**Table S1**: Species abundance (%) of the AGV during pre-treatment (PTT) in 2016 and in cleared and uncleared microsites in 2017 at Maseding

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Species** | **Family** | **Ecological status** | **Life form†** | **PTT** | **Cleared** | **Uncleared** |
| **Grasses** |  |  |  |  |  |  |
| *Eragrostis lehmanniana* (Nees.) | Poaceae | Increaser Ⅱ | P | **16.8** | **16.6** | **21.0** |
| *Aristida bipartita* (Nees.) Trin & Rupr. | Poaceae | Increaser Ⅱ | P | **5.0** | **3.6** | **1.7** |
| *Digitaria eriantha* (Stent.) Steud. | Poaceae | Decreaser | P | **1.9** | **1.7** | **0.9** |
| *Cynodon dactylon* (L.) Pers. | Poaceae | Increaser Ⅱ | P | **7.2** | **1.8** | **2.7** |
| *Bothriochloa insculpta* (Hochst.) ex A. Rich. | Poaceae | Increaser Ⅱ | WP | **3.9** | **4.3** | **3.4** |
| *Brachiaria eruciformis* (Sibth. & Sm.) Griseb. | Poaceae | Increaser Ⅱ | A | **2.8** | **2.4** | **2.6** |
| *Tragus berteronianus* (Schult.) | Poaceae | Increaser Ⅱ | A | **1.5** | **3.7** | **3.1** |
| *Ischaemum afrum* (JF Gmel.) Dandy | Poaceae | Increaser Ⅰ | P | **0.9** | **0.6** | **4.2** |
| *Aristida congesta* subsp. *barbicollis* Roen. & Schult | Poaceae | Increaser Ⅱ | WP | **2.6** | **23.5** | **20.3** |
| *Panicum coloratum* L. | Poaceae | Decreaser | P | **1.6** | **0.4** | **0.5** |
| *Melinis repens* (Willd.) Zizka. | Poaceae | Increaser Ⅱ | P | **0.2** | **-** | **0.1** |
| *Chloris virgata* Sw. | Poaceae | Increaser Ⅱ | A | **0.1** | **0.7** | **0.1** |
| *Urochloa mosambicensis* (Hack.) Dandy. | Poaceae | Increaser Ⅱ | A | **0.5** | **0.9** | **0.0** |
| *Sporobolus nitens* (Trin.) Nees. | Poaceae | Increaser Ⅱ | WP | **0.3** | **-** | **-** |
| *Sorghum versicolor* Andersson. | Poaceae | Increaser Ⅱ | P | **0.0** | **-** | **-** |
| Seedlings | Poaceae | - | - | **1.2** | **-** | **-** |
| **Total** |  |  |  | **46.5** | **60.2** | **60.6** |
| **Forbs** |  |  |  |  |  |  |
| *Bidens pilosa* L. | Asteraceae | Invader | A | **-** | **0.3** | **1.4** |
| *Chochorous asplenifolius* (Burch.) | Tiliaceae | Invader | P | **6.4** | **6.6** | **4.5** |
| *Corbichonia decumbens* (Forssk.) Exell. | Molluginaceae | Increaser Ⅱ | A | **8.5** | **13.8** | **7.0** |
| *Commelina benghalensis* L. | Commelinaceae | Invader | P | **3.6** | **0.5** | **1.6** |
| *Nidorella resedifolia* DC. | Acanthaceae | Increaser Ⅱ | A | **0.2** | **0.1** | **0.4** |
| *Hibiscus trionum L.* | Loranthaceae | Increaser Ⅱ | A | **4.2** | **0.9** | **0.9** |
| *Ipomoea sinensis (Desr.) Choisy.* | Convolvulaceae | Invader | P | **0.4** | **0.2** | **0.01** |
| *Kyphocarpa angustifolia* (Moq.) Lopr. | Amaranthaceae | Invader | A | **3.9** | **-** | **-** |
| *Justicia flava* (Vahl.) Vahl. | Acanthaceae | Increaser Ⅱ | P | **1.4** | **0.6** | **1.6** |
| *Kohautia virgata* (Willd.) Bremek | Acanthaceae | Increaser Ⅱ | P | **1.9** | **2.1** | **2.4** |
| *Schkuhria pinnata* (L.) Kuntze ex Thell. | Asteraceae | Invader | P | **2.4** | **4.6** | **3.7** |
| *Crabbea acaulis* N.E.Br. | Acanthaceae | Invader | P | **1.8** | **4.0** | **9.5** |
| *Crabbea angustifolia* (Nees.) Nees. | Acanthaceae | Invader | P | **0.7** | **-** | **-** |
| *Amaranthus hybridus* (L.) Timeroy. | Amaranthaceae | Invader | P | **0.8** | **0.3** | **0.4** |
| *Phyllanthus maderaspatensis* L. | Phylanthaceae | Invader | A | **0.0** | **1.7** | **0.9** |
| *Phyllanthus uniraria* L. | Phylanthaceae | Invader | A | **0.01** | **0.7** | **0.7** |
| *Embrosia artemisiifolia* L. | Asteraceae | Invader | A | **0.0** | **-** | **-** |
| *Tribulus terrestris* (L.) Oliv. | Zygophyllaceae | Invader | A | **0.6** | **-** | **-** |
| *Spermacoce sinensis* (Klotzsch.) Hierm. | Rubiaceae | - | P | **0.1** | **0.1** | **-** |
| *Achyranthes aspera* (L.) Griseb. | Amaranthaceae | Invader | P | **0.4** | **0.8** | **0.5** |
| *Jamesbrittennia aurantiaca* Burch. | Scrophulariaceae | Invader | P | **0.2** | **0.2** |  |
| *Zinnia peruviana* L. | Asteraceae | Invader | A | **0.4** | **-** | **1.8** |
| Seedlings | - | - | - | **10.9** | **-** | **-** |
| **Total** |  |  |  | **48.8** | **37.5** | **37.3** |
| **Legumes** |  |  |  |  |  |  |
| *Indigofera spp* | Fabaceae | Increaser Ⅱ | P | **-** | **1.0** | **0.5** |
| *Sesbania bispinosa* (Willd.) Pers. | Fabaceae | Increaser Ⅱ | A | **-** | **0.3** | **0.1** |
| *Crotalaria heidmannii* Schinz. | Fabaceae | Invader | P | **-** | **0.2** | **0.7** |
| *Senna italica* Mill. | Fabaceae | Increaser Ⅱ | P | **-** | **0.3** | **0.1** |
| *Turphrosia purpurea* (L.) Pers. | Fabaceae | Invader | P | **1.3** | **-** | **-** |
| *Rhyncosia minima* (L.) Pers. | Fabaceae | Increaser Ⅱ | P | **-** | **0.5** | **0.3** |
| **Total** |  |  |  | **1.3** | **2.3** | **1.7** |
| **Succulents** |  |  |  |  | **-** |  |
| *Portulaca quadrifida* L. | Portulacaceae | Invader | A | **1.3** | **-** | **-** |
| *Kalanchoe brachyloba* Welw. ex Britten | Crassulaceae | Invader | P | **0.7** | **0.01** | **-** |
| **Total** |  |  |  | **2.0** | **0.01** | **-** |
| **Others** |  |  |  |  |  |  |
| *Cyperus rotundus* L. | Cyperaceae | Invader | P | **0.0** | **-** | **-** |
| *Rush spp* | Hyacinthaceae | - |  | **1.1** | **-** | **-** |

†Life form: P = perennial, A = Annual and WP = weak perennial

**Table S2**: Species abundance (%) of the AGV during pre-treatment (PTT) in 2016 and in cleared and uncleared microsites in 2017 at Kgomokgomo

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Species** | **Family** | **Ecological status** | **Life form†** | **PTT** | **Cleared** | **Uncleared** |
| **Grasses** |  |  |  |  |  |  |
| *Eragrostis pseudosclerantha* Chiov. | Poaceae | Increaser Ⅱ | WP | **15.2** | **12.7** | **2.4** |
| *Cynodon dactylon* (L.) Pers. | Poaceae | Increaser Ⅱ | P | **28.3** | **7.6** | **5.3** |
| *Digitaria eriantha* (Stent.) Steud. | Poaceae | Decreaser | P | **16.7** | **5.7** | **4.1** |
| *Urochloa mosambicensis* (Hack.) Dandy. | Poaceae | Increaser Ⅱ | A | **3.3** | **8.7** | **4.4** |
| *Panicum maximum* Jacq. | Poaceae | Decreaser | P | **6.5** | **3.8** | **8.0** |
| *Tragus berteronianus* Schult. | Poaceae | Increaser Ⅱ | A | **0.7** | **6.7** | **6.8** |
| *Schmidtia pappophoroides* Steud. ex J.A.Schmidt | Poaceae | Decreaser | P | **0.6** | **0.4** | **0.1** |
| *Aristida congesta* subsp. *barbicollis* Roen & Schult | Poaceae | Increaser Ⅱ | WP | **0.2** | **1.2** | **0.9** |
| *Dactyloctenium aegyptium* (L.) Willd. | Poaceae | Increaser Ⅱ | A | **-** | **0.2** | **0.1** |
| *Panicum coloratum* L. | Poaceae | Decreaser | P | **0.3** | **-** | **0.02** |
| *Heteropogon contortus* (L.) Roen & Schult. | Poaceae | Increaser Ⅱ | P | **-** | **0.1** | **-** |
| *Eustachys paspaloides* (Vahl.) Lanza & Mattei. | Poaceae | Decreaser | P | **0.1** | **0.1** | **-** |
| *Eragrostis biflora* Hack. ex Schinz. | Poaceae | Increaser Ⅱ | A | **-** | **0.1** | **0.5** |
| *Panicum stapfianum* Fourc. | Poaceae | Decreaser | P | **3.9** | **0.4** | **2.6** |
| *Sporobolus spp* | Poaceae | Increaser Ⅱ | P | **1.4** | **2.4** | **0.4** |
| *Eragrostis spp* | Poaceae | Increaser Ⅱ | P | **0.9** | **0.3** | **0.8** |
| Seedlings | Poaceae | - | - | **0.4** | **-** | **-** |
| **Total** |  |  |  | **78.3** | **50.3** | **36.4** |
| **Forbs** |  |  |  |  |  |  |
| *Evolvulus alsinoides* L. | Convolvulaceae | Invader | P | **0.1** | **0.8** | **1.1** |
| *Limeum viscosum* (J.Gay) Fenzl. | Molluginaceae | Increaser Ⅱ | A | **0.3** | **2.4** | **0.7** |
| *Blepharis integrifolia* (L.f.) E.Mey. ex Schinz | Acanthaceae | Increaser Ⅱ | P | **2.2** | **5.9** | **20.9** |
| *Commelina benghalensis* L. | Commelinaceae | Invader | P | **2.2** | **2.1** | **1.9** |
| *Heliotropium strigosum* Willd. | Boraginaceae | Increaser Ⅱ | A | **0.4** | **0.5** | **0.02** |
| *Monsonia glauca* R. Knuth. | Geraniaceae | Increaser Ⅱ | P | **0.01** | **0.5** | **0.4** |
| *Ipomoea magnusiana* Schinz. | Convolvulaceae | Invader | P | **-** | **0.2** | **0.3** |
| *Ipomoa sinensis* (Desr.) Choisy. | Convolvulaceae | Invader | A | **-** | **0.01** | **-** |
| *Kyphocarpa angustifolia* (Moq.) Lopr. | Amaranthaceae | Invader | A | **0.7** | **0.8** | **1.5** |
| *Justicia flava* (Vahl.) Vahl. | Acanthaceae | Increaser Ⅱ | P | **0.1** | **0.8** | **1.0** |
| *Kohautia virgata* (Willd.) Bremek. | Acanthaceae | Increaser Ⅱ | P | **0.01** | **0.1** | **0.3** |
| *Schkuhria pinnata* (L.) Kuntze ex Thell. | Asteraceae | Invader | P | **-** | **0.1** | **0.4** |
| *Gomphrena celocioides* Mart. | Amaranthaceae | Invader | P | **0.1** | **0.2** | **0.4** |
| *Oxalis latifolia* Kunth. | Oxalidaceae | Invader | P | **-** | **-** | **0.2** |
| *Chochorous longipendunculatus* | Tiliaceae | Invader | P | **-** | **0.1** | **0.02** |
| *Phyllanthus maderaspatensis* L. | Phylanthaceae | Invader | A | **0.01** | **0.2** | **0.3** |
| *Phyllanthus uniraria* L. | Phylanthaceae | Invader | A | **-** | **0.4** | **-** |
| *Achyranthes aspera* (L.) Griseb. | Amaranthaceae | Invader | P | **-** | **0.01** | **-** |
| *Tribulus terrestris* (L.) Oliv. | Zygophyllaceae | Invader | A | **0.4** | **0.1** | **-** |
| *Forb spp* | - | - | P | **2.1** | **0.2** | **0.1** |
| *Solanum nigrum* L. | Solanaceae | Invader | P | **-** | **-** | **0.6** |
| *Hibiscus engleri* (K.) Schum. | Malvaceae | Invader | P | **-** | **0.1** | **0.1** |
| Seedlings | - | - | - | **1.4** | **0.3** | **-** |
| **Total** |  |  |  | **10.0** | **15.8** | **30.2** |
| **Legumes** |  |  |  |  |  |  |
| *Tephrosia purpurea* (L.) Pers. | Fabaceae | Increaser Ⅱ | P | **2.2** | **1.1** | **0.7** |
| *Tepthrosia Viciodes* SchItdI | Fabaceae | Invader | P | **-** | **0.8** | **0.6** |
| *Chamaecrista absus* (L.) H.S Irwin & Barneby. | Fabaceae | Increaser Ⅱ | A | **-** | **0.01** | **0.1** |
| *Crotalaria incana* L. | Fabaceae | Invader | P | **-** | **0.01** | **-** |
| *Crotalaria damarensis* Eng. | Fabaceae | Invader | A | **-** | **0.1** | **-** |
| *Crotalaria sphaerocarpa* Per. Ex DC. | Fabaceae | Invader | A | **0.01** | **0.3** | **0.2** |
| *Crotalaria heidmannii* Schinz. | Fabaceae | Invader | A | **-** | **0.1** | **-** |
| *Otoptera burchelli* DC. | Fabaceae |  | P | **-** | **0.8** | **0.6** |
| *Rhyncosia torta* (Thunb.) DC. | Fabaceae | Increaser Ⅱ | P | **0.1** | **-** | **0.1** |
| **Total** |  |  |  | **2.3** | **3.2** | **2.3** |
| **Succulents** |  |  |  |  |  |  |
| *Portulaca pilosa* | Portulacaceae | Invader | A | **6.4** | **16.7** | **22.9** |
| *Portulaca quadrifida* L. | Portulacaceae | Invader | A | **0.9** | **11.9** | **1.3** |
| *Portulaca hereroensis* Schinz. | Portulacaceae | Invader | A | **-** | **1.5** | **4.6** |
| *Kalanchoe brachyloba* Welw. ex Britten | Crassulaceae | Invader | P | **0.4** | **-** | **0.2** |
| Seedlings | - | - | - | **0.9** | **-** | **-** |
| **Total** |  |  |  | **8.6** | **30.1** | **29.0** |
| **Others** |  |  |  |  |  |  |
| *Cyperus rotundus* L. | Cyperaceae | Invader | P | **0.1** | **-** | **0.4** |
| *Balbostylis hispidula* (Vahl.) R.W. Haines | Cyperaceae | Increaser Ⅱ | A | **-** | **0.3** | **-** |
| *Rush* spp | Hyacinthaceae | - | A | **0.3** | **-** | **0.1** |

†Life form: P = perennial, A = Annual and WP = weak perennial

50 m

50 m

20 m

5 m

10 m

10 m

10 m

7.5 m

5 m

20 m

10 m

7.5 m

7.5 m

7.5 m

5 m

**Fig. S1**: A diagram showing the layout of the experiment and the distribution of plots at Maseding and Kgomokgomo rangelands. The small white shaded squares are 1.7-m2 quadrats used for herbaceous vegetation assessment.