Research Article Open Access

Abstract

Bean is one of the most important legume crops in the world. Root rots are widely distributed around the world and are economically important diseases in common beans. Other fungal diseases such as angular leaf spot, anthracnose, ascoshyta leaf spot, rust; viral diseases such as BCMV and BCMNV may also attack and reduce bean yield. After screening bean genotypes (with different background) for root rot resistance, 25 selected genotypes were used to evaluate their resistance level for major bean diseases such as angular leaf spot, anthracnose, ascochyta, rust, bean common mosaic virus, bean common mosaic necrotic virus and to assess their yield. The experiment was carried out using a Randomized Complete Block Design (RCBD) with three replications. The study results have shown that all genotypes were tolerant to anthracnose, ascochyta leaf spot and rust; 9 genotypes (Gasirida, MAC42 × COLTA, MBC71, Mwirasi, RED RANDISPIONEER, RWR 2245 × G12727AB136, RWV 3006 × G122164 AB136, MEXICO 54 × MEXICO 235) were the most tolerant to angular leaf spot; 23 genotypes were tolerant to BCMNV and 9 genotypes (MAC44, RWR 1668, RWR 2154, CIM RM00321, MAC 49, MBC 71, RWR 3194, SC B790, RWR 3228) tolerant to BCMV. T mo T mo ascochyta. liQ
MEXICO t RWR disand RWR MEX r ct R WR P 024s.

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Received: 04-February-2020, Manuscript No. ACST-20-7064; **Editor assigned:** 07-February-2020, PreQC No. ACST-20-7064(PQ); **Reviewed:** 21-February-2020, QC No. ACST-20-7064; **Revised:** 10-October-2022, QI No. ACST-20-7064; Manuscript No. ACST-20-7064(R); **Published:** 07-November-2022, DOI: 10.4172/2329-8863.1000534

Citation: Mukamuhirwa F, Bizimana JP, Kankundiye L (2022) Department of Agriculture and Animal Resources, University of Kigali, Kigali, Rwanda. Adv Crop Sci Tech 10:534.

Twenty- ve genotypes were selected for resistance to root rots a er screening 114 bean genotypes including released varieties, local landraces, elite lines, and 300 genotypes introduced from CIAT and MSU. ese beans genotypes included climbing and bush type plants that do not require staking materials. ose 25 genotypes were evaluated for disease resistance, yield and other agronomic performances in 2016 C season. Two genotypes MAC 44 and RWR 2154 were used as checks for climbing bean and bush bean respectively (Table 1) [5].

e yield evaluation trial was established in Randomized Complete Block Design with three replicates; each genotype among 25 was planted in small plots made of 4 lines of 2 m each. One seed per station using a spacing of (50 × 10) cm and two seeds per station using spacing of (50 × 20) cm were planted for bush bean and climbing bean respectively [6].

At planting time, fertilizers such as farm yard manure and DAP were applied at the rate of 30 tones/Ha and 100 kg/Ha respectively. Plants were top-dressed with urea 100 kg/Ha at weeding time.

Variety	Growth habit	Source of seed	Variety	Growth habit	Source of seed
MAC 44	climber	CIAT	MAC 42 × COLTA	climber	Rwanda
GASIRIDA	climber	Rwanda	EQUADOR 299 × G 122164 TU	Semi climber	Rwanda
RWR 3228	Bush	Rwanda	RED RANDISPIONNER × RWV 3006	Semi climber	Rwanda
MAC 49	climber	CIAT	G 122164 TU × EQUADOR 299	Semi climber	Rwanda
MWIRASI	climber	Rwanda	G 12727 AB 136 × G 122164 TU	Semi climber	Rwanda
Rwibarura2	climber	Rwanda	EQUADOR × ACC 714	Semi climber	Rwanda
CAL 96	Bush	CIAT	RWR 1668	Bush	Rwanda
MBC 71	climber	CIAT	G 12727 AB 136 × EQUADOR 299	Semi climber	Rwanda
CIM RM00321	Bush	CIAT	RED RANDISPIONEER × MEXICO 235	Semi climber	Rwanda
RWV 3006 × G122164 AB136	Semi climber	Rwanda	RWR 2245 × G12727AB136	Semi climber	Rwanda
RWR 3194	Bush	Rwanda	MEXICO 54 × MEXICO 235	Semi climber	Rwanda
RWR 2154	Bush	Rwanda	ACC 714	Semi climber	Rwanda
SC B790	Bush	CIAT			

Table 1: List of genotypes used in this study.

Source of variation	DF	ALS	Anthracnose	Ascochyita	Rust
Rep	2	0.4	0.34	0.78	0.04
Genotype	23	0.56*	0.09NS	0.44NS	0.07NS
Error	44	0.27	0.09	0.39	0.07
Mean	-	2.45	1.06	1.24	1.04
CV (%)	-	20.89	27.94	50.25	26.05

Table 2: Fungal diseases scored on bean leaves and pods. Note: NS: Non signifcant, *signifcant at the 0.05 probability level.

Source of variation	DF	BCMV	BCMNV
Rep	2	1.52	0.73
Genotype	23	18.41	6.2
Error	44	1.01	1.07
Mean	-	5.65	1.45
CV (%)	-	18.08	71.11

Table 3: Viral diseases scored on bean leaves.

E [illegible]: In the course of this study, bean genotype yield components were evaluated. A er computing the analysis of variance, it has been revealed that the number of germinated plants, the number of days to owering, the plant vigor, the e ciency as well as days to maturing were signi cantly di erent. e genotypes CAL 96 and Mwirasi germinated better than local check MAC 44 while genotype ACC 714 did not germinate at all. is indicates that germination capacity di ers among genotypes. While some varieties can germinate well, others cannot germinate at all. Only 1 genotype performed well compared to bush bean check. Likewise, 1 climbing genotype scored more germinated plants than bean climbing check. e fact that 2 genotypes had high germination rates could probably lead to a positive e ect on bean yield. e number of days to owering varied from 17.33 days to 51 days. e highest number of days to owering was recorded for genotypes G 12727 AB136 × EQUADOR 299 while the lowest was recorded on MEXICO 54 × MEXICO 235. Compared to the bush bean check, out of 14 bush bean genotypes 9 scored few days to owering. is could be due to di erent genetic make-up of considered genotypes and it sounds good because early maturing bean genotypes are needed especially in these days where climate change is impacting negatively on crop yields. In contrary, for climbing bean genotypes, all genotypes scored more days than bean check. is is not good as late maturing varieties are not favored by the current climatic conditions and therefore not preferred by farmers.

e highest plant vigor was recorded on genotypes EQUADOR 299 and G 12727 AB 136X EQUADOR 299 while genotype RWR 2154 showed the lowest vigor. Almost all tested genotypes are more vigorous compared to both local checks. is result which is probably due to

genotypes had more plants, designating that bush beans performed better than climbing beans in regards with this yield parameter. For the seed per pod component, the biggest number was recorded on 2 genotypes namely EQUADOR 299 and G 12727 AB 137XEQUADOR 299 while the lowest was on genotype RED RANDISPIONNER. Among 7 climbing genotypes, only 2 performed better than the check. Among 18 bush bean genotypes, 12 genotypes scored more seeds per pods. is indicates that tested bush bean genotypes are promising because the great number of seed per pod may lead to a subsequent increase of the yield.

GASIRIDA	5	a	b	g5920	>>BD(7T3A <</Lang (en-US)54.05m <09 >>BDC BT /10 0 0 7 161.5998 715.6649 Tm (a)Tj ET E26 /P <</Lang (en-US524.4

MAC 42 X COLTA	21			g					h	i		RWR 1668	9						f	g	h	EQUADOR 299	1429						f	g	h
RED RANDISPIONEER X MEXICO 235	8									i	j	RED RANDISPIONEER X																			

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