Summary: Sweetpotato is 3rd most important root crop, in Sub-Saharan Africa. Scientist-farmer participatory evaluation for dual purpose targeting agricultural potential cold areas (1600–2100 meters above sea level (masl)) of selected 50 clones was done offarm. Genotype and environment effect were significant. The evaluation and organoleptic test identified genotypes potential for dual use in the cold areas as shown in the results below. These clones will be advanced to national performance trials for variety release consideration.

Introduction: Sweetpotato Ranks 5th economically, 3rd most important root crop, is a source of food, feed, income to resource-poor, and remedy to Vit. A. Zinc and Iron deficiency. It’s world and Kenya production are 14.7tha⁻¹, 9.5tha⁻¹ respectively. The crop is increasingly used for animal forage and or silage making, due to diminishing pasture land. Its forage improve greatly milk and meat production, however dual purpose varieties suitable for dairy farming areas, usually cold (1600–2100 masl), have not been bred in East Africa, hence necessitating this work.

Materials and methods: Screening of 50 clones selected from 13,000 polycross seedlings based on: no pubescence, green vines, large un-serrated leaves, high vine and root yield was done on farmer-researcher participatory evaluation on four onfarm sites namely: Runyenjesi, Manyata, Kangundo, and Kiboko. 30 cm long cuttings were planted slanted at 60°, 10 cm deep, under randomized complete block design in single rows of 10 hills, on molded ridges, spaced at 100 x 30 cm replicated 3 times. Data on vine foliage and root biomass collected. Farmer’s identified best performing clones for dual purpose at harvest based on root, foliage yield and cooked test. Data was analyzed using R statistical software and results presented below.

Results and discussion:
• Results are shown in tale 1-3 and figure 1 a,b,c,d and 2
• Genotype (G), environment (E) and interactions (I) on root and forage yield were significant depicting genetic variability to exploit for cold tolerant dual purpose clones.
• Clones Silklow (SK) 2, BND 15, Naspot (NP) II 3 and Kigabali (KB)17 had high forage root ratio and thus may have cold tolerant dual purpose potential.
• Clones Kyabafuruki (KBF) 20, New Kawogo (NK) 7, and Kyebandula (KB) 9, had GxE effects > 3 on root and forage yield, depicting positive genetic selection response.
• Kigabali (KB) 15, Silklow (SK) 6, SilkLow (SK) 2, BND 15, BND 1, and Naspot (NP) II 3 had good cooking qualities.
• The AMMI and Tai stability plots identified stable clones (within the origin e.g. Silklow (SK)2 and Silklow (SK) 6),

Table 1. Storage roots ANOVA

<table>
<thead>
<tr>
<th>Source</th>
<th>Df</th>
<th>Sum Sq</th>
<th>Mean Sq</th>
<th>F value</th>
<th>Pr (&gt;F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>49</td>
<td>2840.5</td>
<td>58.0</td>
<td>2.2</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>E</td>
<td>3</td>
<td>9707.3</td>
<td>3253.8</td>
<td>7.1</td>
<td>0.012</td>
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<tr>
<td>GxE</td>
<td>8</td>
<td>3667.4</td>
<td>458.4</td>
<td>17.0</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Residuals</td>
<td>384</td>
<td>10332.9</td>
<td>26.9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Conclusions: Clones; Kigabali (KB) 15, Kyebandula (KB) 9, and BND 1 showed high potential for cold tolerant dual purpose and would be screened at NPT for variety release consideration.

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Figure 1: (a) Silklow 2: yellow fleshed high root/forage yield, (b) Kigabali 15: Yellow fleshed roots

Figure 2: AMMI and Tai stability plots based on two principal components