NUMEROUS field trials (1, 2, 3, 4, 6, 7) have shown that alfalfa responds remarkably well to phosphatic fertilizers when grown on the calcareous soils of the western states. Chemical analysis of these soils reveals that they are well supplied with total phosphorus, but that the amount which is available to the crop during the growing season is often very small. There is evidence (5) to indicate that the lack of solubility of the native soil phosphates in calcareous soils is due to the high lime content of these soils. Furthermore, soluble phosphatic fertilizers may revert to insoluble tricalcium phosphate by reacting with calcium present in the soil solution of these soils. However, this reversion apparently is not very rapid, as residual effects from applications of superphosphate on alfalfa have been observed from 2 to 3 years after the initial application (7).

The three principal materials now being used in New Mexico for the fertilization of alfalfa are treble superphosphate, containing 44 or 45% of available $P_2O_5$; ammonium phosphate, containing 11% of nitrogen and 48% of available $P_2O_5$; and the less concentrated grades of superphosphate, which may contain 16, 18, or 20% of available $P_2O_5$. In recent years several new phosphatic fertilizers have been made available for experimental purposes by the Tennessee Valley Authority. Among these new materials, triple superphosphate, which may contain as much as 50% of available $P_2O_5$, and calcium metaphosphate, containing 60 to 65% of available $P_2O_5$, seem promising as sources of phosphorus when applied to legumes grown on calcareous soils. The present information concerning the availability of calcium metaphosphate to plants grown on calcareous soils is somewhat conflicting.

McGeorge of Arizona (5) reports from Neubauer and from greenhouse studies that calcium metaphosphate is nearly as available as treble superphosphate or ammonium phosphate. Green (2), from field experiments on alfalfa in Montana, concludes that calcium metaphosphate is far less available than treble superphosphate. Toeves and Baker (7), working in Idaho, obtained significantly higher yields of alfalfa from treble superphosphate or TVA triple superphosphate than from calcium metaphosphate.

It is the purpose of the present report to present results of field and greenhouse experiments comparing several different phosphatic fertilizers as sources of phosphorus for alfalfa and annual yellow clover when grown on a calcareous soil.

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2 Assistant Agronomist.
3 Figures in parenthesis refer to “Literature Cited”, p. 918.