Table 12. Effect of Temperature on Ammonium-Nitrogen Production (1941)[a]

Sample No	Temperature of Incubation	Ammonium-Nitrogen Content (mg N per 100 g dry soil) Number of Days of Flooding		
		0	14	18
1	26° C	1.0	2.8	ND
2	30° C	1.0	3.2	3.3
3	30°-40° C[b]	1.0	ND	5.2
4	40° C	1.0	7.5	ND

ND: No data available.

a Experimental details: Soil obtained on 20 September 1941 from furrow slice of paddy field, Agricultural Experiment Station, Konosu, Saitama Prefecture. This field was fertilized each year with organic fertilizers. Wet soil, equivalent to 70g dry soil was placed in 100 cc beakers and covered to depth of 1 cm with distilled water. Depth of soil in each beaker was 4 cm. Samples were incubated at designated temperature.

b Sample incubated at 30° C for first 14 days and at 40° C for last 4 days.

Table 13. Effect of Temperature and Air-Drying on Ammonium-Nitrogen production (1941)[a]

Soil Sample[b]	Treatment before Flooding	Temperature of Incubation	Ammonium-Nitrogen Content (mg N per 100 g dry soil) Number of Days of Flooding			
			0	7	14	30
A_1	None	26° C	3.1	4.5	4.8	5.7
A_2	None	40° C	3.1	7.0	9.8	10.6
A_3	Air-Dried	26° C	5.6	13.9	14.2	11.3
A_4	Air-Dried	40° C	5.6	17.6	18.0	19.5
B_1	None	26° C	1.8	2.3	2.7	3.0
B_2	None	40° C	1.8	2.9	6.6	5.2
B_3	Air-Dried	26° C	2.4	5.9	11.1	9.5
B_4	Air-Dried	40° C	2.4	14.0	14.6	13.8

a Soil obtained on 2 September 1941 from furrow slice of paddy fields, agricultural experiment station, Konosu, Saitama prefecture. For other experimental details see Table 12.

b Soil Sample, A_1-A_4, were taken from a paddy field fertilized each year with organic fertilizers.
Soil Sample, B_1 - B_4, were taken from a paddy field fertilized each year with inorganic fertilizers.

Table 14. Effect of Ammonium-Nitrogen Production when Soil of The Oxidized Layer is Mixed with Soil of The Reduced Layer (1940)[a]

Soil Sample[b]	Depth of Sampling (cm)	Ammonium-Nitrogen Production (mg N per 100 g dry soil) Days of Flooding	
		0	14
A_1	0-5	2.2	6.6
A_2	5-10	2.2	3.0
B_1	0-5	1.9	3.0
B_2	5-10	1.0	1.0

a. Soil samples obtained on 12 August 1940 from paddy fields at Agricultural experiment station, Konosu, Saitama prefecture. Soil from the upper layer of the furrow slice (0-0.5 cm) was mixed to make one sample, and soil from the lower layer of the furrow slice (5-10 cm) was mixed to make another sample. Method of Incubation was similar to that described in Table 12. The Temperature of Incubation was 30° C.

b. Soil samples A_1-A_2 were from paddy field fertilized annually with organic fertilizers.
Soil samples B_1-B_2 were from paddy field fertilized annually with inorganic fertilizers.

Table 15. Effect of Low Soil Temperature on The Ammonium-Nitrogen Content of Flooded Paddy Rice Soil (1940)[a]

Sample No.	Materials Added	Temperature of Incubation	Depth of Soil Layer (cm)	Nitrogen Content (mg N per 100 g dry soil) Number of Days of Flooding					
				0		14		33	
				NH_4-N	NO_3-N	NH_4-N	NO_3-N	NH_4-N	NO_3-N
1	None	20° C	1	1.1	2.0	0.3	Trace	0.4	Trace
2	Soybean meal	20° C	1	1.1	2.0	2.9	Trace	0.5	Trace
3	Ammonium sulfate	20° C	1	10.5	2.0	4.4	Trace	0.1	Trace
4	None	20° C	4	1.1	2.0	1.3	Trace	1.3	Trace
5	Soybean meal	20° C	4	1.1	2.0	6.5	Trace	4.8	Trace
6	Ammonium sulfate	20° C	4	10.5	2.0	8.4	Trace	7.0	Trace

a Experimental details are similar to those given in Table 6 except for temperature of Incubation.

Table 16. Effect of High Soil Temperature on The Ammonium-Nitrogen Content of Flooded Paddy Rice Soil (1942)[a]

Sample No.[b]	Materials Added	Temperature of Incubation	Depth of Soil Layer (cm)	Ammonium-Nitrogen Content (mg N per 100 g dry soil) Number of Days of Flooding			
				0	14	21	40
A_1	None	30°C	1	2.1	1.9	0.7	0.4
A_2	None	40°C	1	2.1	6.7	3.6	3.5
A_3	Soybean meal	30°C	1	2.1	6.4	2.1	1.0
A_4	Soybean meal	40°C	1	2.1	14.9	17.4	17.6
A_5	Ammonium sulfate	30°C	1	12.1	12.8	12.7	1.5
A_6	Ammonium sulfate	40°C	1	12.1	17.6	20.2	22.9
B_1	None	30°C	1	2.0	1.2	0.5	0.5
B_2	None	40°C	1	2.0	5.5	7.9	6.2
B_3	Soybean meal	30°C	1	2.0	7.0	1.9	0.6
B_4	Soybean meal	40°C	1	2.0	15.2	17.2	18.5
B_5	Ammonium sulfate	30°C	1	12.0	8.5	6.4	0.5
B_6	Ammonium sulfate	40°C	1	12.0	18.8	20.8	16.7

a Method of incubation was similar to that described in Table 6 except for temperature of incubation and depth of soil water.

b Soil samples A_1-A_6 were obtained on 30 November from the furrow slice of a paddy field at the agricultural experiment station, Konosu, Saitama prefecture. This field was fertilized annually with organic fertilizer. Soil samples B_1-B_6 were obtained from the furrow slice of a paddy field at the same agricultural experiment station. This field fertilized with inorganic fertilizers for two successive years and with green manure every third year.

Table 17. Nitrogen Fixation in Flooded Paddy Rice Soils (August-December 1942)[a]

Soil Sample[b]	Materials Added	Total Nitrogen Content (mg N per 100 g dry soil) Number of Days of Flooding					
		0	45	55	57	87	90
A_1	None	108.7	ND	ND	106.6	109.3	ND
A_2	$CaCO_3$	108.7	ND	ND	111.8	114.0	ND
A_3	$CaCO_3.KH_2PO_4$	108.7	ND	ND	132.7	128.3	ND
B_1	None	275.7	ND	277.4	ND	ND	275.0
B_2	$CaCO_3$	275.7	ND	283.7	ND	ND	292.9
C_1	None	358.5	346.4	ND	ND	ND	353.1
C_2	$CaCO_3$	358.5	368.6	ND	ND	ND	379.2
C_3	$CaCO_3.KH_2PO_4$	358.5	366.9	ND	ND	ND	370.0

a. See text for experimental details.

b. Soil samples A_1-A_3 were virgin, alluvial soils obtained near Arakawa river. Soil samples B_1-B_2 were obtained from the furrow slice of a paddy field, at The Agricultural Experiment Station, Konosu, Saitama Prefecture. This field was fertilized each year with inorganic fertilizers.
Soil sample C_1-C_3 were obtained from the furrow slice of a paddy field at the Agricultural Experiment Station, Konosu, Saitama Prefecture. This field was fertilized annually with organic fertilizers.

Table 18. Effect of Air Drying on Ammonium-nitrogen Production in the Various Horizons of paddy Rice soils Under Flooding Condition (1942) a/

Soil Sample b/		Depth (cm)	NH_4-N Content Before Flooding (mg N/100g dry soil)	Wet soil after 30 days of Flooding			Air-Dried soil after 30 Days		
				NH_4-N mg N/100g dry soil	E_6 (volt)	PH	NH_4-N mg N/100g dry soil)	E_6 (volt)	PH
	Furrow	(0 - 9.0	3.5	4.6	0.20	7.5	16.5	0.16	7.8
	Slice	(9.0-13.5	2.5	ND	ND	ND	14.7	0.18	7.9
A	Plow sole	13.5-16.5	3.5	2.6	0.30	7.5	6.9	0.27	7.9
		(16.5-19.5	1.0	ND	ND	ND	4.8	0.34	7.8
	Subsoil	(19.5-25.5	1.2	1.5	0.40	7.2	2.8	0.38	7.8
		(25.5-31.5	2.1	ND	ND	ND	2.8	0.43	7.2
	Furrow	(0 - 7.5	1.0	4.8	0.29	6.9	6.6	0.25	7.5
	slice	(7.5-15.0	0.9	4.1	0.28	7.0	6.8	0.25	7.2
		(15.0-22.5	0.9	1.3	0.31	7.2	5.0	0.20	7.1
		(22.5-27.0	1.8	0.9	0.30	6.6	5.1	0.23	7.4
B	Plow sole	27.0-33.0	1.3	0.9	0.27	6.8	5.0	0.18	7.4
		(33.0-42.0	1.7	0.9	0.32	6.7	3.4	0.17	6.8
	Subsoil	(42.0-51.0	ND	0.4	0.35	6.4	4.1	0.20	6.7
		(51.0-60.0	1.5	0.4	0.44	6.4	3.4	0.19	7.5
	Furrow	(0 -10.5	1.5	6.1	0.28	6.8	14.7	0.19	6.9
	slice	(10.5-15.0	0.6	2.5	0.28	6.8	10.6	0.25	6.8
C	Plow sole	15.0-21.0	0.6	0.9	0.29	6.6	7.6	0.15	6.9
		(21.0-30.0	0.4	0.8	0.30	6.4	4.0	0.15	6.8
	Subsoil	30.0-39.0	0.4	0.7	0.33	6.5	4.2	0.24	7.2
		(39.0-48.0	0.4	0.7	0.32	6.4	3.0	0.21	7.2

Table 18 (cont'd)

Soil Sample b/		Depth (cm)	NH_4-N Content Before Flooding (mg N/100 g dry soil)	Wet soil after 30 days of Flooding			Air-Dried soil after 30 Days Flooding		
				NH_4-N mg N/100g dry soil	E_6 (volt)	PH	NH_4-N (mg N/100g dry soil)	E_6 (volt)	PH
	Furrow	(0 - 9.0	1.0	6.4	0.17	6.7	22.2	0.21	0.8
	slice	(9.0-19.5	1.2	3.8	0.29	7.1	19.4	0.19	7.2
D	Plow sole	19.5-22.5	1.1	2.1	0.39	7.1	12.1	0.18	7.1
		(22.5-34.5	0.5	1.8	0.38	7.4	10.9	0.19	7.8
	Subsoil	(34.5-49.5	2.2	2.5	0.48	7.2	8.9	0.22	8.0
		(49.5-64.5	1.4	2.6	0.45	6.5	10.2	0.27	7.4
	Furrow	(0 - 9.0	1.4	3.9	0.30	7.3	17.9	0.21	7.4
	slice	(9.0-15.0	1.9	3.0	0.39	7.3	16.5	0.24	7.8
E	Plow sole	15.0-18.0	1.0	2.4	0.51	7.3	12.3	0.23	7.5
		(18.0-27.0	0.6	3.4	0.40	7.2	7.5	0.24	7.7
	Subsoil	(27.0-42.0	1.7	2.5	0.50	7.4	9.1	0.26	7.7

a/ For experimental details see text

b/ Sample A- paddy soil, Agricultural Experiment Station, Saitama Prefecture, Yield of brown rice, 3,400 Kg per hectare.
Sample B- paddy soil, Takagawara, Nagano Prefecture, Yield of brown rice, 7,500 Kg per hectare.
Sample C- paddy soil, Takagawara, Nagano Prefecture, Yield of brown rice, 6,000 Kg per hectare.
Sample D- paddy soil, Suwa, Nagano Prefecture, Yield of brown rice, 6,000 Kg per hectare.
Sample E- paddy soil, Suwa Nagano Prefecture, Yield of brown rice, 4,900 Kg per hectare.

These soils were sampled in November 1942, after harvest.

Table 19. Relationship between loss of Ammonium nitrogen applied in flooded paddy rice soil and depth of application (1940)[a].

Depth of Application of Ammonium Sulfate	Amount of NH_4-N Applied (cm)	Status of Nitrogen (mg N per tube of soil)								
		Number of Days of Flooding								
		0	7		21		52			
		Total N content	NH_4-N content	Applied NH_4-N Remaining	NH_4-N content	Applied NH_4-N Remaining	NH_4-N content	Applied NH_4-N Remaining	Total N content	Loss of Total N
Surface water	20.0	281.4	18.3	13.4	11.1	6.8	6.9	2.2	258.4	23.0
Furrow slice, 0-2cm	20.0	246.2	ND	ND	12.2	7.9	9.5	4.8	229.7	16.5
Furrow slice, 3-5cm	20.0	246.1	ND	ND	17.7	13.4	13.1	8.4	234.2	11.9
Check	0	252.4	4.9	0	4.3	0	4.7	0	251.3	1.1

ND: No data available.

a For experimental details see text.