Release of Five Sweetpotato Cultivars in Uganda

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Sweetpotato [Ipomoea batatas (L.) Poir.] cultivars, Bwanjule, New Kawogo, Tanzania, Wagabolige, and Sowola were approved for release by the Ugandan Plant Variety Release Committee (Mwanga et al., 1995). These were the first sweetpotato cultivars to be officially released in Uganda, where sweetpotato is an important food crop with estimated annual production in 1998 of 2.52 million t on 560,000 ha [Food and Agriculture Organization (FAO), 2000]. Per capita sweetpotato production in Uganda is estimated at 119 kg annually. Ugandan sweetpotato farmers grow a large number of sweetpotato landraces, many of them relatively low yielding, narrowly adapted, and susceptible to diseases and pests (Bashaasha et al., 1995).

Four of the newly released cultivars were selections from Ugandan landrace germplasm, and one (Sowola) was newly bred. All were selected on the basis of superior yield performance and disease resistance in multi-location yield trials in Uganda, and their excellent consumer acceptance in taste tests. They present Ugandan farmers with a choice of superior cultivars for improving sweetpotato production, and sweetpotato cultivar development programs outside of Uganda with a new source of germplasm with potential for use either as cultivars or progenitors.

Origin

‘Bwanjule’, ‘New Kawogo’, ‘Tanzania’, and ‘Wagabolige’ are superior Ugandan farmers’ cultivars selected from a collection of 380 landrace accessions assembled at Namulonge Agricultural and Animal Production Research Institute (NAARI) in 1987 and subsequently evaluated in trials at NAARI and elsewhere in Uganda. Pedigrees of these landrace cultivars are not known, but they are assumed to be chance seedlings selected by farmers. On the basis of numbers of landrace cultivars, and the adaptation of these cultivars to local conditions, including diseases and pests, eastern Africa is considered to be a secondary center of sweetpotato genetic diversity.

‘Sowola’, designated NIS/90/389a during testing, is a seedling selection from the sweetpotato breeding program at NAARI, and was selected from bulked seed from a polycross of 18 parents made from 1989 to 1990. The progenitors in this polycross block were popular cultivars from various parts of Uganda as follows: ‘Odeyo cami’, ‘Bwom dege’, and ‘Cwara opoko’, from Gulu District; ‘Tanzania’, from Soroti District; ‘Siliki’, ‘Mpaefumbiro’, and ‘Wagabolige’, from Jinja District; ‘Katalaako’, from Iganga District; ‘Tororo 1’, ‘Tororo 2’, and ‘Tororo 3’, from Tororo District; ‘Nylon’, ‘Bugerere’, ‘Sukali’, and ‘Mwezigumu’ from Nakaamongola District; and ‘Nantongo’, ‘Kawogo’, and ‘Mwezigumu’ from Mpiigi District. Because of the open-pollinated and bulk nature of the seed population, the pedigree of ‘Sowola’ is not known.

At the time of official release, ‘Bwanjule’ and ‘Wagabolige’ were of localized importance in their areas of original collection in Uganda, and ‘New Kawogo’ and ‘Tanzania’ were already widely grown by Ugandan farmers. ‘New Kawogo’ is the predominant cultivar grown in the tall grassland agroecological zone near Kampala. ‘Tanzania’ is a commercially important cultivar widely grown in the drier northeastern districts of Kumi and Soroti. On the basis of morphological characteristics, performance and quality characteristics, ‘Tanzania’ also appears to be widely grown in Tanzania (where it is known as ‘SPN/O’), Malawi (where it is known as ‘Kenya’), Kenya (where it is known as ‘Enaironi’), and Zambia (where it is known as ‘Chingowwa’). ‘Tanzania’ is probably the most widely grown sweetpotato cultivar in Sub-Saharan Africa.

Description and Performance

Selected standard morphological descriptors of the five cultivars [International Potato Center (CIP), Asian Vegetable Research and Development Center (AVRDC), and International Board for Plant Genetic Resources (IBGR), 1991] are presented in Table 1 and selected quality attributes, disease and pest reactions, and agronomic characteristics in Table 2. ‘Sowola’ has semi-erect vines and a relatively nonvigoruous canopy that does not suppress aggressive weeds as effectively as do those of the other cultivars. All five cultivars readily flower and set seed without special treatment under NAARI conditions.

All have relatively high root dry matter content and a somewhat dry texture and slightly sweet taste upon cooking. Flesh color (Table 1) is white to cream. These quality attributes are preferred by Ugandan consumers and differ markedly from the standard moist-textured, orange-fleshed ‘Porto Rico’-type sweetpotato predominant in the United States.

During their evaluation and selection, the released cultivars were routinely assessed for reaction to commonly occurring Ugandan diseases and pests. ‘Sowola’ and ‘Tanzania’ are shallow rooting, and in most cases their storage roots are exposed at the soil surface, making them highly susceptible to attack by sweetpotato weevils, Cylas puncticollis Bohe. and C. bruneus F. The remaining cultivars are somewhat deeper rooting, leading to consistently lower weevil damage in the field. All six cultivars have moderate to high resistance to sweetpotato virus disease (SPVD), a serious disease in some environments in Uganda, and particularly severe at NAARI, where the Ugandan sweetpotato breeding program is based (Gibson et al., 1998). ‘Sowola’, ‘Tanzania’, and ‘Bwanjule’ are resistant to Alternaria stem blight, a severe disease on susceptible genotypes in the southwestern highlands of Uganda, and extending to production areas in Rwanda and Burundi.

Availability

The cultivars are available upon request from the CIP or from NAARI. Cultivars are maintained as pathogen-tested, in vitro plantlets at CIP, Lima, Peru. They are also maintained by CIP as pathogen-tested plants in the greenhouse at Kenya Plant Quarantine Station, Muguga, Kenya, and are maintained by NAARI in Uganda in nonpathogen-tested form. ‘Bwanjule’ (CIP 440168), ‘New Kawogo’ (CIP 441743), ‘Tanzania’, (CIP 440166), and ‘Wagabolige’ (CIP 440167) are maintained by CIP in trust for humanity as part.
of the FAO’s designated global sweetpotato germplasm collection, whereas ‘Sowola’ (CIP 441744), as the product of a joint breeding effort between CIP and NAARI, is not part of this collection. Requests for these cultivars from outside of Africa should be addressed to the Seed Unit, CIP, AA 1558, Lima, Peru. Requests within Africa should be addressed to the Seed Unit, CIP, P.O. Box 25171, Nairobi. Within Uganda, requests for planting materials should be addressed to the Sweetpotato Program, NAARI, P.O. Box 7083, Kampala.

Table 1. Morphological descriptors of five sweetpotato cultivars released in Uganda.

| Cultivar     | Bwanjule       | New Kawogo     | Sowola       | Tanzania     | Wagabolige   |
|--------------|----------------|----------------|--------------|--------------|--------------|
| Plant type   | Spreading      | Spreading      | Semi-erect   | Spreading    | Spreading    |
| Predominant color | Green        | Green          | Green        | Green        | Green        |
| Secondary color | Dark green base | Purple tip     | Lt. purple tip | Absent       | Purple nodes |
| General outline | Almost divided | Lobed          | Lobed        | Lobed        | Triangular   |
| Lobe type    | Very deep      | Moderate       | Deep         | Deep         | Very slight  |
| Lobe number  | 5              | 7              | 5            | 5            | 1            |
| Shape of central lobe | Linear      | Semi-elliptic  | Elliptic     | Lanceolate   | Toothed      |
| Pigmentation | Midrib mostly purple | All veins partially purple | Purple spot on base of midrib | Green        | Midrib mostly purple |
| Mature leaf color | Green      | Green          | Green        | Green        | Green        |
| Immature leaf color | Slightly purple | Mostly purple | Green with purple | Mostly purple | Green with purple at both ends |
| Petiole pigmentation | Green with purple | near leaf | Green        | Green        | Green        |
| Shape        | Obovate        | Obovate        | Long, irregular | Obovate    | Round        |
| Surface defects | Absent        | Shallow, horizontal constrictions | Shallow, longitudinal grooves | Absent       | Shallow, longitudinal grooves |
| Predominant | Purple-red     | Red            | Brownish orange | Yellow       | Brownish orange |
| Intensity    | Intermediate   | Intermediate   | Pale         | Pale         | Pale         |
| Secondary   | Absent         | Brownish orange | Absent       | Absent       | Absent       |
| Maturity (days) | (120 to 150) | (130 to 150) | (100 to 120) | (120)        | (120 to 150) |
| Mean and (range) of storage root yields in various breeding trials (t/ha) | 21.4 (7 to 49) | 23.3 (6 to 45) | 25.6 (9 to 41) | 22.9 (5 to 58) | 24.1 (6 to 79) |
| Other traits | Vigorous foliage | Vigorous foliage | Storage roots sprout easily when injured | Vigorous foliage |

Table 2. Selected agronomic, disease, and pest reaction and quality attributes of six sweetpotato cultivars released in Uganda.

| Attribute                      | Bwanjule | New Kawogo | Sowola | Tanzania | Wagabolige |
|-------------------------------|----------|------------|--------|----------|------------|
| Dry matter (%)                | 30       | 32         | 34     | 32       | 33         |
| Cooked texture                | Somewhat dry | Somewhat dry | Somewhat dry | Somewhat dry | Somewhat dry |
| Sweetness                     | Moderate | Moderate   | Moderate | Sweet    | Moderate   |
| Field reaction to weevils*    | MR       | MR         | HS     | S        | MR         |
| Field reaction to SPVD†**     | R        | HS         | MR     | R        | R          |
| Field reaction to Alternaria stem blight* | R | HS | R | HS |
| Maturity (days)               | (120 to 150) | (130 to 150) | (100 to 120) | (120) | (120 to 150) |
| Mean and (range) of storage root yields in various breeding trials (t/ha) | 21.4 | 23.3 | 25.6 | 22.9 | 24.1 |
| Other traits                  | Vigorous foliage | Vigorous foliage | Storage roots sprout easily when injured | Vigorous foliage |

*HS = highly susceptible, S = susceptible, MR = moderately resistant, R = resistant, and HR = highly resistant.
†SPVD = sweetpotato virus disease.

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