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Investigate of Indigo (*Indigofera tinctoria* L.) and Roselle (*Hibiscus sabdariffa* L.) intercropping on weed density

Table 1- Soil properties of experimental field

Soil Properties	Soil depth 0-30 cm
Soil texture	Sandy loam
Organic matter (%)	0.47
pH	8.4
Total nitrogen (%)	11.8
Phosphorous (%)	0.02
K(mg/100g)	0.03
Na(mg/100g)	0.132
Zn(mg/kg)	0.892
Fe (mg/100g)	4.427

Indigofera tinctoria, also called true indigo, is a species of plant from the bean family that was one of the original sources of indigo dye. It has been naturalized to tropical and temperate Asia, as well as parts of Africa, but its native habitat is unknown since it has been in cultivation worldwide for many centuries. Today most dye is synthetic, but natural dye from I. tinctoria is still available, marketed as natural coloring where it is known as tarum in Indonesia and nila in Malaysia. In Iran and areas of the former Sovient union it is known as basma. The plant is also widely grown as a soil-improving ground cover.

Table 2-Analyesis of variance of dry weigh and density of weeds in different inter cropping system indigo and roselle (g/m²)

Source of Variations	Degree of Freedom	Mean squares			
		Weed density			Weed biomass
		Amaranthus retroflexus L.	*Cyperus esculantus* L.	Other weeds	
Repeat	2	1.056$^{n.s}$	0.56$^{n.s}$	6.5$^{n.s}$	269.38$^{n.s}$
Treatment	5	90.88**	40.32**	15.83	450.05**
Error	10	11.25	2.72	4.03	68.656
(C.V) (%)	-	13.94	14.28	12.73	3.42

Table 3- Comparison means for weed density and biomass in different plant density of woad and roselle

characteristics & Planting ratio	Weed density (plant/m²)			Weed biomass (g/m²)
	Cyperus esculantus L.	Amaranthus retroflexus L.	Other weed densities	
H_{100}	18^{a}	10.67^{a}	9^{a}	112.67 ^{a}
$I_{50}H_{50}$	10.33 ^{bc}	8.67 ^{a}	6^{ab}	100.33 ^{ab}
$I_{100}H_{50}$	7.66^{cd}	2.67^{b}	2^{c}	84 ^{c}
$I_{50}H_{100}$	3.33^{d}	3/00^{b}	4.66^{bc}	94.66^{bc}
$I_{100}H_{100}$	5.33^{cd}	2.67^{b}	4.33^{bc}	86.33 ^{bc}
H_{100}	14^{ab}	8.67^{a}	5^{bc}	111.67^{a}

Roselle (*Hibiscus sabdariffa*) is a species of *Hibiscus* probably native to West Africa, used for the production of bast fibre and as an infusion, in which it may be known as **carcade**. It is an annual or perennial herb or woody-based subshurb, growing to 2–2.5 m (7–8 ft) tall. The leavs are deeply three- to five-lobed, 8–15 cm (3–6 in) long, arranged alternately on the stems.

Abstract

Intercropping is one of the most effective methods to achieve sustainable agriculture. In order to investigate the effect of intercropping on Indigo (*Indigofera tinctoria* L.) and Roselle (*Hibiscus sabdariffa* L.) yield and weed management, an experiment based on randomized completely design (RCB) with three replications was conducted in research field of South Kerman Agricultural and Natural Resource Research and Education Center, Iran, during 2014. Treatments were different plant density of Indigo and Roselle in additive and replacement intercropping system: 100:100, 100:50, 50:100, 50:50 and monoculture of Indigo and Roselle respectively. The result showed that maximum yield of Roselle (1114 kg/hec) is obtained from 100:100 intercropping ratio that 29.25% was higher than Roselle solo culture. Amaranth (*Amarantus* sp.) density in 100:100, 50:100 and 100:50 ratios of Indigo and Roselle were 57.44T 81.5 and 70.38 % lower than Roselle solo culture respectively. Maximum plant density of Cyprus (*Cyprus* sp.) was related to Indigo and Roselle solo culture and 50:50 intercropping ratio. Plant density of other weeds in 100:100, 100:50, 50:100 and 50:50 ratios were 77.7, 48.22, 51.88 and 44.4 % lower than Roselle solo culture. Weed biomass in 100:100, 50:100 and 100:50 ratios of Indigo and Roselle were 25.44, 15.98 and 23.38 % less than Roselle solo culture and its lowest amount (84 gr/m^2) was related to 100:100 additive systems. It seems that solo culture and 50:50 of Indigo and Roselle intercropping system prepare maximum ecological niche for weeds than its additive system prepare maximum ecological niche for weeds than its additive system

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