

# Vetch is an economical source of nitrogen in rice

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Interest in nitrogen fixed in rice fields by leguminous green manures has revived because of the rapidly rising costs of nitrogen fertilizers. We present here previously unreported data from experiments performed over 20 years ago on the best time to plant several vetch species in maturing paddy rice to produce a winter-grown green manure crop.

Vetch can easily be seeded aurally in a rice crop before harvest, but the question was whether it should be planted into the water or after drainage. It was thought that the sprouting vetch could use residual moisture from flood water after, and possibly even before, drainage in mid-September, because little rain occurs until late October or November.

Three field experiments were conducted at the Rice Experiment Station, Biggs, simulating aerial planting of vetch from 25 days before draining the flood water in a rice field up to 32 days after drainage. A device was made from large electric conduit that would drop the seed uniformly from a height of up to 3 feet. In each experimental unit, 100 vetch seeds were planted in a row 20 feet long, with rows 5 feet apart. Each vetch-species and time-of-planting combination was randomized and replicated four times in blocks. After the rice was harvested, the straw was removed from the rows to facilitate observations on the vetch.

In experiment A, four species — common, hairy, Lana woolypod, and purple vetches (*Vicia sativa*, *V. villosa*, *V. dasy-carpa*, and *V. benghalensis*) — were seeded 1, 5, 9, and 25 days before the rice was drained. Purple vetch was also seeded 1, 2, 4, and 8 days after drainage.

Lana and purple vetches were more tolerant of submergence than were common and hairy vetches, but five or more days of submergence severely reduced stands of all

species (see table). Pot tests under controlled conditions confirmed these differences. About one-third of the purple vetch seeds planted at all dates after drainage produced mature plants. A half inch of rain that fell 2 days after the 8-day planting tended to equalize moisture availability among the planting dates after drainage.

Because the rice was lodged, the harvest was run close to the ground at harvest

time 21 days after drainage. Almost all of the vetch plants were cut off, leaving only a few inches of stem. The plants survived, but their final dry weights were probably reduced.

In experiments B and C, planting times ranged from 8 days before to 32 days after drainage, and only Lana and purple vetches were included. In both experiments, production of plants from seed of both species

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Stand Establishment of Vetch Green Manure in Maturing Paddy Rice as Affected by Planting Dates Before and After Drainage									
Experiment A. Establishment on April 8, 1957, per 100 seeds sown fall, 1956									
Days before or after drainage	Stand				Dry weight				
	Common	Hairy	Lana	Purple	Common	Hairy	Lana	Purple	
	%	%	%	%	g	g	g	g	
-25	0	0	0	0	0	0	0	0	
-9	0	0	0	1	0	0	0	6	
-5	0	0	3	5	0	0	17	30	
-1	6	16	33	29	8	40	145	110	
0*	—	—	—	—	—	—	—	—	
1	†	†	†	31	†	†	†	99	
2	†	†	†	30	†	†	†	99	
4	†	†	†	39	†	†	†	133	
8	†	†	†	36	†	†	†	137	
LSD 0.05				9				115	
Experiment B. Establishment on April 27, 1959, per 100 seeds sown fall, 1958					Experiment C., Establishment on May 2, 1960, per 100 seeds sown fall, 1959				
Days before or after drainage	Stand		Dry weight		Stand		Dry weight		
	Lana	Purple	Lana	Purple	Lana	Purple	Lana	Purple	
	%	%	g	g	%	%	g	g	
-8	3	0	20	8	1	3	3	12	
-4	12	5	158	58	3	4	10	15	
-2	17	13	243	143	15	29	85	153	
-1	26	8	305	105	17	34	72	162	
0*	32	18	298	129	21	41	107	206	
1	39	16	363	133	26	28	119	115	
2	30	15	303	135	30	23	91	90	
4	36	29	243	203	21	16	23	16	
8	43	36	268	180	17	21	18	19	
16	53	49	275	223	19	30	18	26	
32	54	37	268	165	24	28	26	27	
LSD 0.05	23	17	258	ns	13	14	60	96	

NOTE: Data are means of four replicates of 100 seeds planted in a 20-foot row.  
 \*Experiment A rice field drained September 7 and 8, 1956. Experiment B field drained September 17, 1958. Experiment C field drained September 22, 1959.  
 †Not measured.

Vetch continued

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