Effects of Climate Change on Grass/Legume Growing Season

Coshocton, Ohio

An outdoor laboratory for land and water management research

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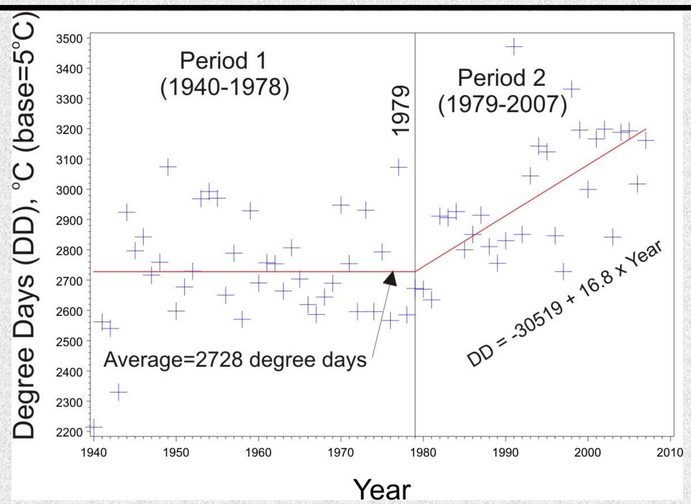

Figure 1. Total annual degree days vs year for Coshocton, Ohio air temperature data from 1940-2007.

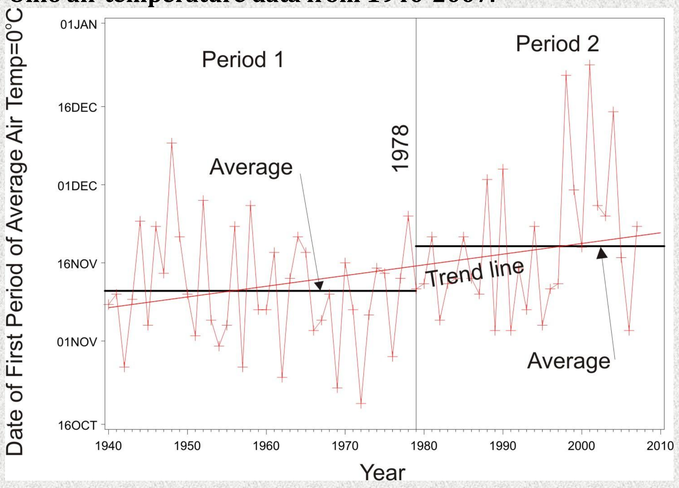

Figure 2. Date of first time average air temperature = 0°C at Coshocton, Ohio

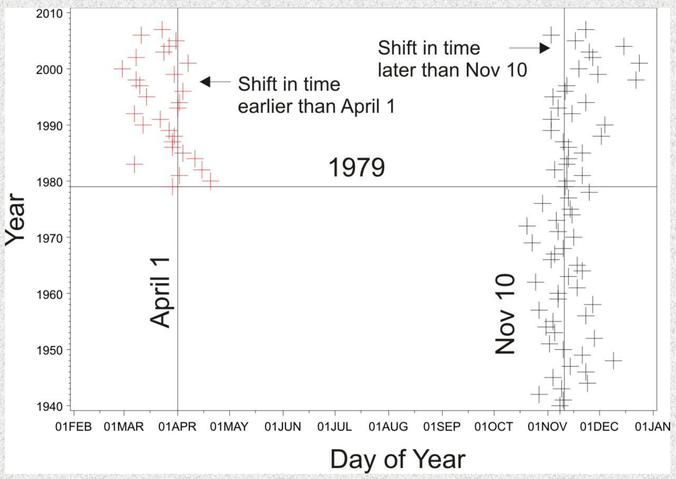

Figure 3. Shifts earlier and later in growing season between the two periods.

- Weather data from the NAEW at Coshocton, Ohio were compiled from 1940-2007 for a *preliminary* look at possible climate change at Coshocton, Ohio. The growing season was defined as the period from April 1 through the average first day of freezing air temperatures, and the base temperature for C3 forages (grasses and legumes) was 5°C.

- Degree days were plotted for each year and two periods were apparent: period 1 (1940-1978) – no trend in total annual degree days; period 2 (1979-2007) – an increasing trend in degree days of 16.8 DD/year (Figure 1).

- First freezing air temperatures in the fall at Coshocton show two statistically significant different averages for the two periods, but no trends with time in either period (Figure 2). *The period 2 average is 8.6 days later than that for period 1.*

- Shifts in dates at beginning (Apr 1) and end (Nov 10) of the growing season at Coshocton, Ohio (Figure 3) are apparent starting in 1979.

- Growing season length is increasing at a rate of ~1.2 days/year at Coshocton, Ohio (Figure 4). On average, the growing season has lengthened by *35 days* from 1979-2007.

- Cumulative degree days is generally larger during the 2nd period compared with the 1st period (Figure 5). The percentile curves are shifted upwards during period 2 compared with period 1. The annual degree day increase is statistically significant.

Conclusion: A preliminary analysis of air temperature data at Coshocton shows that from 1979 through 2007, the growing season for legumes and grasses is increasing in length. Between 1979 and 2007, the growing season has increased 35 days on average.

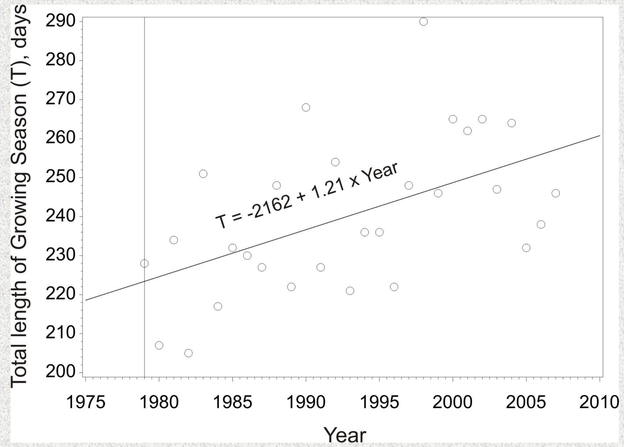

Figure 4. Trend in length of growing season at Coshocton, Ohio since 1979.

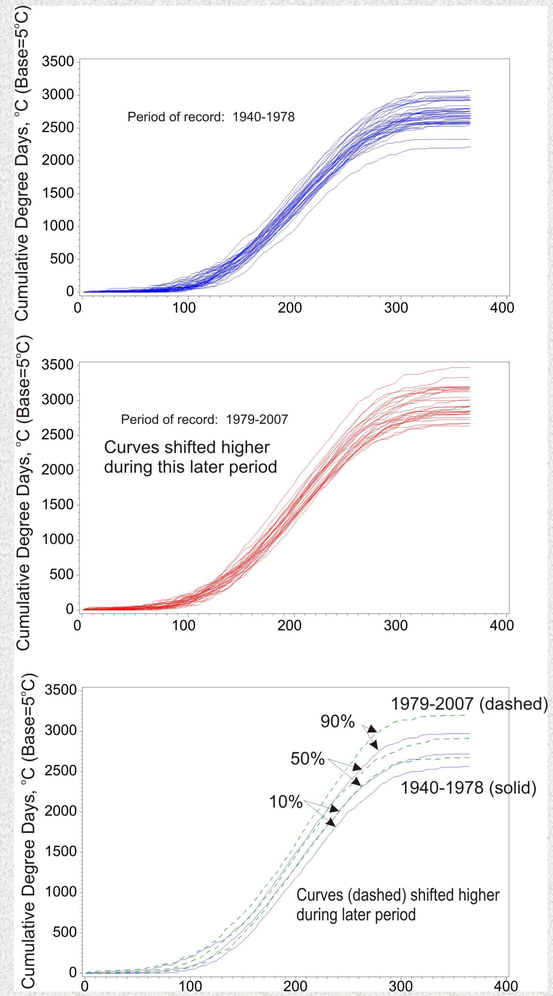

Figure 5. Cumulative degree days (base=5°C) for Coshocton, Ohio from 1940-2007.