Cassava variety evaluation

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Abstract

There is good potential for livestock production in the uplands of northern Laos. Livestock provide most of the cash income for upland farmers. Feed availability, diseases, and grazing area are consistently seen as the main constraints to increased livestock production. Integrating fodder crops into upland farming systems could improve feed availability and livestock health. In 2001, ten cassava varieties, including eight Thai varieties, were evaluated in collaboration with CIAT-FLSP at Houay Khot research station on a clay soil with high level of organic matter (OM), high in P and very high in Ca, Mg, K, and Mn. The experiment was laid out in RCBD with two replications. The cassava varieties tested were not statistically significant different with regard to root yields. In addition to the root yields, some other selected growth parameters were measured to select the best varieties for further testing. Four varieties are recommended for further evaluation. These are Rayong 72 and Rayong 90 (20-24 t/ha), which have good potential for livestock feed and Hanatee and the local red variety (13-15 t/ha), which are eating varieties.

Key words: livestock production, upland farming systems, feed availability, cassava variety

ການທົດລອງແນວພັນມັນຕົ້ນ

ບົດຄັດຫຍໍ້

ຢູ່ເຂດພູດອຍທາງພາກເໜືອຂອງປະເທດລາວມີທ່າແຮງທາງດ້ານການລ້ຽງສັດສູງຍ້ອນວ່າລາຍໄດ້ຂອງປະຊາຊົນໃນເຂດນີ້ສ່ວນໃຫຍ່ແມ່ນມາຈາກການລ້ຽງສັດ, ເຂົາເຈົ້າໄດ້ນຳໃຊ້ລາຍໄດ້ດັ່ງກ່າວເພື່ອການແກ້ໄຂຊີວິດປະຈຳວັນ ເຊ່ນ: ຊື້ອາຫານ ແລະ ສິນຄ້າອື່ນໆ. ແຕ່ເຖິງຢ່າງໃດກໍ່ຕາມ, ການຂະຫຍາຍການລ້ຽງສັດຍັງພົບກັບບັນຫາຫລາຍດ້ານ. ບັນຫາທີ່ເຄີຍພົບເຫັນເລື້ອຍໆ ແມ່ນການຂາດແຄນອາຫານ, ພະຍາດ ແລະ ພື້ນທີ່ມີຈຳກັດ. ເພື່ອແກ້ໄຂບັນຫາດັ່ງກ່າວຂ້າງເທິງນັ້ນ ຈຶ່ງໄດ້ນຳເອົາມັນຕົ້ນຈຳນວນ 10 ແນວພັນ (2 ແນວພັນພື້ນເມືອງ ແລະ 8 ແນວພັນນຳເຂົ້າຈາກປະເທດໄທ) ມາສຶກສາເພື່ອຄັດເລືອກເອົາແນວພັນທີ່ດີ ໃຫ້ຜົນຜະລິດສູງ. ການສຶກສາດັ່ງກ່າວໄດ້ຈັດຕັ້ງປະຕິບັດຮ່ວມມືກັບໂຄງການ CIALSP ຢູ່ສູນຄົ້ນຄ້ວາຫ້ວຍໂຄດ. ຄຸນລັກສະນະຂອງດິນໃນພື້ນທີ່ການທົດລອງເປັນດິນໜຽວມີອິນຊີວັດຖຸ, ທາດ P ສູງ ແລະ ມີທາດ Ca, Mg, K, ແລະ Mn ສູງຫລາຍ. ການທົດລອງໄດ້ຈັດວາງຕາມຮູບແບບ RCBD ມີ 2 ຊ້ຳ. ຜ່ານການວິເຄາະຂໍ້ມູນເຫັນວ່າ ແນວພັນທັ້ນຳມາສຶກສາໃຫ້ຜົນຜະລິດຮາກ ບໍ່ແຕກຕ່າງກັນທາງດ້ານສະຖິຕິ. ເຖິງຢ່າງໃດກໍ່ຕາມ, ນອກຈາກການວັດແທກຜົນຜະລິດຮາກແລ້ວຍັງໄດ້ວັດແທກຄຸນລັກສະນະການຈະເລີນເຕີບໂຕຂອງພືດອີກດ້ວຍ ເພື່ອຊ່ວຍໃນການຕັດສິນໃຈໃນການຄັດເລືອກເອົາແນວພັນທີ່ດີສຳລັບການນຳໃຊ້ໃນຕໍ່ໜ້າ. ໃນຈຳນວນ 10 ແນວພັນ ມີ 4 ແນວພັນໄດ້ຖືກຄັດເລືອກເປັນແນວພັນທີ່ດີເດ່ນກ່ວາໝູ່ ຄື: ຣາຢອງ 72 ແລະ ຣາຢອງ 90 ໃຫ້ຜົນຜະລິດຮາກ 20-24 ໂຕ່ນ/ ຮຕ. ຮາບາຕີ ແລະ ແນວພັນແດງ ພື້ນເມືອງ ເປັນແນວພັນທີ່ໃຊ້ເປັນອາຫາຂອງຄົນໄດ້ ໃຫ້ຜົນຜະລິດຮາກ 13 ຫາ 15 ໂຕ່ນ/ ຮຕ.

Introduction

There is high potential for livestock production in the uplands of northern Laos. Livestock provide most of the cash income for the upland farmers. Feed availability, diseases, and grazing area were consistently seen as the main constraints to the increased livestock production. Integrating fodder crops, into upland farming systems could not only increase feed availability for the livestock production, but also improve food security for the upland farmers. Other advantages of cassava production over other crops are ease of planting, feeding, and storage. Due to its high potential, ten cassava varieties, including eight varieties from Thailand, were evaluated in collaboration with CIAT-FLSP at Houay Khot Research Center.

Materials and methods

The experiment was undertaken at Houay Khot Research Center, Xieng Ngeune district. The site is located about 30 km south of Luang Prabang town with elevation of 360 m asl. The soil is clay with high level of organic matter (OM), high in P and very high in Ca, Mg, K, and Mn (Annex 1). This soil is generally suitable for many crops but may be heavy for cassava. The experiment was laid out in RCBD with 2 replications. A total of 10 varieties were evaluated (Table 1). Eight of the varieties were from Thailand and the other two were local varieties from around Luang Prabang. On May 16, 2001, 12 stakes of each variety were planted in the center of each plot and a local variety was used around the border of each plot. At planting time, 15-15-15 fertilizer was applied at the rate of 200 kg/ha to all plots. Hand weeding was done when it was required. Selected growth parameters (stem diameter, branch height, plant height, and canopy diameter) were measured every month during the first four months

following planting. The growth parameters from the 4th month were used in a correlation analysis with yield to better evaluate the varieties tested. The cassava was harvested on March 12, 2002.

Table 1. The main uses of different variety tested

	Variety	Uses
1.	Hanatee	Eating
2.	Rayong 2	Eating
3.	Rayong 1	Starch + Animal feed
4.	Rayong 5	Starch + Animal feed
5.	Rayong 60	Starch + Animal feed
6.	Rayong 72	Starch + Animal feed
7.	Rayong 90	Starch + Animal feed
8.	Kasetsart 50	Starch + Animal feed
9.	Local red	Eating
10.	Local white	Eating

Results

There were significant differences between varieties for the measured growth parameters (Table 2), however, root yields did not vary significantly between varieties, despite a wide range in average yields (13 to 24 t/ha). The above ground (top) yields were relatively high, ranging from 38 to 53 t/ha (wet weight). Higher root yields were associated with smaller stem, shorter in plant height, and higher harvest index (Tables 2 and 3). There were no association between yields and branch height and canopy diameter.

Among the ten varieties evaluated, Rayong 72 and Rayong 90 produced the highest root yields (20-24 t/ha). Hanatee and local red variety had the highest root yields (15-17 t/ha) among the four eating varieties.

Table 2. Growth performance (at 4 months) and yields of cassava evaluated at Houay Khot Research Centre, Luang Prabang. Bolds are recommended for further testing.

Varieties	**Growth[a] (cm)**				**Yield (t/ha)**		**HI[b]**
	Stem diameter	*Branch height[c]*	*Plant height*	*Canopy diameter*	*Root yield*	*Top yield[d]*	
Hanatee	**2.9cd**	**175b**	**315ab**	**240b.d**	**17.25**	**52.20**	**0.25**
Rayong 2	3.1ab	109e	312a.c	252b	13.34	48.62	0.22
Rayong 1	3.3a	212a	293a.c	258ab	16.34	48.50	0.25
Rayong 5	3.1ab	131de	270b.d	226d	14.33	37.50	0.28
Rayong 60	3.1b	165bc	298a.c	248bc	16.67	39.37	0.30
Rayong 72	**2.7d**	**144b.d**	**259cd**	**231cd**	**19.92**	**25.28**	**0.44**
Rayong 90	**2.8d**	**145b.d**	**235d**	**274a**	**24.38**	**38.74**	**0.39**
Kasetsart 50	3.1bc	209a	296a.c	257ab	18.00	38.32	0.32
Local red	**3.1ab**	**183c.e**	**324ab**	**232cd**	**15.42**	**42.96**	**0.26**
Local white	3.2ab	120de	332a	239b.d	12.75	53.40	0.19
ANOVA							
Replication	ns	ns	ns	ns	ns	--	--
Variety	<0.01	<0.01	0.05	<0.01	ns	--	--
LSD (0.05)	0.2	32.8	55.2	19.6	19.5	--	--
CV(%)	5.6	23.3	11.6	6.5	41.7	--	--

[a] The measurement was taken in Sept 15 or about 4 months after planting, [b] Harvest index, [c] Height from the ground to the first branch, [d] Average from 2 replications

Table 3. Relationships (correlation coefficient) between yields and selected growth parameters.

Parameters	Yields (t ha^{-1})	
	Root (N=20)	*Top (N=10)*
Stem diameter	-0.87**	0.64 ^{ns}
Branch height	-0.24 ^{ns}	0.07 ^{ns}
Plant height	-0.73*	0.70*
Canopy diameter	0.11 ^{ns}	0.08 ^{ns}
Total yields	-0.25 ^{ns}	0.92**
HI	0.74*	-0.89**

*, **, and ^{ns} indicate significant correlation at P<0.05, P<0.01, and not statistically significant different, respectively.

Discussion

The cassava varieties tested did not differ significantly with respect to root yields. However, based on the yield results and correlation analysis, four varieties may be recommended for further on-farm testing. The four varieties are Rayong 72 and Rayong 90, which are used for livestock feed and starch; and Hanatee and the local red variety, which are eating varieties.

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Annex

Annex 1. Chemical and physical characteristics of Houay Khot Research Center soil.

Chemical Characteristics													Physical characteristics			
%	←		*mg/100g*	→			←		*ppm*	→			←		*%*	→
pH	OM	P	Al	Ca	Mg	K	Al	B	Zn	Mn	Cu	Fe	Sand	Silt	Clay	Texture
5.4	3.5	12.4	0.10	6.94	2.78	0.89	1	0.76	3.16	110.1	0.79	16.2	19.7	29.9	50.4	Clay