PHYSIOMORPHOLOGICAL RESPONSE OF TRITICALE TO SEWAGE WASTEWATER

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Abstract of the thesis, Submitted to the Aligarh Muslim University, Aligarh, India, for the Degree of Doctor of Philosophy in Botany, 1995.

Five field experiments were carried out during the "rabi" season of 1991-1993, to test the suitability of sewage wastewater for commercial cultivation of triticale varieties, Delfin, Juppa 'S', Mula 'S', Tigre 'S' (all Mexican) and TL-419 (bred from Mexican parents and released by PAU, Ludhiana), taking one local high yielding cultivar of wheat (HD-2204) as check. These were irrigated with sewage wastewater and groundwater, supplemented with different doses of nitrogen and phosphorus and a fixed dose of potassium. The data were mostly found significant.

In Experiment 1 (split plot), performed during 1991-1992, the comparative utility of sewage wastewater and groundwater used as irrigant was studied on the basis of growth, yield and quality of five triticales, including Delfin, the best yielding Mexican variety among those already tested at Aligarh, Juppa 'S', Mula 'S', Tigre 'S' and TL-419, and one wheat (HD-2204) check. Sewage wastewater proved superior over groundwater. Among the varieties, Delfin performed best, followed by TL-419 and wheat. On the other hand Juppa 'S' and Mula 'S' gave the poorest response. TL-419 surpassed the wheat check for grain quality, except protein content.

Experiment 2 (split plot) was also performed in 1991-1992, to compare the effect of the two irrigants (sewage wastewater and groundwater) and of six
doses of basal nitrogen \((N_{60}, N_{90}, N_{120}, N_{150}, N_{180} \text{ and } N_{210})\). Sewage wastewater proved superior over groundwater. \(N_{120}\) proved optimum, with doses higher than \(N_{120}\) exhibiting luxury consumption.

Experiment 3 (factorial randomised) was conducted during the year 1992-1993 to study the effect of sewage wastewater alone together with four nitrogen doses \((N_6, N_{60}, N_{90} \text{ and } N_{120})\) on comparative performance of two varieties of triticale, namely TL-419 and Juppa 'S' and one of wheat (HD-2204). \(N_{120}\) proved optimum for most of the parameters studied, including grain yield and quality. Among the varieties, TL-419 proved superior to wheat and Juppa 'S' in terms of growth and yield parameters. Regarding grain quality wheat performed best, followed by TL-419 and Juppa 'S' for total soluble and insoluble protein content. However, for protein yield, TL-419 proved best, followed by wheat and Juppa 'S', in that order.

Experiment 4 (factorial randomised) was carried out simultaneously with Experiment 3 (1992-1993) to study the performance of the same two varieties of triticale and one of wheat, namely TL-419, Juppa 'S' and HD-2204 as taken in Experiment 3 under four basal phosphorus regimes, i.e. \(P_0, P_{20}, P_{40} \text{ and } P_{60}\). Of these, \(P_{40}\) proved optimum for growth, yield and quality parameters while \(P_{60}\) proved wasteful. TL-419 gave the best results regarding growth, yield and quality, except grain protein content.

Experiment 5 (factorial randomised) was carried out together with Experiment 3 and 4 (1992-1993), to find out the best combination of nitrogen and phosphorus doses of fertilizer \((N_0P_0, N_{60}P_{20}, N_{90}P_{20}, N_{120}P_{20}, N_{60}P_{40}, N_{90}P_{40}, N_{120}P_{40}, N_{60}P_{60}, N_{90}P_{60} \text{ and } N_{120}P_{60})\) for the cultivation of TL-419 and Juppa 'S' irrigated with sewage wastewater. Of these, \(N_{120}P_{40}\) gave optimum results, including growth and yield characteristics. TL-419 out-yielded Juppa 'S' in all respects.