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## MANAGEMENT OF WINTER WHEAT IN THE ALBERTA PARKLAND

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FINAL REPORT

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### Executive Summary

Winter wheat has been a traditional crop in southern Alberta; however, with the release of new varieties, winter wheat has gradually expanded northward into the Parkland area.

Due to insufficient agronomic information on the newly released winter wheat varieties, the Agronomy Unit of Alberta Agriculture, Food and Rural Development undertook the "Parkland Winter Wheat Initiative" project in 1997. This project included seven cores and was conducted at six experimental sites located in the Northwest, Northeast, and Central regions with two sites in each region. The design of each core was to answer a particular question.

#### Core 1 – Sources, Methods of Placement, and Rate of Nitrogen Fertilizer in Fall Application

- In Core 1, there were three nitrogen application rates (30, 60 and 90 kg N/ha), three sources of nitrogen fertilizers (urea, coated urea and ammonium nitrate), and three methods of application (narrow seed-row, pre-band and sideband).

#### Core 2 – Sources and Rate of Nitrogen Application in Spring

- In Core 2, there were three fertilizer sources (urea, coated urea and ammonium nitrate) and three nitrogen rates (30, 60 and 90 kg N/ha).

#### Core 3 – Varieties, Seeding Dates and Seeding Rates

- In Core 3, there were four winter wheat varieties (CDC Kestrel, CDC Osprey, CDC Clair, and AC Readymade), one winter triticale (Pika), one fall rye (AC Rifle), three seeding dates (early September, middle September, and late September), and three seeding rates (15, 23 and 30 plants/ft<sup>2</sup>).

#### Core 4 – Germination in Fall and Winter Survival Rate: Varietal Response to Different Seeding Dates and Rates

- In Core 4, two field surveys were conducted on seedling rate in Core 3 (one in late fall and one in early spring).

#### Core 5 – Weed Management

#### Core 6 – Disease Incidence

- Core 5 and 6 were conducted by investigating weed densities and disease incidences through Core 1 to Core 3.

#### Core 7 – Comparison to Spring Cereals

- Core 7 consisted of nine spring cereal varieties – one spring rye (Gazelle), one spring triticale (Pronghorn), and seven spring wheat varieties including four Hard Red Spring varieties (Roblin, AC Splendor, AC Barrie, and Katepwa), two Canada Prairie Spring varieties (AC Karma and AC Foremost), and one Extra Strong variety (Laser).

Core 1, 2, 3, 4, and 7 were conducted in a completed randomized block design with four replicates. All data were analyzed by ANOVA following by mean separation through Least Significant Difference (LSD) at 5%.

Very little difference was found in the three methods of fertilizer applied in the fall (narrow seed-row, pre-band and sideband). Fall-applied coated urea tended to yield more than urea and ammonium nitrate. Increase of nitrogen application rates increased grain yield, as well as the protein content, but that increase was more prominent in a moisture area (e.g., Lacombe), as compared to the dry area (e.g., Vermilion).

The spring nitrogen fertilizer application, coated urea, yielded less than urea and ammonium nitrate. Similar to the fall-applied nitrogen fertilizers, increased nitrogen rate increased crop yield. For crop yield and protein content, there was little difference between the fall and spring nitrogen fertilizer applications.

The optimum seeding date was around September 15, and optimum seeding rate was 23 plants/ft<sup>2</sup>. Among winter wheat varieties (CDC Osprey, CDC Kestrel, CDC Clair, and AC Readymade), CDC Clair gave higher yield than the rest of the varieties; but AC Readymade gave higher protein content than the other varieties. Considering both yield and grain protein content, CDC Clair is an optimal variety for the Parkland area in Alberta.

Stinkweed was the number one weed in the winter cereals. Seeding early and increase of seeding rate suppressed weed growth.

There was 30% take-all root rot incidence in the winter wheat field at Westlock (site near Jarvie) – Core 1 with fall-applied urea. For disease incidences in the winter cereals, the frequency of powdery mildew strongly interacted with rates of nitrogen application and sources of nitrogen fertilizers. Higher disease incidence coupled with increment of nitrogen application. Coated urea had less disease incidence than the urea, even in the higher application rate.

Spring wheat yield was higher with CPS varieties (AC Foremost and AC Karma) in comparison with HRS lines (AC Barrie, AC Splendor, Katepwa, and Roblin) and the Extra Strong variety (Laser). Roblin consistently had high protein content. In comparison with the winter wheat varieties, spring wheat yield was about 7 to 29% lower when using CDC Osprey as a benchmark.

There was no yield difference between spring and winter triticale but fall rye yielded more than the spring rye.

The results from the seven cores varied from site to site. Therefore, the integrated winter wheat management package should be region specific. The climatic conditions should be taken into account when considering ideal varieties and optimum seeding dates and rates for a region.