>             | 1 | 375  | 4   | 0 | 0 | 0 | 1 | 1 |
| <i>Incertae saedis 453</i>     | 1 | 375  | 3   | 0 | 0 | 0 | 1 | 1 |
| <i>Senna lindheimeriana</i>    | 1 | 125  | 32  | 0 | 0 | 0 | 1 | 1 |
| <i>Incertae saedis 425</i>     | 1 | 250  | 9   | 0 | 0 | 0 | 1 | 1 |
| <i>Abutilon incanum</i>        | 1 | 250  | 8   | 0 | 0 | 0 | 1 | 1 |
| <i>Abutilon sp 554</i>         | 1 | 250  | 8   | 0 | 0 | 0 | 1 | 1 |
| <i>Incertae saedis 712</i>     | 1 | 250  | 6   | 0 | 0 | 0 | 1 | 1 |
| <i>Eysenhartia polystachya</i> | 1 | 75   | 29  | 0 | 0 | 0 | 1 | 1 |
| <i>Ehretia anacua</i>          | 1 | 25   | 35  | 0 | 0 | 0 | 1 | 1 |
| <i>Acacia berlandieri</i>      | 1 | 55   | 31  | 0 | 0 | 0 | 1 | 1 |
| <i>Sphaeralcea sp</i>          | 1 | 125  | 20  | 0 | 0 | 0 | 1 | 1 |
| <i>Serjania sp 620</i>         | 1 | 125  | 20  | 0 | 0 | 0 | 1 | 1 |
| <i>Incertae saedis 444</i>     | 1 | 250  | 1   | 0 | 0 | 0 | 1 | 1 |
| <i>Incertae saedis 567</i>     | 1 | 250  | 1   | 0 | 0 | 0 | 1 | 1 |
| <i>Croton sp 582</i>           | 1 | 125  | 19  | 0 | 0 | 0 | 1 | 1 |
| <i>Urvillea ulmaceae</i>       | 1 | 250  | 1   | 0 | 0 | 0 | 1 | 1 |
| <i>Incertae saedis 710</i>     | 1 | 125  | 16  | 0 | 0 | 0 | 1 | 1 |
| <i>Sapoteca medii</i>          | 1 | 125  | 16  | 0 | 0 | 0 | 1 | 1 |
| <i>Phyla incisa</i>            | 1 | 125  | 12  | 0 | 0 | 0 | 1 | 1 |
| <i>Incertae saedis 623</i>     | 1 | 125  | 12  | 0 | 0 | 0 | 1 | 1 |
| <i>Phaseolus sp</i>            | 1 | 125  | 11  | 0 | 0 | 0 | 1 | 1 |
| <i>Xylosma flexuosum</i>       | 1 | 20   | 26  | 0 | 0 | 0 | 1 | 0 |
| <i>Salvia sp 592</i>           | 1 | 125  | 9   | 0 | 0 | 0 | 1 | 0 |
| <i>Abutilon sp 575</i>         | 1 | 125  | 7   | 0 | 0 | 0 | 1 | 0 |
| <i>Acleisanthes sp</i>         | 1 | 125  | 7   | 0 | 0 | 0 | 1 | 0 |
| <i>Calliandra eriophylla</i>   | 1 | 125  | 7   | 0 | 0 | 0 | 1 | 0 |

|                               |   |     |    |   |   |   |   |   |
|-------------------------------|---|-----|----|---|---|---|---|---|
| <i>Randia laetevirens</i>     | 1 | 15  | 23 | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 439</i>    | 1 | 125 | 6  | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 446</i>    | 1 | 125 | 3  | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 426</i>    | 1 | 125 | 3  | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 445</i>    | 1 | 125 | 2  | 0 | 0 | 0 | 1 | 0 |
| <i>Sphaeralcea coccinea</i>   | 1 | 125 | 2  | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 585</i>    | 1 | 125 | 1  | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 450</i>    | 1 | 125 | 1  | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 568</i>    | 1 | 125 | 1  | 0 | 0 | 0 | 1 | 0 |
| <i>Litsea</i> sp 576          | 1 | 125 | 1  | 0 | 0 | 0 | 1 | 0 |
| <i>Tradescantia</i> sp        | 1 | 125 | 1  | 0 | 0 | 0 | 1 | 0 |
| <i>Malvastrum</i> sp          | 1 | 125 | 1  | 0 | 0 | 0 | 1 | 0 |
| <i>Cissus sicyoides</i>       | 1 | 125 | 1  | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 586</i>    | 1 | 125 | 1  | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 713</i>    | 1 | 125 | 0  | 0 | 0 | 0 | 1 | 0 |
| <i>Anoda cristata</i>         | 1 | 125 | 0  | 0 | 0 | 0 | 1 | 0 |
| <i>Stevia</i> sp              | 1 | 20  | 10 | 0 | 0 | 0 | 1 | 0 |
| <i>Yucca</i> sp               | 1 | 5   | 8  | 0 | 0 | 0 | 1 | 0 |
| <i>Quercus</i> sp 607         | 1 | 5   | 7  | 0 | 0 | 0 | 1 | 0 |
| <i>Diospyros</i> sp 232       | 1 | 15  | 5  | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 437</i>    | 1 | 5   | 6  | 0 | 0 | 0 | 1 | 0 |
| <i>Parkinsonia aculeata</i>   | 1 | 5   | 6  | 0 | 0 | 0 | 1 | 0 |
| <i>Ebanopsis ebano</i>        | 1 | 10  | 5  | 0 | 0 | 0 | 1 | 0 |
| <i>Prosopis levigata</i>      | 1 | 5   | 5  | 0 | 0 | 0 | 1 | 0 |
| <i>Caesalpinia mexicana</i>   | 1 | 5   | 2  | 0 | 0 | 0 | 1 | 0 |
| <i>Guaiacum angustifolium</i> | 1 | 5   | 1  | 0 | 0 | 0 | 1 | 0 |

**Tabla 14: Valor de importancia por estratos de las especies acompañantes de *Dioon edule* var *angustifolium* en áreas cerradas**

| Especies                                     | Estratos | D/ha  | Cobertura / ha | Fr | D% | Cob% | Fr% | VI % |
|--|----------|-------|----------------|----|----|------|-----|------|
| <i>Diospyros texana</i>                      | 3        | 1238  | 2273           | 1  | 1  | 12   | 2   | 5    |
| <i>Ebanopsis ebano</i>                       | 2        | 353   | 2002           | 1  | 0  | 11   | 2   | 4    |
| <i>Dioon edule</i> var. <i>angustifolium</i> | 1        | 3745  | 1798           | 0  | 2  | 10   | 1   | 4    |
| <i>Ruellia</i> sp 501                        | 1        | 16500 | 483            | 0  | 9  | 3    | 1   | 4    |
| <i>Acacia berlandieri</i>                    | 1        | 595   | 1724           | 0  | 0  | 9    | 1   | 3    |
| <i>Malpighia glabra</i>                      | 1        | 7500  | 401            | 0  | 4  | 2    | 1   | 2    |
| <i>Incertae saedis 206</i>                   | 1        | 11125 | 29             | 0  | 6  | 0    | 1   | 2    |
| <i>Sida physocalyx</i>                       | 1        | 11125 | 29             | 0  | 6  | 0    | 1   | 2    |
| <i>Havardia pallens</i>                      | 2        | 413   | 880            | 1  | 0  | 5    | 2   | 2    |

|                                |   |       |     |   |   |   |   |   |
|--------------------------------|---|-------|-----|---|---|---|---|---|
| <i>Incertae saedis 201</i>     | 1 | 10375 | 32  | 0 | 5 | 0 | 1 | 2 |
| <i>Celtis pallida</i>          | 3 | 435   | 647 | 1 | 0 | 3 | 2 | 2 |
| <i>Mimosa malacophylla</i>     | 1 | 5375  | 459 | 0 | 3 | 2 | 1 | 2 |
| <i>Incertae saedis 205</i>     | 1 | 7875  | 29  | 0 | 4 | 0 | 1 | 2 |
| <i>Incertae saedis 525</i>     | 2 | 500   | 583 | 1 | 0 | 3 | 2 | 2 |
| <i>Quercus sp 234</i>          | 1 | 15    | 728 | 0 | 0 | 4 | 1 | 2 |
| <i>Zanthoxylum fagara</i>      | 2 | 445   | 527 | 1 | 0 | 3 | 2 | 2 |
| <i>Phoebe tampicensis</i>      | 2 | 65    | 521 | 1 | 0 | 3 | 2 | 1 |
| <i>Calyptocarpus sp</i>        | 1 | 6750  | 16  | 0 | 4 | 0 | 1 | 1 |
| <i>Tragia ramosa</i>           | 1 | 4375  | 234 | 0 | 2 | 1 | 1 | 1 |
| <i>Incertae saedis 200</i>     | 1 | 5875  | 40  | 0 | 3 | 0 | 1 | 1 |
| <i>Acacia farnesiana</i>       | 3 | 1058  | 165 | 1 | 1 | 1 | 2 | 1 |
| <i>Forestiera angustifolia</i> | 1 | 265   | 520 | 0 | 0 | 3 | 1 | 1 |
| <i>Croton sp 803</i>           | 1 | 4875  | 36  | 0 | 3 | 0 | 1 | 1 |
| <i>Croton cortesianus</i>      | 1 | 3000  | 143 | 0 | 2 | 1 | 1 | 1 |
| <i>Esenbeckia berlandieri</i>  | 2 | 58    | 266 | 1 | 0 | 1 | 2 | 1 |
| <i>Anoda cristata</i>          | 1 | 3500  | 81  | 0 | 2 | 0 | 1 | 1 |
| <i>Incertae saedis 204</i>     | 1 | 4000  | 25  | 0 | 2 | 0 | 1 | 1 |
| <i>Incertae saedis 800</i>     | 1 | 4125  | 7   | 0 | 2 | 0 | 1 | 1 |
| <i>Ruellia sp 765</i>          | 1 | 3250  | 66  | 0 | 2 | 0 | 1 | 1 |
| <i>Helietta parvifolia</i>     | 1 | 330   | 339 | 0 | 0 | 2 | 1 | 1 |
| <i>Bidens sp</i>               | 1 | 3625  | 7   | 0 | 2 | 0 | 1 | 1 |
| <i>Diospyros sp 232</i>        | 2 | 53    | 201 | 1 | 0 | 1 | 2 | 1 |
| <i>Pistacia texana</i>         | 1 | 20    | 354 | 0 | 0 | 2 | 1 | 1 |
| <i>Tragia sp</i>               | 1 | 3500  | 4   | 0 | 2 | 0 | 1 | 1 |
| <i>Cracca sp</i>               | 1 | 3375  | 4   | 0 | 2 | 0 | 1 | 1 |
| <i>Incertae saedis 209</i>     | 1 | 3250  | 11  | 0 | 2 | 0 | 1 | 1 |
| <i>Condalia hookeri</i>        | 2 | 53    | 171 | 1 | 0 | 1 | 2 | 1 |
| <i>Incertae saedis 217</i>     | 1 | 3125  | 13  | 0 | 2 | 0 | 1 | 1 |
| <i>Croton sp 506</i>           | 1 | 2125  | 99  | 0 | 1 | 1 | 1 | 1 |
| <i>Berberis chochocco</i>      | 1 | 110   | 295 | 0 | 0 | 2 | 1 | 1 |
| <i>Cordia boissieri</i>        | 1 | 55    | 300 | 0 | 0 | 2 | 1 | 1 |
| <i>Incertae saedis 202</i>     | 1 | 2875  | 6   | 0 | 2 | 0 | 1 | 1 |
| <i>Cynanchum barbigerum</i>    | 1 | 875   | 196 | 0 | 0 | 1 | 1 | 1 |
| <i>Incertae saedis 215</i>     | 1 | 1625  | 118 | 0 | 1 | 1 | 1 | 1 |
| <i>Coursetiaibaea sp</i>       | 1 | 2750  | 4   | 0 | 1 | 0 | 1 | 1 |
| <i>Incertae saedis 502</i>     | 1 | 1250  | 140 | 0 | 1 | 1 | 1 | 1 |
| <i>Carlownightia sp</i>        | 1 | 2625  | 5   | 0 | 1 | 0 | 1 | 1 |
| <i>Amyris madrensis</i>        | 2 | 150   | 89  | 1 | 0 | 0 | 2 | 1 |
| <i>Incertae saedis 812</i>     | 1 | 2500  | 2   | 0 | 1 | 0 | 1 | 1 |
| <i>Incertae saedis 802</i>     | 1 | 2375  | 3   | 0 | 1 | 0 | 1 | 1 |
| <i>Diospyros palmeri</i>       | 2 | 10    | 76  | 1 | 0 | 0 | 2 | 1 |
| <i>Incertae saedis 216</i>     | 1 | 2125  | 14  | 0 | 1 | 0 | 1 | 1 |
| <i>Incertae saedis 813</i>     | 1 | 2250  | 2   | 0 | 1 | 0 | 1 | 1 |
| <i>Lantana macropoda</i>       | 1 | 250   | 191 | 0 | 0 | 1 | 1 | 1 |
| <i>Sida filicaulis</i>         | 1 | 2125  | 5   | 0 | 1 | 0 | 1 | 1 |
| <i>Acacia rigidula</i>         | 1 | 165   | 191 | 0 | 0 | 1 | 1 | 1 |
| <i>Incertae saedis 806</i>     | 1 | 1750  | 14  | 0 | 1 | 0 | 1 | 1 |
| <i>Incertae saedis 773</i>     | 1 | 1750  | 4   | 0 | 1 | 0 | 1 | 1 |



Distribución y Relaciones Ecológicas del chamal *Dioon edule* var *angustifolium* en La Sierra de San Carlos Tamaulipas  
Anexos

|                                |   |      |     |   |   |   |   |   |
|--------------------------------|---|------|-----|---|---|---|---|---|
| <i>Caesalpinia mexicana</i>    | 2 | 135  | 6   | 1 | 0 | 0 | 2 | 1 |
| <i>Incertae saedis 774</i>     | 1 | 1500 | 14  | 0 | 1 | 0 | 1 | 1 |
| <i>Incertae saedis 508</i>     | 1 | 1250 | 34  | 0 | 1 | 0 | 1 | 1 |
| <i>Incertae saedis 764</i>     | 1 | 1250 | 33  | 0 | 1 | 0 | 1 | 1 |
| <i>Incertae saedis 207</i>     | 1 | 1375 | 7   | 0 | 1 | 0 | 1 | 1 |
| <i>Setaria leucopila</i>       | 1 | 1375 | 6   | 0 | 1 | 0 | 1 | 1 |
| <i>Incertae saedis 809</i>     | 1 | 1375 | 4   | 0 | 1 | 0 | 1 | 1 |
| <i>Fraxinus greggii</i>        | 1 | 5    | 137 | 0 | 0 | 1 | 1 | 1 |
| <i>Randia laetevirens</i>      | 1 | 60   | 126 | 0 | 0 | 1 | 1 | 1 |
| <i>Serjania sp 522</i>         | 1 | 125  | 119 | 0 | 0 | 1 | 1 | 1 |
| <i>Incertae saedis 223</i>     | 1 | 1250 | 4   | 0 | 1 | 0 | 1 | 0 |
| <i>Opuntia lindheimeri</i>     | 1 | 260  | 97  | 0 | 0 | 1 | 1 | 0 |
| <i>Incertae saedis 810</i>     | 1 | 1125 | 8   | 0 | 1 | 0 | 1 | 0 |
| <i>Incertae saedis 805</i>     | 1 | 1125 | 1   | 0 | 1 | 0 | 1 | 0 |
| <i>Notholaena sp</i>           | 1 | 1000 | 6   | 0 | 1 | 0 | 1 | 0 |
| <i>Incertae saedis 214</i>     | 1 | 1000 | 3   | 0 | 1 | 0 | 1 | 0 |
| <i>Incertae saedis 225</i>     | 1 | 1000 | 2   | 0 | 1 | 0 | 1 | 0 |
| <i>Incertae saedis 515</i>     | 1 | 125  | 75  | 0 | 0 | 0 | 1 | 0 |
| <i>Salvia sp 811</i>           | 1 | 875  | 1   | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 776</i>     | 1 | 750  | 10  | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 222</i>     | 1 | 750  | 3   | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 221</i>     | 1 | 750  | 2   | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 815</i>     | 1 | 750  | 2   | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 210</i>     | 1 | 750  | 2   | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 526</i>     | 1 | 250  | 45  | 0 | 0 | 0 | 1 | 0 |
| <i>Acacia roemeriana</i>       | 1 | 10   | 66  | 0 | 0 | 0 | 1 | 0 |
| <i>Ruellia nudiflora</i>       | 1 | 625  | 6   | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 219</i>     | 1 | 625  | 3   | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 509</i>     | 1 | 625  | 2   | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 213</i>     | 1 | 85   | 52  | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 513</i>     | 1 | 250  | 32  | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 203</i>     | 1 | 500  | 5   | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 224</i>     | 1 | 500  | 3   | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 220</i>     | 1 | 500  | 1   | 0 | 0 | 0 | 1 | 0 |
| <i>Malvastrum sp</i>           | 1 | 500  | 1   | 0 | 0 | 0 | 1 | 0 |
| <i>Karwinskia humboldtiana</i> | 1 | 25   | 39  | 0 | 0 | 0 | 1 | 0 |
| <i>Opuntia leptocaulis</i>     | 1 | 55   | 33  | 0 | 0 | 0 | 1 | 0 |
| <i>Xylosma flexuosum</i>       | 1 | 15   | 31  | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 519</i>     | 1 | 125  | 18  | 0 | 0 | 0 | 1 | 0 |
| <i>Stevia sp</i>               | 1 | 15   | 18  | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 511</i>     | 1 | 125  | 0   | 0 | 0 | 0 | 1 | 0 |
| <i>Rhus virens</i>             | 1 | 5    | 12  | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 510</i>     | 1 | 125  | 0   | 0 | 0 | 0 | 1 | 0 |
| <i>Sphaeralcea sp</i>          | 1 | 20   | 10  | 0 | 0 | 0 | 1 | 0 |
| <i>Celtis reticulata</i>       | 1 | 5    | 7   | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 211</i>     | 1 | 25   | 4   | 0 | 0 | 0 | 1 | 0 |
| <i>Guaiacum angustifolium</i>  | 1 | 10   | 1   | 0 | 0 | 0 | 1 | 0 |
| <i>Incertae saedis 218</i>     | 1 | 5    | 1   | 0 | 0 | 0 | 1 | 0 |

## ANEXO IV

**Tabla 15: Germinación de *Dioon edule* var *angustifolium* en % a través del tiempo en medio controlado**

| TIEMPO<br>(DÍAS) | PORCENTAJE DE GERMINACIÓN |                   |                    |
|------------------|---------------------------|-------------------|--------------------|
|                  | T1 E. HORIZONTAL          | T2 E. HACIA ABAJO | T3 E. HACIA ARRIBA |
| 1                | 2.9                       | 8.8               | 2.9                |
| 2                | 13.2                      | 26.5              | 17.6               |
| 3                | 39.7                      | 41.2              | 33.8               |
| 4                | 51.5                      | 47.1              | 35.3               |
| 5                | 60.3                      | 54.4              | 52.9               |
| 6                | 69.1                      | 63.2              | 55.9               |
| 7                | 72.1                      | 66.2              | 61.8               |
| 8                | 72.1                      | 66.2              | 61.8               |
| 10               | 76.5                      | 72.1              | 64.7               |
| 11               | 83.8                      | 73.5              | 67.6               |
| 12               | 83.8                      | 75.0              | 69.1               |
| 13               | 83.8                      | 75.0              | 69.1               |
| 18               | 85.3                      | 79.4              | 72.1               |

**Tabla 16: Germinación de semillas de *Dioon edule* var *angustifolium* en % a través del tiempo en vivero**

| DÍAS | T1: SOMBRA - E.<br>HORIZONTAL | T2: SOL - E.<br>HORIZONTAL | T3: SOMBRA - E.<br>VERTICAL | T4: SOL - E.<br>VERTICAL |
|------|-------------------------------|----------------------------|-----------------------------|--------------------------|
| 1    | 0                             | 0                          | 0                           | 0                        |
| 2    | 0                             | 0                          | 0                           | 0                        |
| 4    | 9                             | 3                          | 0                           | 0                        |
| 5    | 30                            | 8                          | 0                           | 0                        |
| 8    | 40                            | 33                         | 0                           | 0                        |
| 10   | 40                            | 33                         | 0                           | 0                        |
| 12   | 40                            | 33                         | 0                           | 0                        |
| 16   | 50                            | 36                         | 0                           | 0                        |
| 19   | 51                            | 38                         | 0                           | 0                        |
| 22   | 51                            | 40                         | 0                           | 0                        |
| 24   | 52                            | 43                         | 0                           | 0                        |
| 26   | 52                            | 45                         | 0                           | 1                        |
| 32   | 52                            | 46                         | 1                           | 2                        |
| 34   | 53                            | 47                         | 2                           | 3                        |
| 37   | 53                            | 51                         | 4                           | 3                        |
| 39   | 53                            | 52                         | 6                           | 3                        |
| 41   | 56                            | 54                         | 7                           | 3                        |
| 44   | 59                            | 66                         | 16                          | 6                        |
| 46   | 63                            | 68                         | 17                          | 7                        |
| 48   | 66                            | 72                         | 27                          | 14                       |
| 51   | 73                            | 76                         | 34                          | 23                       |
| 53   | 75                            | 79                         | 37                          | 31                       |
| 55   | 77                            | 80                         | 37                          | 35                       |
| 58   | 81                            | 82                         | 39                          | 37                       |
| 67   | 86                            | 85                         | 54                          | 50                       |
| 69   | 87                            | 87                         | 60                          | 51                       |
| 72   | 88                            | 88                         | 65                          | 52                       |
| 74   | 89                            | 88                         | 73                          | 52                       |
| 76   | 89                            | 88                         | 73                          | 52                       |

**Tabla 17: Emergencia de *Dioon edule* var *angustifolium* en % a través del tiempo en condiciones contrastantes de iluminación**

| DIAS | T1= SOMBRA - E.<br>HORIZONTAL | T3= SOMBRA - E.<br>VERTICAL | T4= SOL- E.<br>VERTICAL | T2= SOL - E.<br>HORIZONTAL |
|------|-------------------------------|-----------------------------|-------------------------|----------------------------|
| 1    | 0                             | 0                           | 0                       | 0                          |
| 2    | 0                             | 0                           | 0                       | 0                          |
| 4    | 0                             | 0                           | 0                       | 0                          |
| 5    | 0                             | 0                           | 0                       | 0                          |
| 8    | 0                             | 0                           | 0                       | 0                          |
| 10   | 0                             | 0                           | 0                       | 0                          |
| 12   | 0                             | 0                           | 0                       | 0                          |
| 16   | 0                             | 0                           | 0                       | 0                          |
| 19   | 2                             | 0                           | 0                       | 0                          |
| 22   | 3                             | 0                           | 0                       | 1                          |
| 24   | 4                             | 0                           | 0                       | 2                          |
| 26   | 5                             | 0                           | 0                       | 2                          |
| 32   | 5                             | 0                           | 0                       | 3                          |
| 34   | 13                            | 1                           | 1                       | 3                          |
| 37   | 15                            | 3                           | 1                       | 5                          |
| 39   | 19                            | 6                           | 1                       | 6                          |
| 41   | 27                            | 7                           | 1                       | 10                         |
| 44   | 32                            | 15                          | 3                       | 17                         |
| 46   | 40                            | 17                          | 5                       | 23                         |
| 48   | 47                            | 26                          | 10                      | 30                         |
| 51   | 60                            | 34                          | 18                      | 35                         |
| 53   | 64                            | 37                          | 27                      | 44                         |
| 55   | 66                            | 37                          | 31                      | 45                         |
| 58   | 70                            | 39                          | 33                      | 46                         |
| 67   | 81                            | 54                          | 47                      | 51                         |
| 69   | 83                            | 60                          | 49                      | 53                         |
| 72   | 84                            | 65                          | 50                      | 54                         |
| 74   | 85                            | 69                          | 50                      | 55                         |
| 76   | 85                            | 69                          | 50                      | 55                         |

## ANEXO V



Figura 1: *Dioon edule* var. *angustifolium*



Figura 2: Presencia de *Dioon edule* var. *angustifolium* en áreas abiertas y áreas cerradas



Figura 3: Germinación de la semilla de *Dioon edule* var. *angustifolium* en medio controlado



Figura 4: Germinación y emergencia de la semilla de *Dioon edule* var. *angustifolium* en vivero



Figura 5: Desarrollo de la plántula de *Dioon edule* var. *angustifolium* en vivero

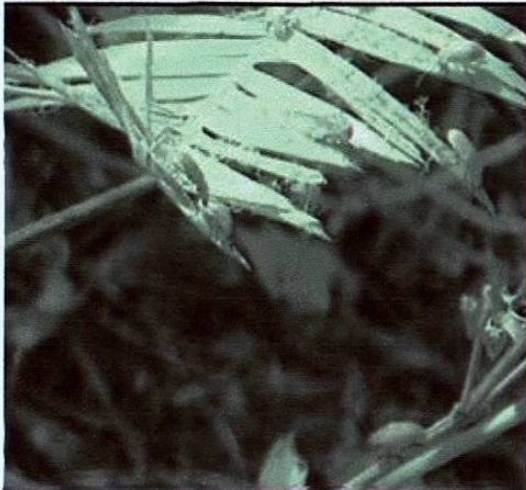


Figura 6: Coleóptero adulto de la familia de los Crisomélidos sobre individuos jóvenes de *Dioon edule* var. *angustifolium*



Figura 7: Larvas de lepidóptero de la familia Lycaenidae, del genero *Emaeus debora* sobre individuos adultos de *Dioon edule* var. *angustifolium*



Figura 8: Planta de *Dioon edule* var. *angustifolium* producida en vivero



Figura 9: Cono femenino de *Dioon edule* var. *angustifolium*



Figura 10: Cono masculino de *Dioon edule* var. *angustifolium*



