‘RW11-17’, ‘RW11-1860’, ‘RW11-2419’, ‘RW11-2560’, ‘RW11-2910’, and ‘RW11-4923’ Sweetpotato

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The six dual-purpose sweetpotato [Ipomoea batatas L. (Lam.)] cultivars, RW1117, RW111860, RW112419, RW112560, RW112910, and RW114923, were approved for release by the Plant Variety Release Committee of Rwanda in Feb. 2013 (RAB, Rwanda Agriculture Board, 2013). Sweetpotato forms a major part of the diet of both rural and urban communities in Rwanda. Moreover, the crop is expected to become more important with time as farmers engaged in mixed crop–livestock systems increasingly use vines as animal feed. Its use for both food and feed makes it attractive in areas where landavailability is a constraint. Moreover, the implementation of the Rwandese government policy, which encourages use of zero grazing practice to mitigate soil erosion, emphasizes the use of sweetpotato as an alternative source of animal forage (MINAGRI, 2013).

The six released cultivars have relatively high dry matter content (<30%) and have good to high consumer acceptance. The cultivars also have moderate to high levels of field resistance to sweetpotato virus disease (SPVD) and Alternaria bataticola blight and yield higher (8.3 to 22.8 t ha–1) than the average storage root yield of 6.0 t ha–1’ [FAOSTAT, 2011; International Potato Center (CIP), 1999]. Two of the released cultivars, RW11-2910 and RW11-2560, are orange-fleshed sweetpotato (OFSP), providing consumers with moderate to high beta-carotene (provitamin A) with potential to alleviate vitamin A deficiency. The six sweetpotato cultivars, RW11-17, RW11-1860, RW11-2419, RW11-2560, RW11-2910, and RW11-4923, are field seedling selections from the sweetpotato program of the Rwanda Agriculture Board (RAB, Rwanda Agriculture Board, 2013). The cultivars were selected from bulked seed from an open-polinated polycross nursery of 60 parents established in 2010; their male pedigrees are unknown. The 60 parents in the polycross comprised 30 introductions and 30 landraces collected from different major agroecological zones of Rwanda (Table 1). All the 60 parents were used in the polycross as sources of one or a combination of genes controlling important desirable traits. During the evaluation, the six clones were coded as follows: abbreviation for Rwanda, the last two digits of the year (2011) the genotype was initially selected (11), and the genotype selection number. The codes of these cultivars became the official names at cultivar release. All the six cultivars were respectively, the progenies of the following female parents: ‘Ejumula’, an OFSP landrace introduced from Uganda; ‘2000-203’, a RAB breeding line; ‘97-062’, also, known as Gihangamukungu, orange-fleshed, released in 2004; ‘Mugande’, bred and released by RAB in 2004; ‘SPK004’, an OFSP landrace introduced from Kenya; and ‘Ukerewe’, a yellow-fleshed cultivar from Tanzania.

Table 1. Origin and main attributes of sweetpotato parents used in the 2009–10 polycross nursery at Rubona, Rwanda.*

| Origin | Skin color | Flesh color | Origin | Skin color | Flesh color |
|--------|------------|-------------|--------|------------|-------------|
| RW11-17 | Red | O | NAPST 8 | NU | PR | O |
| RW11-1860 | White | W | Silik Omuyuka | NU | C | W |
| RW11-2419 | Red | W | Otada | NU | C | C |
| RW11-2560 | Red | Y | Porosita | CN | PR | C |
| RW11-2910 | Red | W | Todelokener | NU | C | C |
| RW11-2910 | Red | W | Dimbuka | NU | C | C |
| RW11-2910 | Red | W | Kyabafuruki | NU | C | W |
| RW11-2910 | Red | W | New Kago | NU | PR | W |
| RW11-2560 | White | O | NAPST 10 | NU | PR | DO |
| RW11-2910 | Red | W | SPK0066-61 | NU | PR | DO |
| RW11-17 | Red | W | LUW1274 | NU | C | O |

*Codes used in table—origin: IB = ISAR bred; I = ISAR; CN = CIP/Nairobi; NU = NAR/UGanda; L = landrace; skin color: C = cream; LY = light yellow; DO = dark orange; PR = purple-red; flesh color: O = orange; W = white; Y = yellow; LO = light orange; P = purple; LY = light yellow; DO = dark orange.
Table 2. Morphological descriptors of seven sweetpotato cultivars released in Rwanda in Feb. 2013. 

| Cultivar | RW11-17 | RW11-1860 | RW11-2419 | RW11-2560 | RW11-2910 | RW11-4923 | Kwezikumwe |
|----------|---------|-----------|-----------|-----------|-----------|-----------|------------|
| **Descriptor** | **Plant type** | **Vine internode** | **Vine pigmentation** | **Mature leaf shape** | **Foliage color** | **Skin color** | **Flesh color** |
| **Plant type** | Spreading | Semi-erect | Red | Hestate | Purple | Cream | Deep orange |
| **Length** | Short | Short | Very thin | Lobed | Deep | Moderate | Light orange |
| **Diameter** | Very thin | Short | Thin | Hestate | Moderate | Deep | Intermediate orange |
| **Predominant color** | Green | Green | Green | Hestate | Slighty purple | Green | Cream |
| **Secondary color** | Dark purple | Green with purple | Green | Triangular | Slightly purple | Purple tip | Yellow |
| **General outline** | Triangular | Hestate | Very dispersed | Hestate | Slightly purple | Green | Absent |
| **Lobe number** | 1 | Very slight | 1 | Closed cluster | Slightly purple | Green | Absent |
| **Shape of central lobe** | Triangular | Hestate | Long elliptical | Closed cluster | Slightly purple | Green | Absent |
| **Mature leaf** | Purple | Green | Green with purple | Hastate | Slightly purple | Green | Yellow |
| **Abaxial leaf vein** | Purple | Green | Green | Hastate | Slightly purple | Green | Absent |
| **Immature leaf petiole pigmentation** | Green | Green | Green | Hastate | Slightly purple | Green | Absent |
| **Habit** | Sparse | None | Spars | Moderate | Slightly purple | Green | Absent |
| **Stigma exertion** | Exerted | Exerted | Exerted | Exerted | Exerted | Exerted | Inserted |
| **Seed set** | Spars | Spars | Spars | Spars | Spars | Exerted | Inserted |
| **Stalk** | Short | Long elliptical | Long elliptical | Long elliptical | Long elliptical | Long elliptical | Long elliptical |
| **Formation Shape** | Dispersed | Very dispersed | Long elliptical | Long elliptical | Long elliptical | Long elliptical | Long elliptical |
| **Surface defects** | Veins | Alligator-like skin | Alligator-like skin | longitudinal grooves | Alligator-like skin | Alligator-like skin | Alligator-like skin |
| **Predominant lobe** | Red | White | White | Red | Purple-red | Cream | Absent |
| **Intensity** | Dark | Dark | Intermediate | Intermediate | Intermediate | Intermediate | Intermediate |
| **Secondary lobe** | Absent | Absent | Absent | Absent | Absent | Absent | Absent |
| **Predominant Secondary lobe** | Cream | Yellow | Cream | Deep orange | Light orange | Intermediate orange | Cream |
| **Intactness** | Cream | Yellow | Cream | Deep orange | Light orange | Intermediate orange | Cream |

*Selected descriptors according to International Potato Center, Asian Vegetable Research and Development Center, and the International Board for Plant Genetic Resources (1991).
Table 3. Performance of the six sweetpotato released cultivars on-station across three locations, Rubona, Karama, and Ngoma in 2013A.\(^a\)

| Cultivar     | Storage root yield (t·ha\(^{-1}\)) | Vine yield (t·ha\(^{-1}\)) | SPVD | Alternaria blight |
|--------------|----------------------------------|-----------------------------|------|-------------------|
| Total        | Marketable                       |                             |      |                   |
| RW11-17      | 21.9                             | 14.5                        | 31.6 | 1.3               |
| RW11-1860    | 20.8                             | 14.3                        | 25.6 | 2.2               |
| RW11-2419    | 20.7                             | 15.1                        | 31.5 | 2.8               |
| RW11-2560    | 22.8                             | 17.9                        | 26.3 | 2.2               |
| RW11-2910    | 20.0                             | 13.1                        | 28.2 | 2.5               |
| RW11-4923    | 19.0                             | 11.8                        | 28.4 | 2.0               |
| Kwezikumwe   | 14.1                             | 11.3                        | 30.6 | 1.7               |
| Mean         | 19.9                             | 14                           | 28.9 | 2.4               |
| LSD\(_{0.05}\) | 6.0                             | 6.9                          | 6.7  | 1.7               |
| CV (%)       | 16.1                             | 19.2                        | 32.0 | 35.6              |

\(^a\)Rubona, situated 2.59°S and 29.73°E is in the midaltitude agroecology, 1650 m above sea level (masl), with 1050 to 1200 mm rainfall, 18.7°C, low sweetpotato virus disease (SPVD) pressure, and light gravel soil texture; Karama, situated 1.94°S, 30.06°E is in the low-altitude, semiarid agroecology, 1400 masl, with 700 to 900 annual rainfall, 20.8°C mean annual temperature, high SPVD pressure, in the semiarid, drought-prone zone; Ngoma, situated 2.16°S, 30.55°E is in the low-altitude agroecology, 1420 masl, with 850 to 1000 mm rainfall, 20.3°C, medium SPVD pressure, and clay soil.

\[\text{LSD} = \text{least significant difference.}\]

Table 4. Yield quality attributes and reaction to pests and diseases on-farm of six sweetpotato cultivars released in Rwanda in Feb. 2014.

| Attribute                    | RW11-17 | RW11-1860 | RW11-2419 | RW11-2560 | RW11-2910 | RW11-4923 | Local control (Kwezikumwe) |
|------------------------------|---------|-----------|-----------|-----------|-----------|-----------|-----------------------------|
| Mean storage root (SR) yield (t·ha\(^{-1}\)) | 12.9    | 9.8       | 11.0      | 13.4      | 13.8      | 9.9       | 120.4                       |
| Mean SR yield (% of local control) | 186.9   | 142.0     | 171.0     | 194.2     | 120.4     | 131.8     | 100.0                       |
| Mean dry matter (DM) content of SR (%) | 30.8    | 37.8      | 24.9      | 21.0      | 31.1      | 37.3      | 30.0                        |
| DM content (%) of vines       | 17.0    | 20.7      | 17.6      | 20.6      | 18.3      | 19.2      | 18.0                        |
| DM yield of roots (t·ha\(^{-1}\)) | 4.0     | 3.7       | 2.9       | 2.8       | 2.6       | 3.4       | 2.4                         |
| DM yield of vines (t·ha\(^{-1}\)) | 4.1     | 4.8       | 3.4       | 2.7       | 3.9       | 4.4       | 2.6                         |
| Mean fresh weight to vine ratio | 2.0     | 1.9       | 1.9       | 2.0       | 2.0       | 2.0       | 2.1                         |
| Maturity (days)               | 135–150 | 120–135   | 135–150   | 120–135   | 120–135   | 120–135   | 120–135                     |
| Taste test rank (n = 32; 19 female, 13 male) | Excellent | Excellent | Good      | Good      | Good      | Very good | Very good                   |
| Field reaction to SPVD\(^b\) | MR      | MR        | MR        | MR        | MR        | MR        | MR                           |
| Field reaction to Alternaria stem blight | MR      | MR        | MR        | MR        | MR        | MR        | MR                           |
| Field reaction to weevils     | MR      | MR        | MR        | MR        | MR        | MR        | MR                           |

\(^a\)Taste test rank was based on aggregate pairwise comparison by the panel (farmers) evaluating taste, flavor, flesh color, skin color, and general acceptability.

\(^b\)SPVD = sweetpotato virus disease; MR = moderately resistant, moderate damage resulting from disease or moderate numbers of insects present or moderate damage (in case of insect damage). Classification of resistance were based on field evaluation in Rwanda.

The release of sweetpotato cultivars was mainly through farmer-to-farmer exchange or sale of planting material. Most seed companies do not disseminate sweetpotato planting material. Sweetpotato planting material reached farmers in the mentioned districts through RAB projects and various development partners such as Catholic Relief Services, Young Women Christian Association, the farmers’ federation (Imbaraga Syndicate), World Vision, and Africare.

The released cultivars are currently maintained in the open field of RAB at Rubona, Rwanda. Requests for planting material should be addressed to: Sweetpotato Program, RAB, P.O. Box 5016 Kigali, Rwanda.

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