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**Appendices to J Poll Ecol 38(3), Verweij et al.**

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**Table S1.** List of cultivar numbers per plant genus with the number of plants per plot in parentheses. For commercially available cultivars, the commercial name has been added. The other cultivars were experimental cultivars.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ***S. nemorosa*** | ***D. cooperi*** | ***G. aristata*** | ***S. telephium*** | ***A. hybrida*** | ***L. angustifolia*** | ***L. stoechas*** | ***P. atriplicifolia*** |
| Rose Marvel (15) | DL RC Candy Red (15) | GA Mango (15) | Crystal Pink (13) | Beelicious Purple (15) | LV Eternal Elegance (9) | Anouk (15) | Little Lace (3) |
| SV Caramia (15) | DL RC Magenta Pop (15) | GA Red Sky (15) | SE02 (8) | Silver Blue (15) | LV Vintage Amethyst (8) | Forte Deep Purple (15) | Little Spire (14) |
| SV Caramia Rosa (15) | DL RC Orange (15) | GA Yellow Touch (15) | SE03 (9) | MP Better Amarillo (15) | LV Vintage Plum (11) | LV Berry Beautiful (13) | PV Jelena (15) |
| SV Midnight Purle (15) | DL RC Purple (15) | GA04 (15) | SE04 (9) | MP Better Amber (15) | LV Vintage Violet (11) | LV Big Night (15) | PV Zasha (15) |
| SV Midnight Rose (15) | DL RC White (15) | GA05 (15) | SE05 (10) | MP Better Violeta (15) | LF05 (11) | LV05 (15) | PV05 (11) |
| SV Noble Knight (15) | DL RC Yellow (15) | GA06 (15) | SE06 (11) | MP Honey Ember (15) | LF06 (9) | LV06 (9) | PV06 (12) |
| SV Royal Magenta (15) | DL SS Orange (15) | GA07 (15) | SE07 (13) | MP Honey Purple (15) | LF07 (9) | LV07 (15) | PV07 (9) |
| SV Salute Ice Blue (15) | DL SS Purple (15) | GA08 (15) | SE08 (8) | MP Honey Sandstone (15) | LF08 (10) | LV08 (15) | PV08 (4) |
| SV Salute Light Pink (15) | DL WOW Orange (15) | GA09 (15) | SE09 (9) | MP09 (15) | LF09 (8) | LV09 (15) | PV09 (9) |
| SV Salute Neon Pink (15) | DL10 (15) | GA10 (15) | SE10 (10) | MP10 (15) | LF10 (10) | LV10 (15) | PV10 (7) |
| SV11 (15) | DL11 (15) | GA11 (15) | SE11 (14) | MP11 (15) | LF11 (7) | LV11 (15) | PV11 (4) |
| SV12 (15) | DL12 (15) | GA12 (15) | SE12 (6) | MP12 (15) | LF12 (7) | LV12 (15) | PV12 (12) |
| SV13 (15) | DL13 (15) | GA13 (15) | SE13 (16) | MP13 (15) | LF13 (6) | LV13 (15) | PV13 (9) |
| SV14 (15) | DL14 (15) | GA14 (9) | SE14 (12) | MP14 (15) | LF14 (12) | LV14 (15) | PV14 (12) |
| SV15 (15) | DL15 (15) | GA15 (15) | SE15 (8) | MP15 (15) | LF15 (8) | LV15 (15) |  |

**Table S2.** An overview of the bee community surrounding the study site (radius 1.5km) based on observation. Bees from the Apidae family are more common than bees from other families.

|  |  |
| --- | --- |
| **Family** | **Species** |
| Andrenidae | *Andrena flavipes, Andrena nitida* |
| Apidae | *Apis Mellifera, Bombus hortorum, Bombus hypnorum, Bombus lapidarius, Bombus lucorum, Bombus pascuorum, Bombus pratorum, Bombus terrestris* |
| Colletidae | *Hylaeus* spp. |
| Halictidae | *Lasioglossum* spp. |
| Megachilidae | *Megachile* spp., *Chelostoma rapunculi* |

**Table S3.** An overview of the plant community surrounding the study site, containing the most common flowering plants and trees based on observation.

|  |  |
| --- | --- |
| **Family** | **Species** |
| Adoxaceae | *Sambucus nigra* |
| Apiaceae | *Angelica sylvestris*, *Daucus carota* |
| Asteraceae | *Achillea millefolium, Achillea ptarmica, Centaurea jacea, Cichorium intybus, Cirsium arvense, Crepis capillaris, Jacobaea vulgaris, Pilosella aurantiaca, Pulicaria dysenterica, Tanacetum vulgare, Taraxacum spp., Tussilago farfara* |
| Boraginaceae | *Phacelia* spp. |
| Caprifoliaceae | *Dipsacus fullonum* |
| Caryophyllaceae | *Silene* *dioica*, *Silene latifolia* |
| Ericaceae | *Vaccinium oxycoccus* |
| Fabaceae | *Lathyrus tuberosus, Trifolium pratense, Trifolium repens* |
| Geraniaceae | *Geranium* *pratense, Geranium pyrenaicum* |
| Iridaceae | *Iris pseudacorus* |
| Lamiaceae | *Glechoma hederacea*, *Mentha aquatica*, *Origanum vulgare* |
| Malvaceae | *Tilia spp.* |
| Oleaceae | *Ligustrum vulgare* |
| Onagraceae | *Epilobium hirsutum* |
| Orobanchaceae | *Rhinanthus* spp. |
| Ranunculaceae | *Ranunculus* spp. |
| Rosaceae | *Crataegus monogyna, Daucus carota, Potentilla anserina, Potentilla reptans, Prunella vulgaris, Prunus spinosa, Rubus caesius, Vicia cracca, Vicia tetrasperma* |
| Valerianaceae | *Valeriana officinalis* |

**Table S4.**Peak flowering time per plant genus.

|  |  |  |
| --- | --- | --- |
| **Plant genus** | **Start peak** | **End peak** |
| *Salvia nemorosa* | 12/06/2023 | 27/06/2023 |
| *Delosperma cooperi* | 18/07/2023 | 22/08/2023 |
| *Gaillardia aristata* | 27/06/2023 | 28/07/2023 |
| *Sedum telephium* | 23/08/2023 | 06/09/2023 |
| *Agastache hybrida* | 21/06/2023 | 17/07/2023 |
| *Lavandula angustifolia* | 05/07/2023 | 28/07/2023 |
| *Lavandula stoechas* | 29/06/2023 | 27/07/2023 |
| *Perovskia atriplicifolia* | 10/07/2023 | 28/07/2023 |

**Table S5.** Overview of observed visiting bee species for each cultivar per plant genus.

|  |  |  |  |
| --- | --- | --- | --- |
| **Plant genus** | **Cultivar** | **Number of bee species** | **Visitor species** |
| *S. nemorosa* | Rose Marvel | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. hypnorum* |
| *S. nemorosa* | SV Caramia | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *S. nemorosa* | SV Caramia Rosa | 5 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius, B. hypnorum* |
| *S. nemorosa* | SV Midnight Purple | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *S. nemorosa* | SV Midnight Rose | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *S. nemorosa* | SV Noble Knight | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *S. nemorosa* | SV Royal Magenta | 5 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius, B. hypnorum* |
| *S. nemorosa* | SV Salute Ice Blue | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *S. nemorosa* | SV Salute Light Pink | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *S. nemorosa* | SV Salute Neon Pink | 5 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius, B. hypnorum* |
| *S. nemorosa* | SV11 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *S. nemorosa* | SV12 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. hypnorum* |
| *S. nemorosa* | SV13 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. hypnorum* |
| *S. nemorosa* | SV14 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *S. nemorosa* | SV15 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. hypnorum* |
| *D. cooperi* | DL RC Candy Red | 3 | *A. mellifera, B. pascuorum, B. lapidarius* |
| *D. cooperi* | DL RC Magenta Pop | 3 | *A. mellifera, B. terrestris, B. lapidarius* |
| *D. cooperi* | DL RC Orange | 2 | *A. mellifera, B. lapidarius* |
| *D. cooperi* | DL RC Purple | 3 | *A. mellifera, B. pascuorum, B. lapidarius* |
| *D. cooperi* | DL RC White | 3 | *A. mellifera, B. pascuorum, B. lapidarius* |
| *D. cooperi* | DL RC Yellow | 2 | *A. mellifera, B. lapidarius* |
| *D. cooperi* | DL SS Orange | 2 | *A. mellifera, B. lapidarius* |
| *D. cooperi* | DL SS Purple | 2 | *A. mellifera, B. lapidarius* |
| *D. cooperi* | DL WOW Orange | 2 | *A. mellifera, B. lapidarius* |
| *D. cooperi* | DL10 | 2 | *A. mellifera, B. lapidarius* |
| *D. cooperi* | DL11 | 3 | *A. mellifera, B. terrestris, B. lapidarius* |
| *D. cooperi* | DL12 | 2 | *A. mellifera, B. lapidarius* |
| *D. cooperi* | DL13 | 2 | *A. mellifera, B. lapidarius* |
| *D. cooperi* | DL14 | 2 | *A. mellifera, B. lapidarius* |
| *D. cooperi* | DL15 | 2 | *A. mellifera, B. lapidarius* |
| *G. aristata* | GA Mango | 5 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius, Lasioglossum spp.* |
| *G. aristata* | GA Red Sky | 2 | *B. terrestris, B. lapidarius* |
| *G. aristata* | GA Yellow Touch | 4 | *A. mellifera, B. terrestris, B. lapidarius, B. pratorum* |
| *G. aristata* | GA04 | 5 | *A. mellifera, B. terrestris, B. lapidarius, B. hypnorum, B. pratorum* |
| *G. aristata* | GA05 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *G. aristata* | GA06 | 3 | *B. terrestris, B. lapidarius, Lasioglossum spp.* |
| *G. aristata* | GA07 | 4 | *B. terrestris, B. pascuorum, B. lapidarius, Lasioglossum spp.* |
| *G. aristata* | GA08 | 3 | *B. terrestris, B. lapidarius, Lasioglossum spp.* |
| *G. aristata* | GA09 | 3 | *A. mellifera, B. terrestris, B. lapidarius* |
| *G. aristata* | GA10 | 4 | *A. mellifera, B. terrestris, B. lapidarius, Lasioglossum spp.* |
| *G. aristata* | GA11 | 5 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius, Lasioglossum spp.* |
| *G. aristata* | GA12 | 5 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius, Lasioglossum spp.* |
| *G. aristata* | GA13 | 3 | *B. terrestris, B. lapidarius, Lasioglossum spp.* |
| *G. aristata* | GA14 | 2 | *B. terrestris, B. lapidarius* |
| *G. aristata* | GA15 | 4 | *A. mellifera, B. terrestris, B. lapidarius, Lasioglossum spp.* |
| *S. telephium* | Crystal Pink | 0 | - |
| *S. telephium* | SE02 | 2 | *A. mellifera, B. terrestris* |
| *S. telephium* | SE03 | 1 | *A. mellifera* |
| *S. telephium* | SE04 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *S. telephium* | SE05 | 1 | *A. mellifera* |
| *S. telephium* | SE06 | 2 | *A. mellifera, B. lapidarius* |
| *S. telephium* | SE07 | 0 | - |
| *S. telephium* | SE08 | 3 | *A. mellifera, B. terrestris, B. lapidarius* |
| *S. telephium* | SE09 | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *S. telephium* | SE10 | 1 | *A. mellifera* |
| *S. telephium* | SE11 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *S. telephium* | SE12 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *S. telephium* | SE13 | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *S. telephium* | SE14 | 3 | *A. mellifera, B. terrestris, B. lapidarius* |
| *S. telephium* | SE15 | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *A. hybrida* | Silver Blue | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *A. hybrida* | Beelicious Purple | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *A. hybrida* | MP Better Amarillo | 2 | *A. mellifera, B. pascuorum* |
| *A. hybrida* | MP Better Amber | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *A. hybrida* | MP Better Violetta | 2 | *A. mellifera, B. pascuorum* |
| *A. hybrida* | MP Honey Ember | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *A. hybrida* | MP Honey Purple | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *A. hybrida* | MP Honey Sandstone | 2 | *A. mellifera, B. pascuorum* |
| *A. hybrida* | MP09 | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *A. hybrida* | MP11 | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *A. hybrida* | MP10 | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *A. hybrida* | MP12 | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *A. hybrida* | MP13 | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *A. hybrida* | MP14 | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *A. hybrida* | MP15 | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *L. stoechas* | Anouk | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *L. stoechas* | Forte Deep Purple | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *L. stoechas* | LV Berry Beautiful | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *L. stoechas* | LV Big Night | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *L. stoechas* | LV05 | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *L. stoechas* | LV06 | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *L. stoechas* | LV07 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *L. stoechas* | LV08 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *L. stoechas* | LV09 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *L. stoechas* | LV10 | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *L. stoechas* | LV11 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *L. stoechas* | LV12 | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *L. stoechas* | LV13 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *L. stoechas* | LV14 | 5 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius, B. hypnorum* |
| *L. stoechas* | LV15 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *L. angustifolia* | LV Eternal Elegance | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *L. angustifolia* | LV Vintage Amethyst | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *L. angustifolia* | LV Vintage Plum | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *L. angustifolia* | LV Vintage Violet | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *L. angustifolia* | LF05 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *L. angustifolia* | LF06 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *L. angustifolia* | LF07 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *L. angustifolia* | LF08 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *L. angustifolia* | LF09 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *L. angustifolia* | LF10 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *L. angustifolia* | LF11 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *L. angustifolia* | LF12 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *L. angustifolia* | LF13 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *L. angustifolia* | LF14 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *L. angustifolia* | LF15 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *P. atriplicifolia* | Little Spire | 3 | *A. mellifera, B. pascuorum, B. hypnorum* |
| *P. atriplicifolia* | Little Lace | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *P. atriplicifolia* | PV Jelena | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *P. atriplicifolia* | PV Zasha | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *P. atriplicifolia* | PV05 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *P. atriplicifolia* | PV06 | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *P. atriplicifolia* | PV07 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *P. atriplicifolia* | PV08 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *P. atriplicifolia* | PV09 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *P. atriplicifolia* | PV10 | 3 | *A. mellifera, B. terrestris, B. pascuorum* |
| *P. atriplicifolia* | PV11 | 2 | *A. mellifera, B. pascuorum* |
| *P. atriplicifolia* | PV12 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *P. atriplicifolia* | PV13 | 4 | *A. mellifera, B. terrestris, B. pascuorum, B. lapidarius* |
| *P. atriplicifolia* | PV14 | 3 | *A. mellifera, B. pascuorum, B. lapidarius* |

**Table S6.** Test for analysis of bee visitation rate. Tukey = post-hoc pairwise comparisons using Tukey’s HSD, KW = Kruskal-Wallis test, Dunn = pairwise multiple comparisons using Dunn’s test.

|  |  |  |  |
| --- | --- | --- | --- |
| **Plant genus** | ***A. mellifera*** | ***Bombus* spp.** | ***Lasioglossum* spp.** |
| *Salvia nemorosa* | ANOVA + Tukey | ANOVA + Tukey | NA |
| *Delosperma cooperi* | ANOVA + Tukey | ANOVA + Tukey | NA |
| *Gaillardia aristata* | KW + Dunn | ANOVA + Tukey | KW + Dunn |
| *Sedum telephium* | KW + Dunn | KW + Dunn | NA |
| *Agastache hybrida* | KW + Dunn | KW + Dunn | NA |
| *Lavandula angustifolia* | KW + Dunn | ANOVA (log10) + Tukey | NA |
| *Lavandula stoechas* | KW + Dunn | ANOVA + Tukey | NA |
| *Perovskia atriplicifolia* | KW + Dunn | KW + Dunn | NA |

**Table S7.** Test for analysis of floral traits; nectar sugar content, corolla tube depth and the number of flowers. Tukey = post-hoc pairwise comparisons using Tukey’s HSD, KW = Kruskal-Wallis test, Dunn = pairwise multiple comparisons using Dunn’s test.

|  |  |  |  |
| --- | --- | --- | --- |
| **Plant genus** | **Nectar sugar content** | **Corolla tube depth** | **Nr. of flowers** |
| *Salvia nemorosa* | ANOVA (log10) + Tukey | KW + Dunn | ANOVA + Tukey |
| *Delosperma cooperi* | KW + Dunn | NA | ANOVA (log10) + Tukey |
| *Gaillardia aristata* | ANOVA + Tukey | KW + Dunn | ANOVA (log10) + Tukey |
| *Sedum telephium* | KW + Dunn | NA | NA |
| *Agastache hybrida* | KW + Dunn | KW + Dunn | ANOVA + Tukey |
| *Lavandula angustifolia* | ANOVA (log10) + Tukey | ANOVA + Tukey | ANOVA + Tukey |
| *Lavandula stoechas* | ANOVA (log10) + Tukey | KW + Dunn | ANOVA (log10) + Tukey |
| *Perovskia atriplicifolia* | KW + Dunn | KW + Dunn | KW + Dunn |

**Figure S1.** Overview of flower morphology of (A) *G. aristata*, (B) *S. nemorosa,* (C) *L. angustifolia* and *L. stoechas* (D*) P. atriplicifolia* and (E) *A. hybrida*. CTD = corolla tube depth.

