



Holstein Canada

When the Cows Come Home and How Their Results are Analyzed

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Outline

- Overview of the dairy industry
- Proc Report
- Proc Gplot



Holstein Canada

- Member owned and directed organization
- Main purpose:
 - Improve the Holstein Breed
 - Maintain and make available genealogical records
 - Promote the best interest of the breed



Holstein Breed

- Distinguished by their black and white or red and white colour
- Cow was originally from the Netherlands
- Holstein breed makes up 93% of the dairy cattle population
- Outstanding milk production



Milk Production

- Annual milk production in Canada is approximately 76 million hectoliters
- 1/3 is consumed as fluid milk
- Remainder is processed into cheese, butter, yogurt and skim milk powder
- 70% of the dairy cows in Canada are involved in milk recording
- In 2008 the average production of a Canadian Holstein is 9,836 kg of milk, 366 kg of fat, 314 kg of protein



Classification

- Comprehensive evaluation of the physical structure (or conformation) of a dairy animal
- Used in order to produce cows that have maximum milking ability while maintaining longevity within the herd
- Good conformation cows are put together for optimal workability making them cows that are easy to work with and lower maintenance



Classification continued

- Classification is done by a classifier
- In one year, a classifier evaluates the conformation of over 32,000 cows in close to 1,000 dairy herds.
- Classifying allows the herd owner to benchmark their cows in comparison to the national population.



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Reports

- **Herd Analysis**
 - Active cows with latest classification, milk recording and genetic analysis data
 - Analyze herd trends
- **Classifier statistics**
 - Used to analyze each classifier compared to the group



Proc Report



```
PROC REPORT DATA=datasetname <options>;  
COLUMN variable list and column specifications;  
DEFINE column / column usage and attributes;  
COMPUTE column; compute block statement; ENDCOMP;  
RUN;
```



```
proc report data=herd nofs;  
  columns herd year milk fat protein;  
  define herd / display;  
  define year / display;  
  define milk / display;  
  define fat / display;  
  define protein / display;  
run;
```



The SAS System

herd	year	milk	fat	protein
Bluebird	2005	9329	349	301
Kessel	2005	9669	360	312
Mapellan	2005	11001	449	367
Vieux	2005	9889	401	369
Geni	2005	8800	301	298
Lesper	2005	10020	398	364
Moro	2005	10090	398	326
Rony	2005	9985	367	359
Bluebird	2006	9459	339	321
Kessel	2006	9569	370	322
Mapellan	2006	10981	398	377
Vieux	2006	9878	397	359
Geni	2006	9001	321	302
Lesper	2006	10620	405	374
Moro	2006	10190	398	316
Rony	2006	9785	377	369



Column Statement

- Provide a list of variables for the REPORT to operate against
- Use a comma to attach a statistics variable
 - Mean, sum, etc.



```
proc report data=herd nofs;  
  columns herd (milk fat protein), mean;  
  define herd / group;  
  define milk / display;  
  define fat / display;  
  define protein / display;  
run;
```



The SAS System

herd	milk mean	fat mean	protein mean
Bluebird	9394	344	311
Geni	8900.5	311	300
Kessel	9619	365	317
Lesper	10320	401.5	369
Mapellan	10991	423.5	372
Moro	10140	398	321
Rony	9885	372	364
Vieux	9883.5	399	364



Define statement

- Display
 - Show the value of the variable
- Group
 - Consolidates the observations
- Analysis
 - Used in the calculations with a statistic



Define Statement

- Computed
 - Variable not in the incoming data that is to be created
- Order
 - Sorts the data and forms groups when summary statistics are used
- Across
 - Creates groups across the page rather than down



```
proc report data=herd nofs;  
  columns region year, (milk fat protein);  
  define region / group;  
  define year / across;  
  define milk / analysis mean format=9.2;  
  define fat / analysis mean format=7.2;  
  define protein / analysis mean format=7.2;  
run;
```



The SAS System

region	year					
	2005			2006		
	milk	fat	protein	milk	fat	protein
Alberta	10037.50	382.50	342.50	9987.50	387.50	342.50
Ontario	9999.67	386.00	326.67	10003.00	369.00	340.00
Quebec	9569.67	366.67	343.67	9833.00	374.33	345.00



Adding Text

- **Column headers are built in from either the column label or the column name**
 - **Headline**
 - **Underlines the header**
 - **Headskip**
 - **Adds a space**



```
proc report data=herd nofs headline headskip;  
  columns region year, ('-Mean Averages-' milk fat  
    protein);  
  define region / group 'Region';  
  define year / across 'Year';  
  define milk / analysis mean format=7.2 'Milk';  
  define fat / analysis mean format=7.2 'Fat';  
  define protein / analysis mean format=7.2 'Protein';  
Title1 Regional statistics;  
run;
```



Regional statistics

Year

2005

2006

-----Mean Averages-----

Region Milk Fat Protein Milk Fat Protein

Alberta	10037.50	382.50	342.50	9987.50	387.50	342.50
Ontario	9999.67	386.00	326.67	10003.00	369.00	340.00
Quebec	9569.67	366.67	343.67	9833.00	374.33	345.00



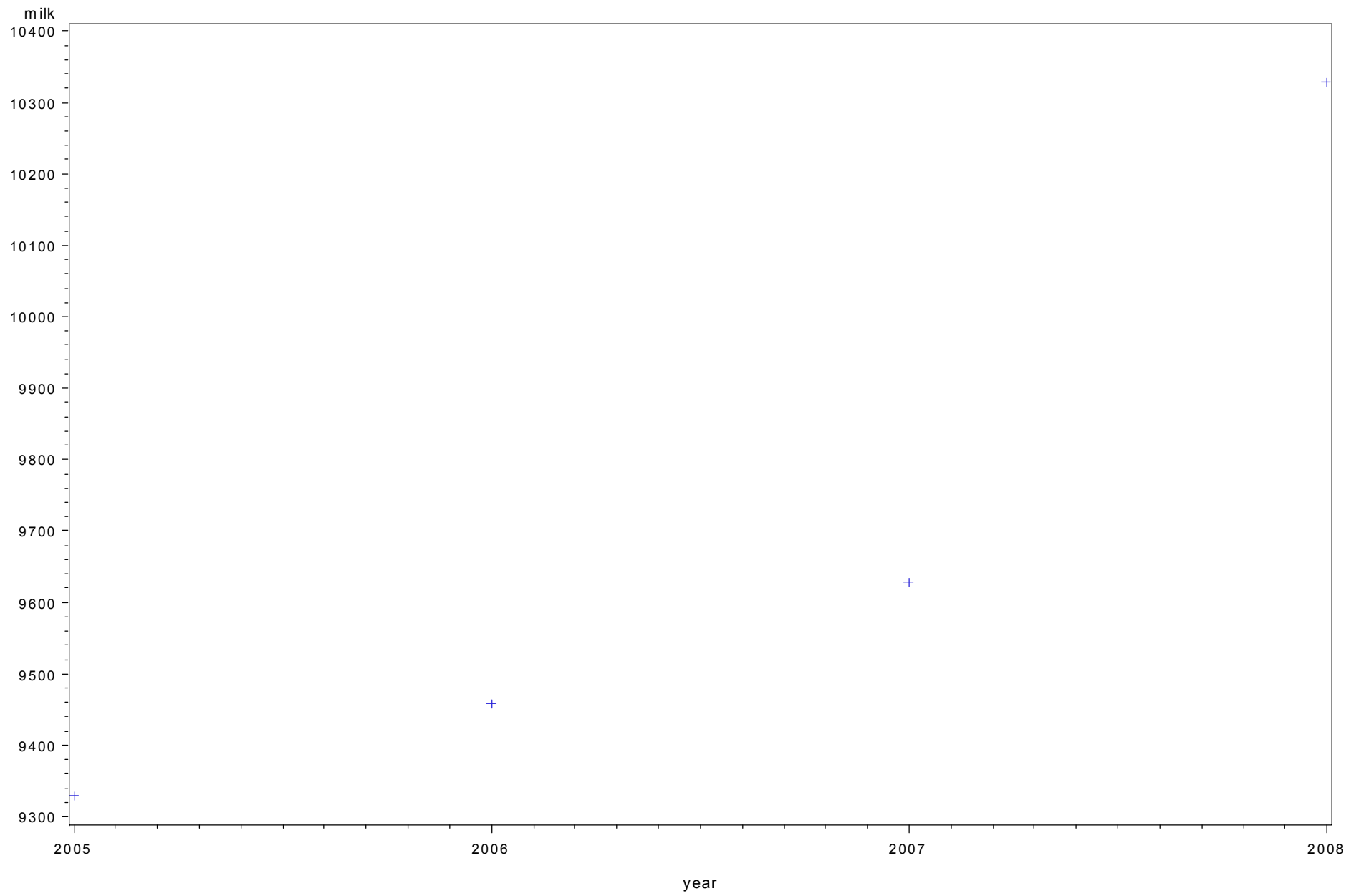
Proc Gplot



Proc Gplot

```
Proc gplot data=milk;  
  plot milk*year;  
  by herd;  
run;
```

herd=Bluebird





Symbol

```
Symbol1 value=dot interpol=join;
```

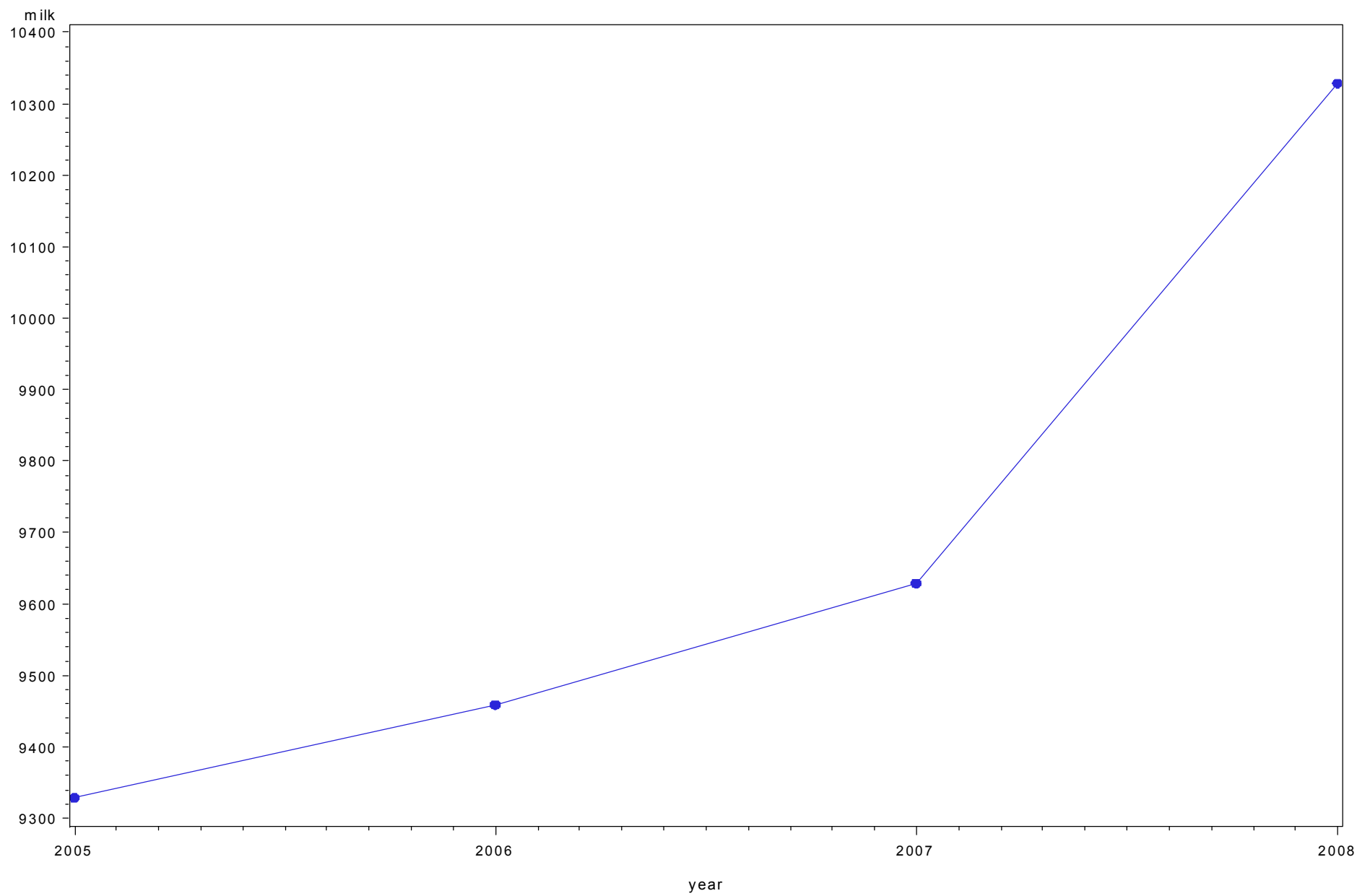
```
Proc gplot data=milk;
```

```
  plot milk*year;
```

```
  by herd;
```

```
run;
```

herd=Bluebird





Title

```
Symbol1 value=dot interpol=join;
```

```
Title 'Total Milk produced in kilograms by  
year';
```

```
Proc gplot data=milk;
```

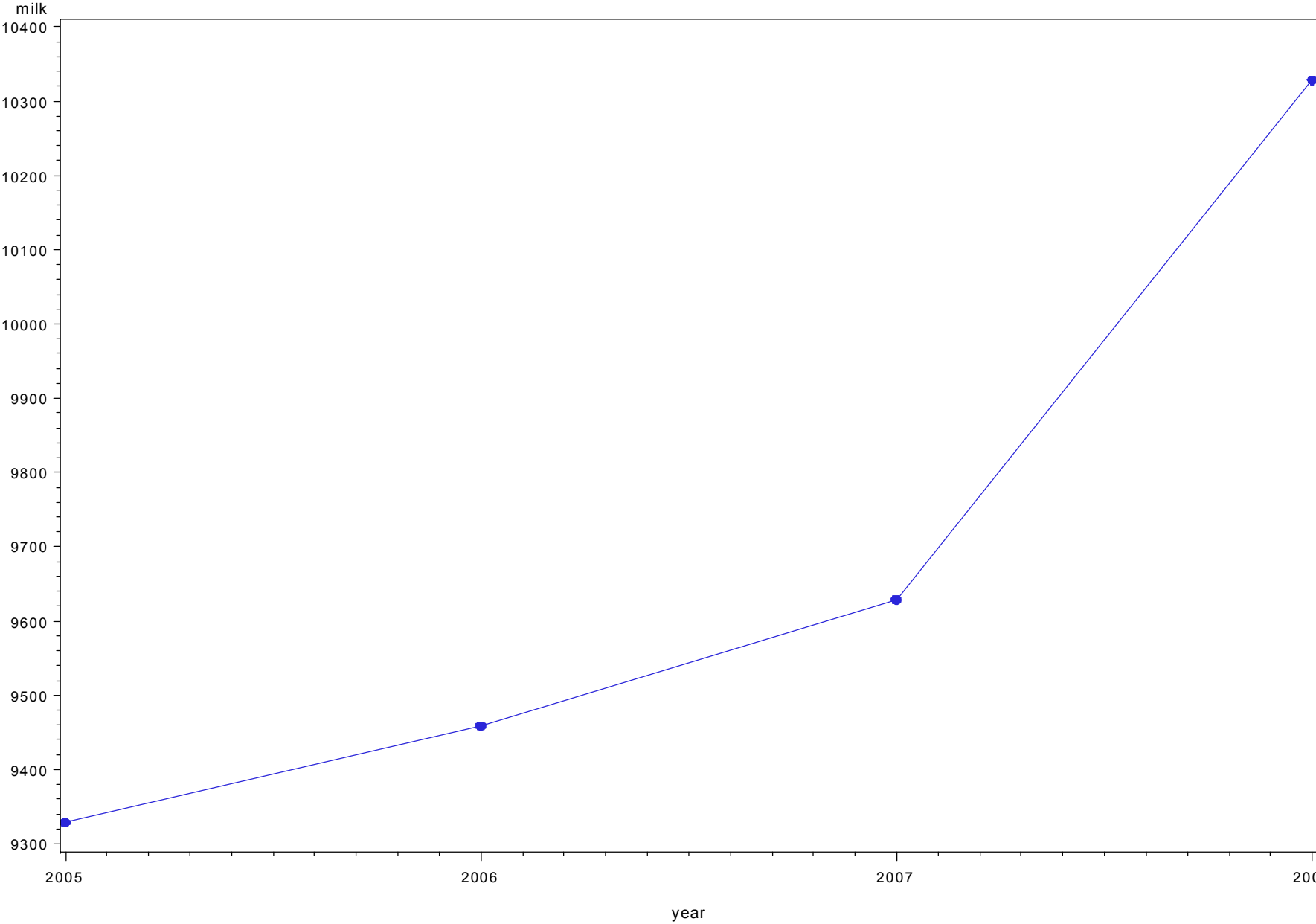
```
plot milk*year;
```

```
by herd;
```

```
run;
```

Total Milk produced in kilograms by year

herd=Bluebird



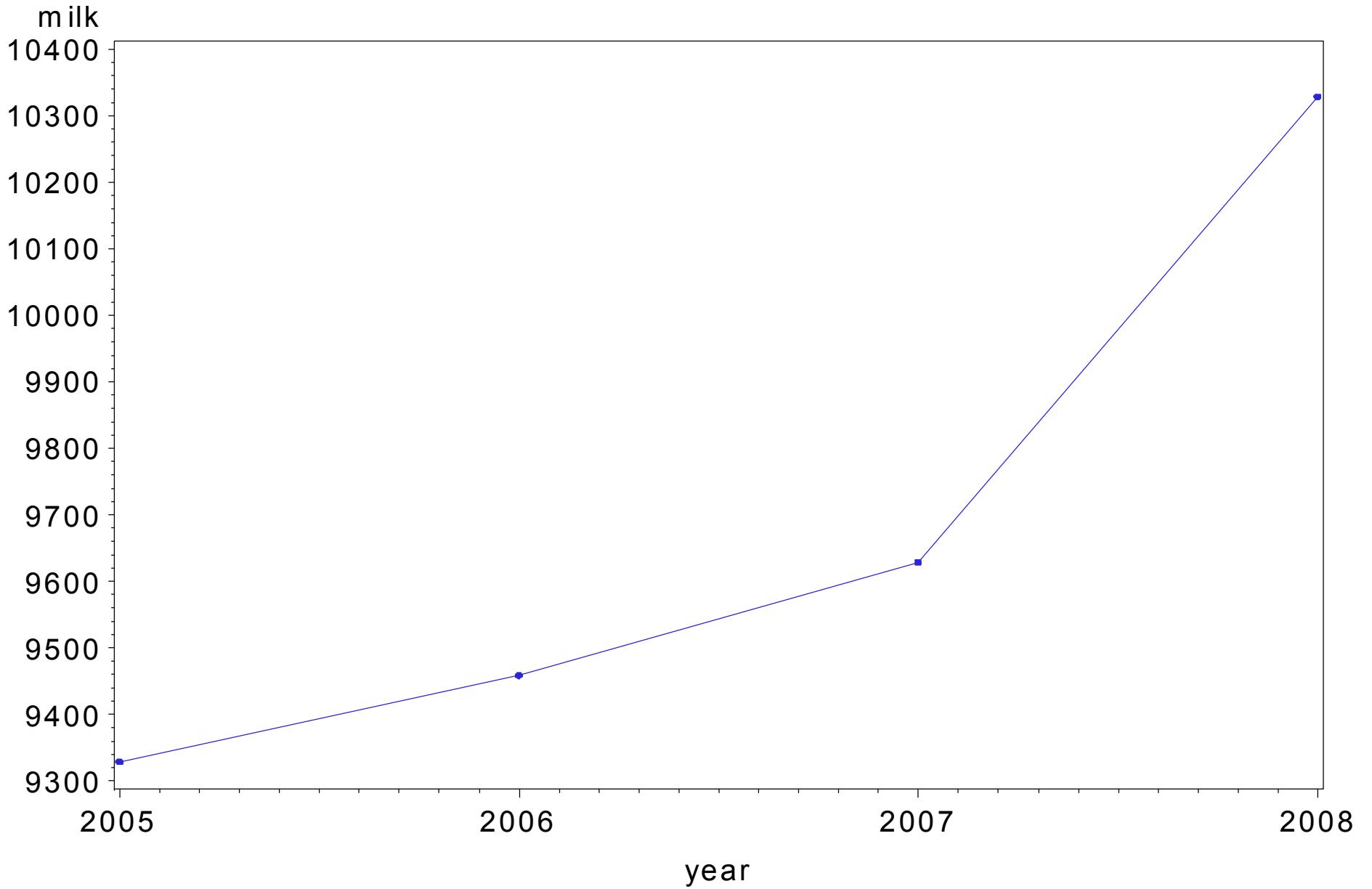


Goptions

```
Goptions ftext='Arial' htext=3 gunit=cm;  
Symbol1 value=dot interpol=join;  
Title justify =c 'Total Milk produced in  
kilograms by year';  
Proc gplot data=milk;  
    plot milk*year;  
    by Herd;  
run;
```

Total Milk produced in kilograms by year

herd=Bluebird

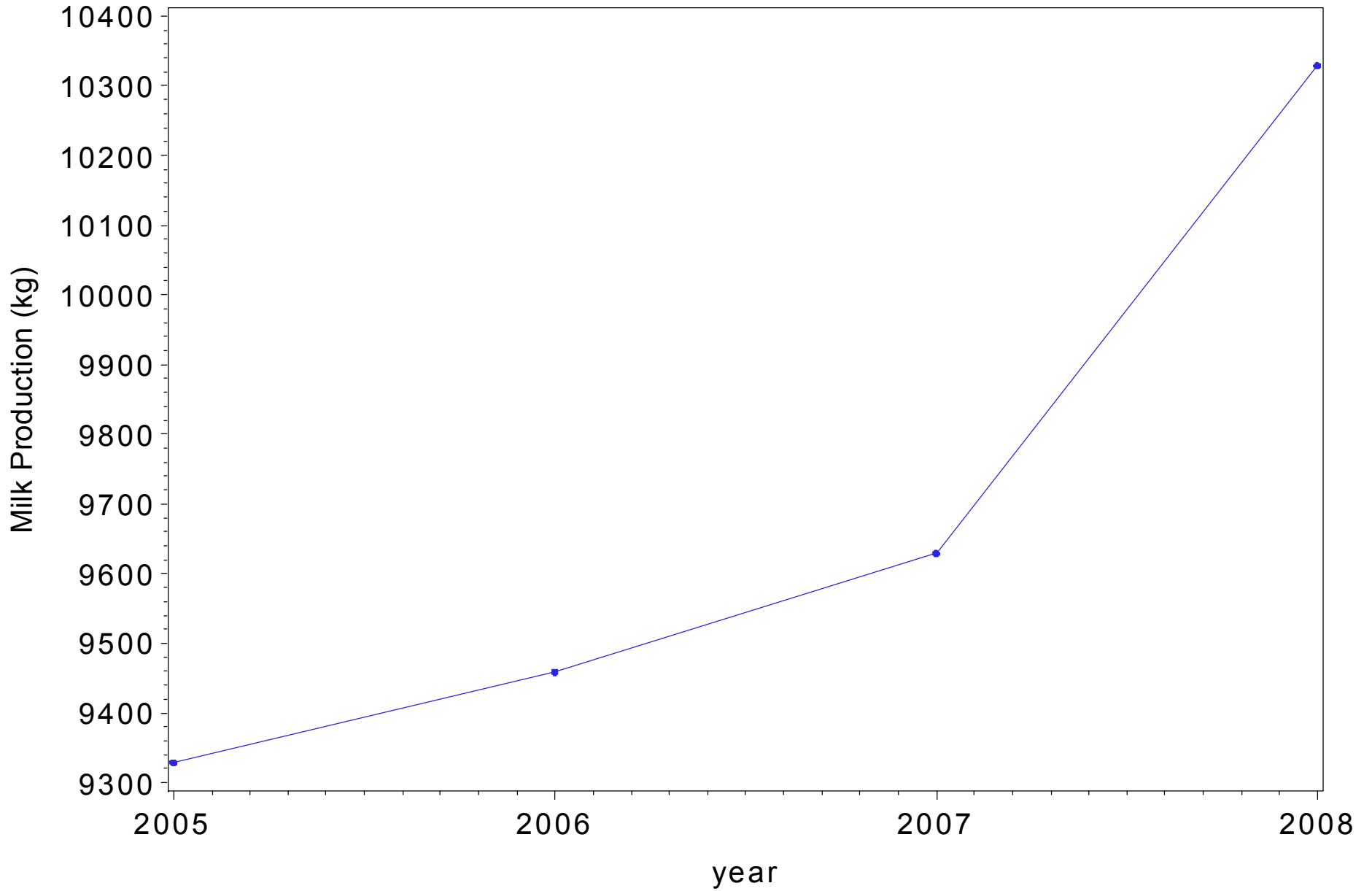




Axis

```
Goptions ftext='Arial' htext=3 gunit=cm;  
Symbol1 value=dot interpol=join c=blue;  
Axis1 label=(angle=90 'Milk Production (kg)');  
Axis2 order=(2005 to 2008);  
Title justify =c "Total Milk produced in kilograms  
by year";  
Proc gplot data=milk  
  plot milk*year/vaxis=axis1 haxis=axis2;  
by herd;  
run;
```

Total Milk produced in kilograms by year
herd=Bluebird

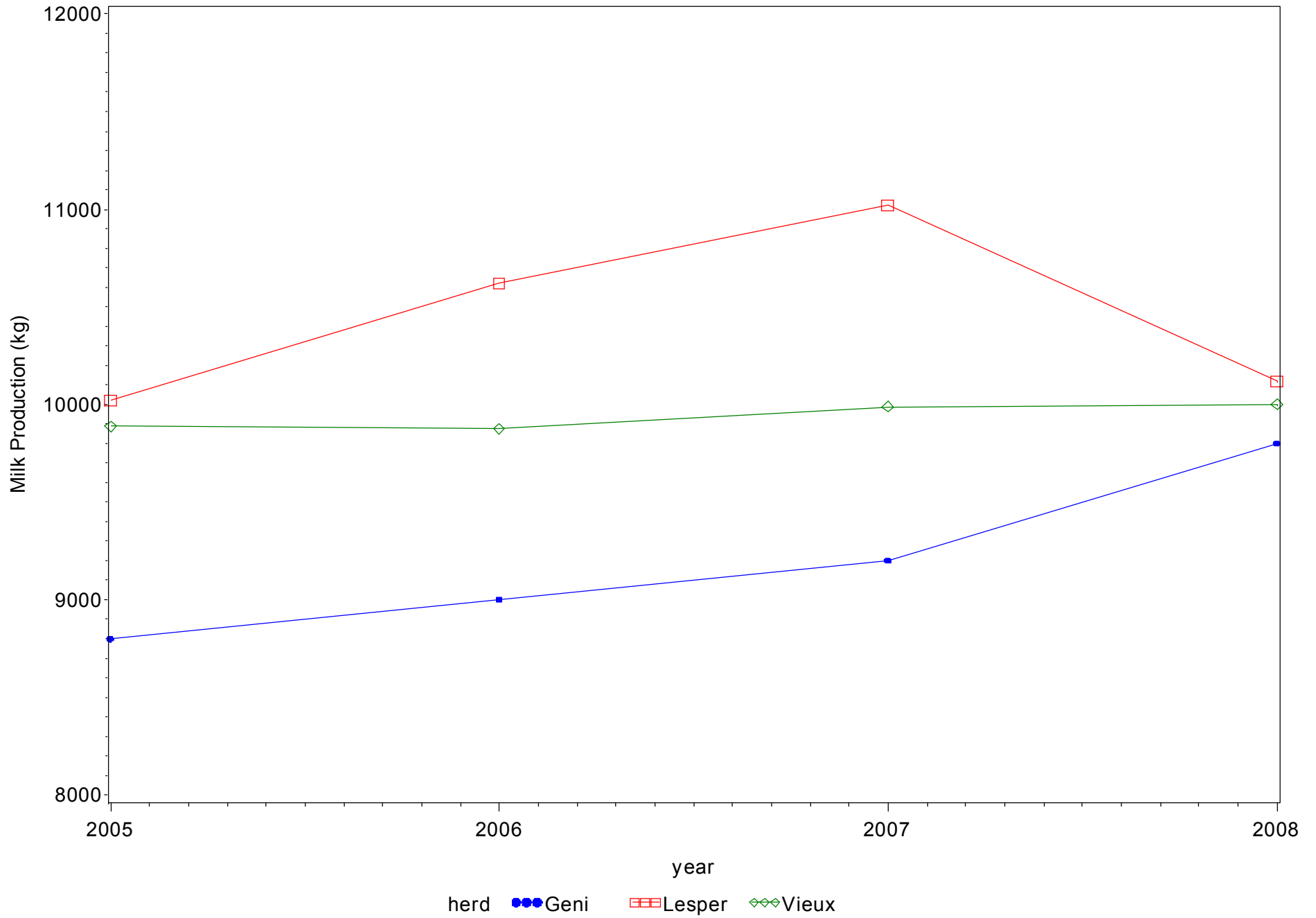




Add Another line

```
Goptions ftext='Arial' htext=3 gunit=cm;
Symbol1 value=dot interpol=join c=blue;
Symbol2 v=square i=join h=2 c=red;
Symbol3 v=diamond i=join h=2 c=green;
Axis1 label=(angle=90 'Milk Production (kg)');
Axis2 order=(2005 to 2008);
Title justify =c 'Total Milk and Fat produced in kilograms
    by year';
Proc gplot data=milk;
    plot milk*year=herd/vaxis=axis1 haxis=axis2 legend;
by region;
run;
```

Total Milk and Fat produced in kilograms by year
region=Quebec





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Thank you