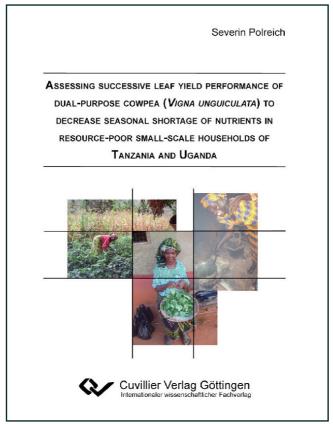


Severin Polreich (Autor)

Assessing successive leaf yield performance of dualpurpose cowpea (Vigna unguiculata) to decrease seasonal shortage of nutrients in resource-poor small-scale households of Tanzania and Uganda



https://cuvillier.de/de/shop/publications/417

Copyright:

Cuvillier Verlag, Inhaberin Annette Jentzsch-Cuvillier, Nonnenstieg 8, 37075 Göttingen, Germany

Telefon: +49 (0)551 54724-0, E-Mail: info@cuvillier.de, Website: https://cuvillier.de

Table of contents

1	GEN	IERAL INTRODUCTION	_ 1
	1.1	Background	_ 1
	1.2	Physiological aspects in cowpea	
	1.3	Effect of defoliation on growth and yield performance of cowpea	
	1.4	A review on yield stability	
	1.4		
	1.4		
	1.4	.3 Trade-off between yield stability and yield quantity	_ 8
	1.5	Objectives	_ 9
	1.6	Thesis outline	10
2	Acc	CESSION-SPECIFIC LEAF YIELD PERFORMANCE ACROSS REPEATED LEAF HARVESTS AND	
ΕN	NVIRON	NMENTAL INTERACTION	11
	2.1	Introduction	
	2.2	Material and Methods	
	2.2		
	2.2		
	2.2		
	2.2		15
	2.2		23
		2.2.5.1 Stability parameters	24
		2.2.5.2 Reliability and test-check differences	25
	2.3	Results	27
	2.3	.1 Environmental impact on leaf yield production	27
	2.3	.2 Impact of phenological traits on leaf yield production	27
	2.3	.3 Leaf yield stability across seasons and locations	29
	2.3	.4 Environmental interaction with yield performance across single leaf harvests	32
	2.4	Discussion	36
	2.4	.1 Leaf yield production and environmental factors	36
	2.4		
	2.4		
	2.4		
	2.5	Conclusions	45
3		CTUATIONS OF CRUDE PROTEIN AND IRON CONTENTS IN YOUNG COWPEA LEAVES ACROSS	
LO	OCATIC	ONS AND SUCCESSIVE LEAF HARVESTS	47
	3.1	Introduction	47
	3.2	Material and Methods	51
	3.2	.1 Plant material and experimental layout	51
	3.2		
		3.2.2.1 Reference analysis	
		3.2.2.2 Estimations of leaf nutrients by using NIRS	
	3.2	.3 Calculation of effective plot length (EPL _{xy})	57

	3.2.4	Data analysis	_ 59
	3.2.	4.1 Multiple regression	_ 59
	3.2.		
ŝ	3.3 Re	sults	
	3.3.1	GxE interactions of crude protein and iron content in young cowpea leaves	
	3.3.2	Comparisons of crude protein and iron contents in cowpea leaves across locations and leaf	
	harves	ts	6
	3.3.3	Comparisons of effective plot lengths for crude protein and iron contents in cowpea leaves ac	ros
	locatio	ns and leaf harvests	_ 6
	3.3.4	Relationships among effective plot length and other yield parameters	_ 6
3	3.4 Di	scussion	6
	3.4.1	Crude protein in cowpea leaves	
	3.4.2	Iron in cowpea leaves	
	3.4.3	Estimating yield benefit based on qualitative and quantitative leaf traits	
Ĵ	3.5 Co	nclusions	6
4		PACT OF ALTERING LEAF-HARVESTING SCENARIOS ON THE DUAL-PURPOSE UTILITY OF	-
DIF	FERENT	COWPEA ACCESSIONS	7
			- ' 7
		roduction	_
4		nterial and Methods	
	4.2.1	Experimental layout, plant material, and variables assessed	
	4.2.2	Data analysis	
	4.2.3	Leaf harvest effect	
	4.2.4	Responsiveness	_ 7
4		sults	- 7
	4.3.1	Impact of different leaf-harvesting frequencies on plant agro-morphology, phenology, and yie	
		ters	
	4.3.	2 1 3 3	
	4.3. 4.3.		
	4.3.		
	4.3.2		
	4.3.2	Leaf and seed yield interaction	
	4.3.		
,			_
4	4.4.1	Effect of leaf harvesting on growth type	_
		Effect of leaf harvesting on growth type	
	4.4.2 4.4.3	Effect of leaf harvesting on plant growth and morphology Relation between leaf harvest effect, physiological and phenological traits	
	4.4.4		
	4.4.4	Total edible dry matter yields Responsiveness	ہ ۔ 9
		Responsiveness	- 9 9
- 4	+) (0	TICHISTORS	v

	93
5.1 Introduction	9.
5.2 Material und Methods	9:
5.2.1 Experimental layout and sampling procedure	95
5.2.2 Data analysis	97
5.2.2.1 Stability parameters	97
5.2.2.2 Reliability and test-check differences	97
5.2.2.3 Index of superiority (S _i)	98
5.3 Results	99
5.3.1 Genotype-environment interactions of leaf and seed yield traits	
5.3.2 Effect of leaf harvesting on seed yield	99
5.3.3 Seed yield stability and reliability of leaf-harvested cowpeas	103
5.3.4 Determination of superiority	104
5.3.4 Determination of superiority5.3.5 Impact of dynamics in single leaf harvests of dual-purpose accessions or	
	the superiority index
5.3.5 Impact of dynamics in single leaf harvests of dual-purpose accessions or	the superiority index
5.3.5 Impact of dynamics in single leaf harvests of dual-purpose accessions or	the superiority index 103
5.3.5 Impact of dynamics in single leaf harvests of dual-purpose accessions or 5.4 Discussion	10: 10: 10:
5.3.5 Impact of dynamics in single leaf harvests of dual-purpose accessions or 5.4 Discussion 5.4.1 Environmental impact on cowpea yield components	103 1 yield 108
5.3.5 Impact of dynamics in single leaf harvests of dual-purpose accessions or 5.4 Discussion 5.4.1 Environmental impact on cowpea yield components 5.4.2 Effect of location on relationship between reliability and stability of seed	103 1 yield 103
5.3.5 Impact of dynamics in single leaf harvests of dual-purpose accessions or 5.4 Discussion 5.4.1 Environmental impact on cowpea yield components 5.4.2 Effect of location on relationship between reliability and stability of seec 5.4.3 Accuracy of greatest lower bounds for yield traits	103 104 105 107 107 108 108 108 108 109 110
5.3.5 Impact of dynamics in single leaf harvests of dual-purpose accessions or 5.4 Discussion 5.4.1 Environmental impact on cowpea yield components 5.4.2 Effect of location on relationship between reliability and stability of seed 5.4.3 Accuracy of greatest lower bounds for yield traits 5.4.4 Application of the superiority index and farmers' demands	102 103 104 105 106 107 107 108 108 108 108 108 118
5.3.5 Impact of dynamics in single leaf harvests of dual-purpose accessions or 5.4 Discussion 5.4.1 Environmental impact on cowpea yield components 5.4.2 Effect of location on relationship between reliability and stability of seed 5.4.3 Accuracy of greatest lower bounds for yield traits 5.4.4 Application of the superiority index and farmers' demands 5.5 Conclusions	105 1 yield
5.3.5 Impact of dynamics in single leaf harvests of dual-purpose accessions or 5.4 Discussion 5.4.1 Environmental impact on cowpea yield components 5.4.2 Effect of location on relationship between reliability and stability of seed 5.4.3 Accuracy of greatest lower bounds for yield traits 5.4.4 Application of the superiority index and farmers' demands 5.5 Conclusions GENERAL OUTLOOK SUMMARY	103 103 104 105 107 1106 1106 1107 1116 1116
5.3.5 Impact of dynamics in single leaf harvests of dual-purpose accessions or 5.4 Discussion 5.4.1 Environmental impact on cowpea yield components 5.4.2 Effect of location on relationship between reliability and stability of seed 5.4.3 Accuracy of greatest lower bounds for yield traits 5.4.4 Application of the superiority index and farmers' demands 5.5 Conclusions GENERAL OUTLOOK SUMMARY ZUSAMMENFASSUNG	105 107 108 109 109 110 110 111 111 115
5.3.5 Impact of dynamics in single leaf harvests of dual-purpose accessions or 5.4 Discussion 5.4.1 Environmental impact on cowpea yield components 5.4.2 Effect of location on relationship between reliability and stability of seed 5.4.3 Accuracy of greatest lower bounds for yield traits 5.4.4 Application of the superiority index and farmers' demands 5.5 Conclusions GENERAL OUTLOOK SUMMARY	105 107 108 109 109 110 111 111 112 112