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plant available P supply. The P status of soil cannot be impartially assessed without adequate nutrient sufficiency ranges. Available literature data are contradictory (**Table 3**). Studies performed at the Institute for Soil Science and Agrochemistry Research reveal that the P sufficiency ranges estimated by the Olsen method in accordance with the P sufficiency ranges developed earlier (Yanishevskii, 1996; Agrochemical

methods of soil examination, 1975) do not usually agree with the values obtained by other alkaline and salt methods.

The authors propose refined P sufficiency ranges, as determined by the Olsen method, which now coincide with estimates of soil P supply from other mild chemical methods (Machigin, pH 9.0; Chang–Jackson, Al–P fraction, pH 8.5; Karpinskii–Zamyatina, pH 5.8). A category of very high supply was also added in hopes of further contributing to the more rational use of the resources available. Optimum plant available P for stable, high crop yields lies within the range corresponding to high P supply. An increase above the optimum level results in an abrupt decrease in crop response to P fertilizer. Liberal application of P fertilizers to highly alkaline soils is also unadvisable as high alkalinity (pH $_{\text{KCl}}$ 8.0 or pH $_{\text{water}}$ 8.5 and higher) is frequently due not only to the presence of calcium carbonates, but also to the presence of Na. The latter compound is detrimental to the growth and development of many agricultural crops, which abruptly decreases the efficiency of fertilizers applied.

Mathematical models and the corresponding software were developed by the authors for the determination of the actual supply of alkaline soils with available P depending on the

Table 3. Soil supply with plant available phosphorus as determined by the Olsen method.

	Soil test P ₂ O ₅ , mg/kg		
Phosphorus sufficiency ranges	Yanishevskii, 1996	Agrochemical methods of Soil Examination, 1975	Proposed ranges
Low	< 11	< 25	< 18
Medium	11-23	25-50	19-34
Increased	23-41	50-90	35-50
High	> 41	> 90	51-66
Very high	-	-	> 67

pH $_{\rm KCl}$ or pH $_{\rm water}$ values (Khristenko, 2009). The use of these mathematical models or software, as well as the improved scale for soil P supply, will contribute to the optimization of fertilizing systems and, hence, expenditures per ha of fertilized area. For example, finding that the supply of soil P is 25 mg P_2O_5/kg (medium P supply) rather than 5 mg P_2O_5/kg (low P supply), the farmer can significantly reduce fertilizer application without fear of crop yield reductions.

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he International Plant Nutrition Institute (IPNI) is proud to continue its support of the IPNI Scholar Award program in 2012 and would like to remind all prospective candidates that the June 30 deadline for submitting applications is quickly approaching. This Award of USD 2,000 (two thousand dollars) is an annual competition amongst students enrolled in graduate degree programs supporting the science of plant nutrition and crop nutrient management. Funding for the Scholar Award program is provided through the support of IPNI member companies, primary producers of nitrogen, phosphate, potash, and other fertilizers.

The IPNI Scholar Award recipients are selected by regional committees of IPNI scientific staff. The selection committee adheres to rigorous guidelines while considering each applicant's academic achievements. The awards are presented directly to the students at their universities and no specific duties are required of them. Graduate students in the disciplines of soil and plant sciences including agronomy, horticulture, ecology, soil fertility, soil chemistry, crop physiology, and other areas related to plant nutrition are encouraged to apply. Graduate students must also attend a degree-granting institution located in any country with an IPNI Program.



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