UREA PHOSPHATES

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Conclusions reached from experiments carried out during the period 1953 to 1957 inclusive

During this period, 28 field-scale fertilizer tests and 22 rod row experiments were set out in which urea phosphates were compared to ammonium nitrate-ammonium phosphate carriers. The observations drawn from these data included

(1) The biuret content of the commercial urea available at that time, approximately 2%, was probably the main reason for the poor performance of the 19-38-0 urea phosphate fertilizer, compared to the 23-23-0 (ammonium nitrate-ammonium phosphate).

(2) Significant differences were noted in the response pattern between the barley and wheat. The yield depressions attributed to urea where wheat was used as a test crop were non-existent with barley (or, for that matter, oats).

(3) In certain instances where reagent-grade urea was used, the urea phosphates did not perform as well as the ammonium nitrate-ammonium phosphate mixtures. This was attributed to ammonium ion toxicity.

(4) With rates of N application at 20 lb per acre or less, the performance of the urea phosphates compared very favorably to that of the ammonium nitrate-ammonium phosphate. However, exceptions to this general conclusion were recorded.

(5) Using A values as an index of phosphorus availability, the urea phosphates could not be considered as available as the ammonium nitrate-ammonium phosphates.

Observations from field experiments carried out during the 1966 and 1967 growing seasons

The following observations can be drawn from the 16 field-scale fertilizer tests and 4 radio-tracer tests carried out during the past two years.

The 'P' Availablity of Urea-Phosphates and Nitrate-Phosphates Based on A Value Data (mean of 4 tests - 1966-1967)

Source of N	A Value, lb P/ac	Relative Efficiency Compared to 11-48-0 (%)
$(NH_2)_2CO$	47	117
NH_4NO_3	37	176

Comparison of Nitrogen Sources in Mixed N-P Carriers

(Field strip tests on stubble land, 1966-67)

Crop	No. of Plots	Check Yield (by/ac)	Yield Increase, bu/ac			L.S.D. (P =.0.5)
			11-48-0	23-23-0	23-23-0S	
Wheat	6	28.7	3.0	4.1	2.5	1.2
Barley	5	27.6	8.4	7.9	9.6	1.7
			11-48-0	23-23-0	27-27-0	
Wheat	6	21.0	3.3	5.1	3.3	2.1
Barley	3	27.6	2.7	4.9	6.2	2.0

(1) The urea phosphate, 27-27-0, is slightly superior to the ammonium nitrate-ammonium phosphate, 23-23-0, as a source of N and P for barley. The reverse was recorded for wheat.

(2) There is indication in the data that the adverse effects of urea when placed with the wheat seed frequently coincides with high levels of available soil N. This suggestion requires further investigation.

(3) The 23-23-0 S carrier (nitrogen sources include ammonium sulphate and urea) did not prove any better than 27-27-0 when used to fertilize wheat sown on stubble land. This would suggest that where these carriers were inferior to the ammonium nitrate-ammonium phosphate carrier, 23-23-0, that the 'threshold level' of ammonium ion in contact with the seed had been exceeded.

General Comments

On the basis of the data obtained to date, it is suggested that the 27-27-0 and 23-23-0 S be fully recommended for barley and oats. The same general statement pertains also to wheat, but caution with respect to maximal rate of application of 20 lb of N per acre should be indicated.

Further investigations will have to be carried out before any definite conclusions can be drawn on the so-called ammonium ion effect, and the reasons why wheat appears to be somewhat more sensitive than barley.