
Seasonal Drought Occurrence in the Semiarid Prairie Surrounding Swift Current from 1999 to 2003

Herb Cutforth and Doug Judiesch

SPARC, Agriculture and Agri-Food Canada, Swift Current, SK

Key Words: seasonal drought, southwestern Saskatchewan

Introduction

Water availability is the major limiting factor to agricultural production on the semiarid prairie of southwestern Saskatchewan. Droughts are often defined as periods, generally in the order of months or years, when the water supply of a region is consistently below long-term averages. Droughts usually result from a combination of high rates of evaporation (from the soil and plants) and low amounts of precipitation, as occurred in 1984, 1985 and 2001 (Fig. 1). Occasionally, there are years when precipitation is near normal but the evaporative demand of the atmosphere is far in excess of the water available to meet the demand, as occurred in 1988 with record rates of evaporation in each of May, June, and July.

Typical/atypical rainfall amounts and patterns

One of the driest decades on record for the area surrounding Swift Current was the 1980's with 3 severe drought years (1984, 1985 and 1988) during which growing season (May, June, July) water availability was in extremely short supply (Fig. 1). However, during the 1990's, growing season precipitation totals were consistently average to above average. The weather experienced during the 1990's was not typical for the semiarid prairie of southwestern Saskatchewan. Prior to 2001, the last severe drought occurred in 1988. History tells us that growing season weather in the Brown soil zone is extremely variable and, therefore, unpredictable. Apart from the 1990's, droughts lasting from months to years occur frequently in southwest Saskatchewan. On average, severe droughts occur once every four years.

More frequent drought occurrence

With the increased variability in growing season rainfall over the past 4 to 5 years and the severe drought of 2001-2002, we may be returning to more typical weather patterns associated with the semiarid prairie. Seasonal droughts varying in length and intensity occurred from 1999 to 2003.

The MJJA growing season precipitation for 1999 was 20% above normal with May, June and July receiving above normal rainfall while August was very dry (Fig. 2, 1999). Monthly precipitation totals decreased from May to July.

Similarly to 1999, MJJA precipitation for 2000 was above normal (Fig. 2, 2000). However, the distribution was essentially the reverse of 1999 with July receiving almost 250% more rainfall than the long-term average whereas precipitation for May and June was near normal.

Overall, 2001 was extremely dry representing a severe drought; the 2nd driest year on record for Swift Current (Fig. 2, 2001). Precipitation was 52% of normal. January through April

precipitation was well below the long-term average. May and June received less than half their normal precipitation whereas precipitation during July was near normal mainly because of two large rainfall events. August received only a trace of rain.

The dry weather continued throughout the remainder of 2001 and continued until about mid-June 2002 (Fig. 2, 2000 and 2001). Whereas October 2001 through May 2002 was extremely dry, the later part of 2002 was wet, especially June through August which was very wet (receiving 190% of normal rainfall). June and August each received at least twice their normal rainfall, with July rainfall 30% above normal.

In 2003, the growing season was preceded with a wet April leading to normal rainfall for May and June (Fig. 2, 2003). However, July and August were dry, especially July which received only 16% of normal rainfall.

Summary

Briefly, the 1999 and 2000 growing seasons were moist. Both 1999 and 2000 experienced brief late season dry spells. The 2001 growing season was extremely dry throughout representing a severe drought. In 2002, the initial portion of the growing season was very dry (an early season drought) whereas the later two thirds was wet. The first half of the 2003 growing season received adequate moisture but the later half was very dry, experiencing a late season drought.

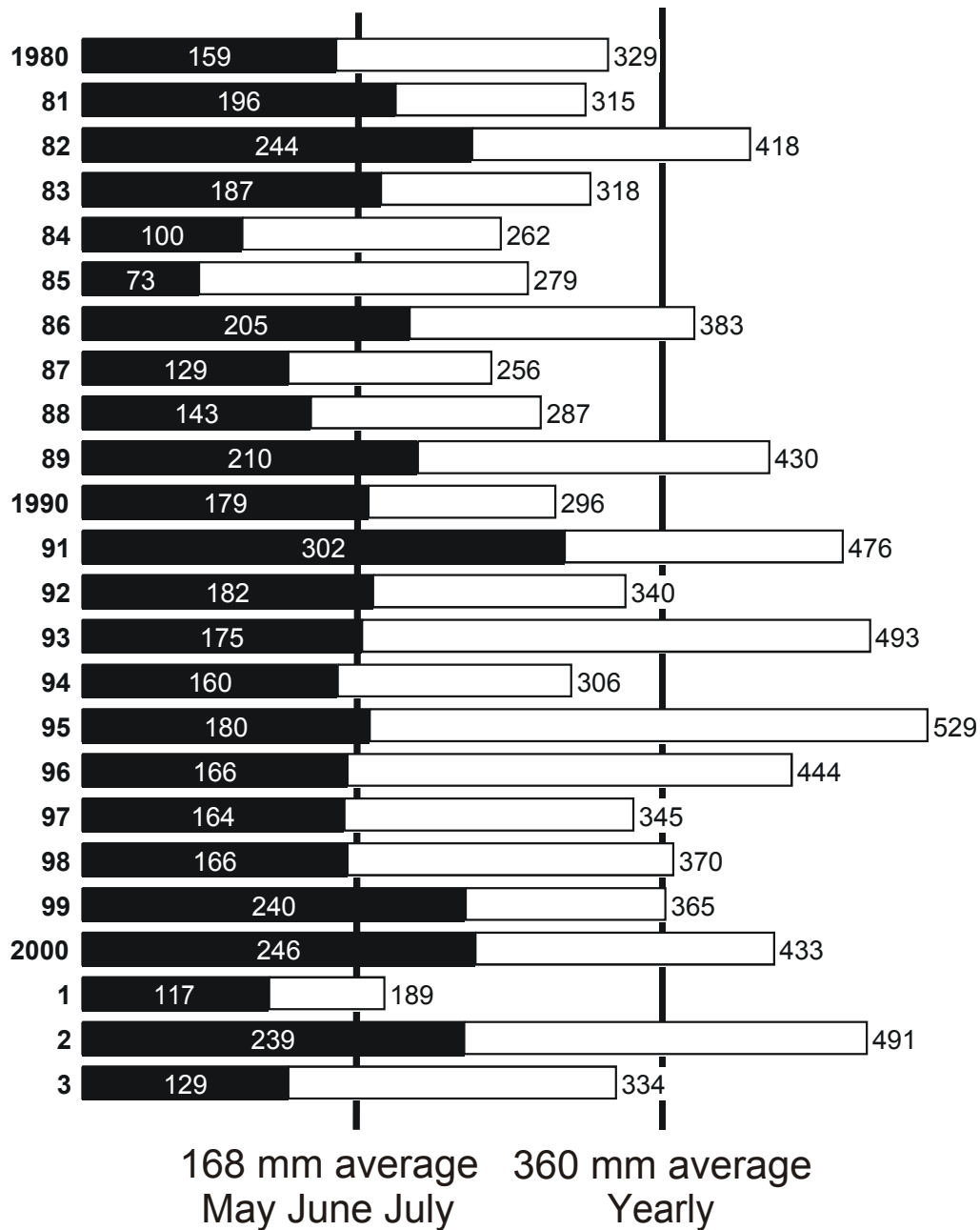


Figure 1: Growing season (May, June, July-MJJ) and yearly precipitation totals from 1980 to 2003 at the South Farm of the Semiarid Prairie Agricultural Research Centre (SPARC) Swift Current, SK. Long-term average (1887 to 2003) yearly and growing season (MJJ) totals are also presented.

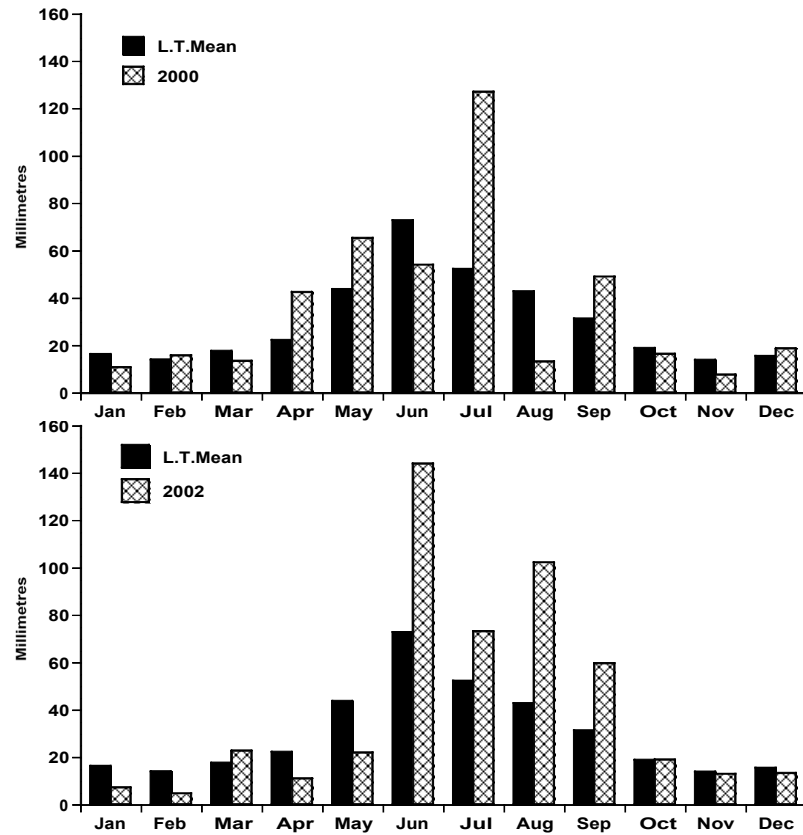
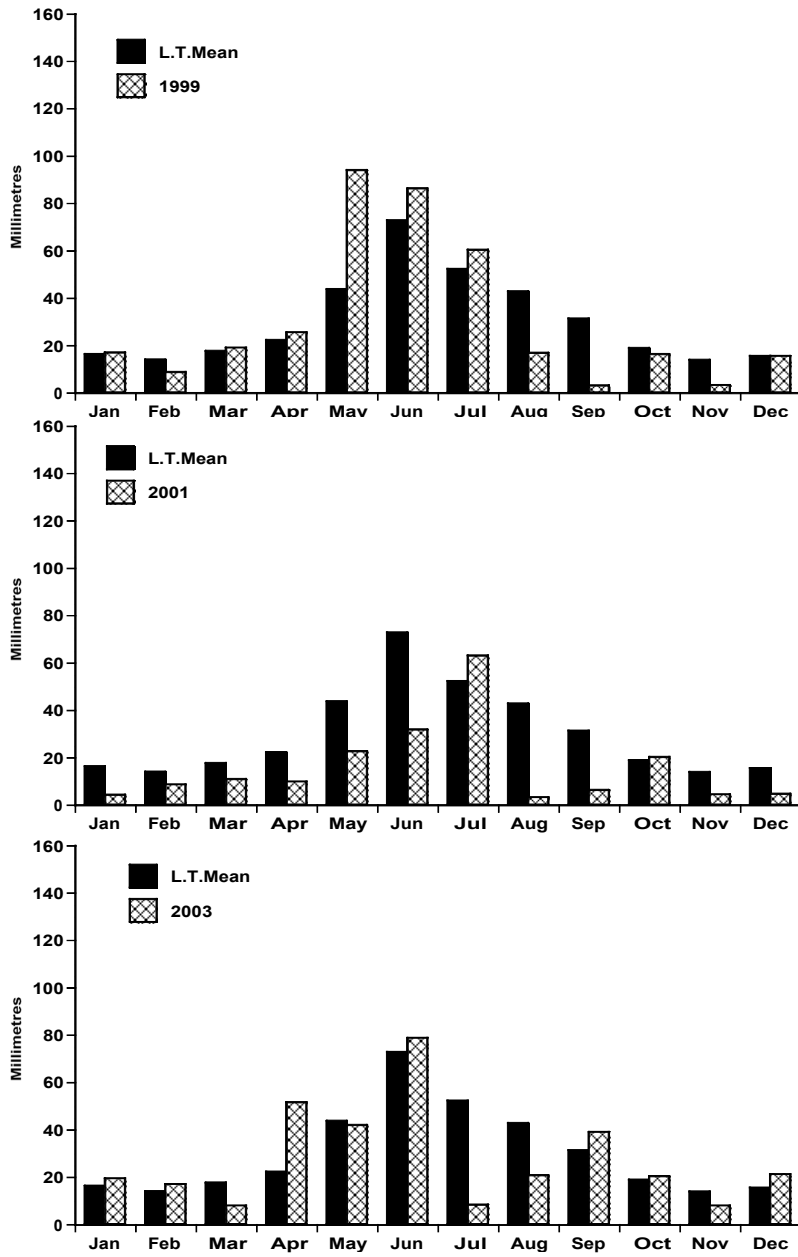


Figure 2: Monthly precipitation totals for 1999, 2000, 2001, 2002, and 2003. Also presented are the long-term mean (L.T. Mean) monthly precipitation totals averaged across years from 1887 to 2003.