CHAPTER VI

SUMMARY

Field experiments were conducted during rabi seasons of 1971-72 and 1972-73 at the Meerut University Farm, Meerut. The objectives were to assess the production potentialities of the high yielding dwarf and semidwarf varieties of wheat at 60 and 150 kg N/ha, and also to work out the possibilities of using different kinds of surface mulches to reduce the evaporation losses of water from the field. Four varieties, two each of dwarf (Neera and Moti) and semidwarf (Kalyam Sona and Sonalika) groups were grown at 60 and 150 kg N/ha levels. The treatments of mulching included control, sand, saw dust and polyethylene sheet. In case of sand and saw dust, 1.25 cm thick layer of each was spread over the field surface while in the case of polyethylene, 200 gauge thick sheet was spread to give a complete coverage of the ground surface. The plants in case of polyethylene were taken out by making localised incisions. In total there were 32 treatments combinations, each replicated three times in a split-plot design with varieties occupying main plots and soil mulches and nitrogen sub-plots. The important findings are given as under :-
1. Amongst the different varieties, Kalyan Sona yielded maximum dry matter closely followed by Moti but both producing distinctly higher than Sonalika and Heera. The increase in the production was associated mainly with the increase in the height of the plants, number of shoots/plant and the leaf area index. Favourable early rains in 1973 gave higher total harvest compared to that in 1972.

2. Two high yielding varieties viz., Kalyan Sona and Moti absorbed higher quantities of nutrients especially N, P and K from the soil than other varieties. Quantitatively, Kalyan Sona removed 145.3 kg N, 19.6 kg P$_2$O$_5$ and 61.1 kg K$_2$O/ha while Moti 148.8, 20.4 and 56.6 kg respectively. The minimum nitrogen uptake was recorded in case of Heera (124.6 kg/ha). Nitrogen use efficiency was also higher for Moti and Kalyan Sona.

3. Seasonal consumptive use of water was also associated with the yield. On an average, Kalyan Sona needed maximum quantity of water (315.2 mm) for maximum grain yield (62.5 q/ha). Moti, on the other hand, required 306.6 mm water to produce 62.3 q grains. Like that of total water use and dry matter production, Moti and Kalyan Sona resulted in maximum water use efficiency also. Varietal differences were not marked for moisture depletion pattern.
4. In economic analysis, Kalyan Sona gave highest rupee net return/ha (Rs. 6226) followed by Moti (Rs. 6014), Sonalika (Rs. 5022) and Neera (Rs. 4830) in order.

5. Application of 150 kg N/ha produced 21.1 and 16.7% higher grain and total dry matter respectively over 60 kg N. These increases were associated with the increase in the growth and yield contributing attributes as mentioned under point 1 above. Also under high level of N, the uptake of N, P and K increased by 54.5, 10.8 and 20.8% over low level while the nitrogen use efficiency decreased by 27.4%.

6. Daily water use by plants increased up to the age of 120 days and decreased thereafter. Rate of water use was higher with high N level. This resulted in 5.8 and 15.4% higher water use efficiency on grain and total dry matter yield basis respectively. Irrespective of the soil depth, the soil moisture depletion was higher with the use of high level of N.

7. Application of 150 kg N/ha yielded 28.4% higher net returns than 60 kg N/ha.

8. Mulches had significant effect on the yield of grain. Use of sand, saw dust and polyethylene mulches increased the dry matter production by 2.2, 7.3 and 12.5% respectively over no mulch while the corresponding increases in grain yields were 3.5, 6.0 and 12.2%.
9. Use of mulches affected the uptake of nutrients as well. Use of sand, saw dust and polyethylene mulches over control increased average N uptake by 7.0, 0.2 and 6.3% while P by 4.4, 6.1 and 11.1% respectively over control. Nitrogen use efficiency on grain basis decreased under sand mulch. The relative efficiency was 3.5 and 3.3% higher by the use of saw dust and polyethylene mulches respectively over sand mulch.

10. There was 9.3, 22.5 and 36.1% reduction in the consumptive use by the use of sand, saw dust and polyethylene respectively over the control. Similarly, the corresponding increases in water use efficiency on grain yield basis were 18.0, 22.3 and 57.4% over control. Without mulch the surface moisture got lost quickly and most of the extraction at later stages occurred from deeper layers while mulches reduced evaporation losses. The pattern of moisture extraction from different layers had been more or less uniform.

11. Use of sand, saw dust and polyethylene mulches increased gross return respectively by 3.2, 7.5 and 12.3% over control. This was primarily for higher total production. Relatively higher cost of mulches especially of polyethylene and also their higher application cost did not result in higher net returns.
12. Kalyan Sona and Moti varieties grown at 150 kg N/ha with polyethylene yielded higher, absorbed higher amount of nutrients from the soil and gave higher water use efficiency compared to other varieties.