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Wing Moul Chronology, Duration and Synchronicity in Captive Harlequin Ducks, Surf Scoters, White-winged Scoters and Long-tailed Ducks



**3rd North American
Sea Duck Conference
Château Laurier, Québec
Dr. Jean-Pierre L. Savard
Science and Technology
10-14 November 2008**



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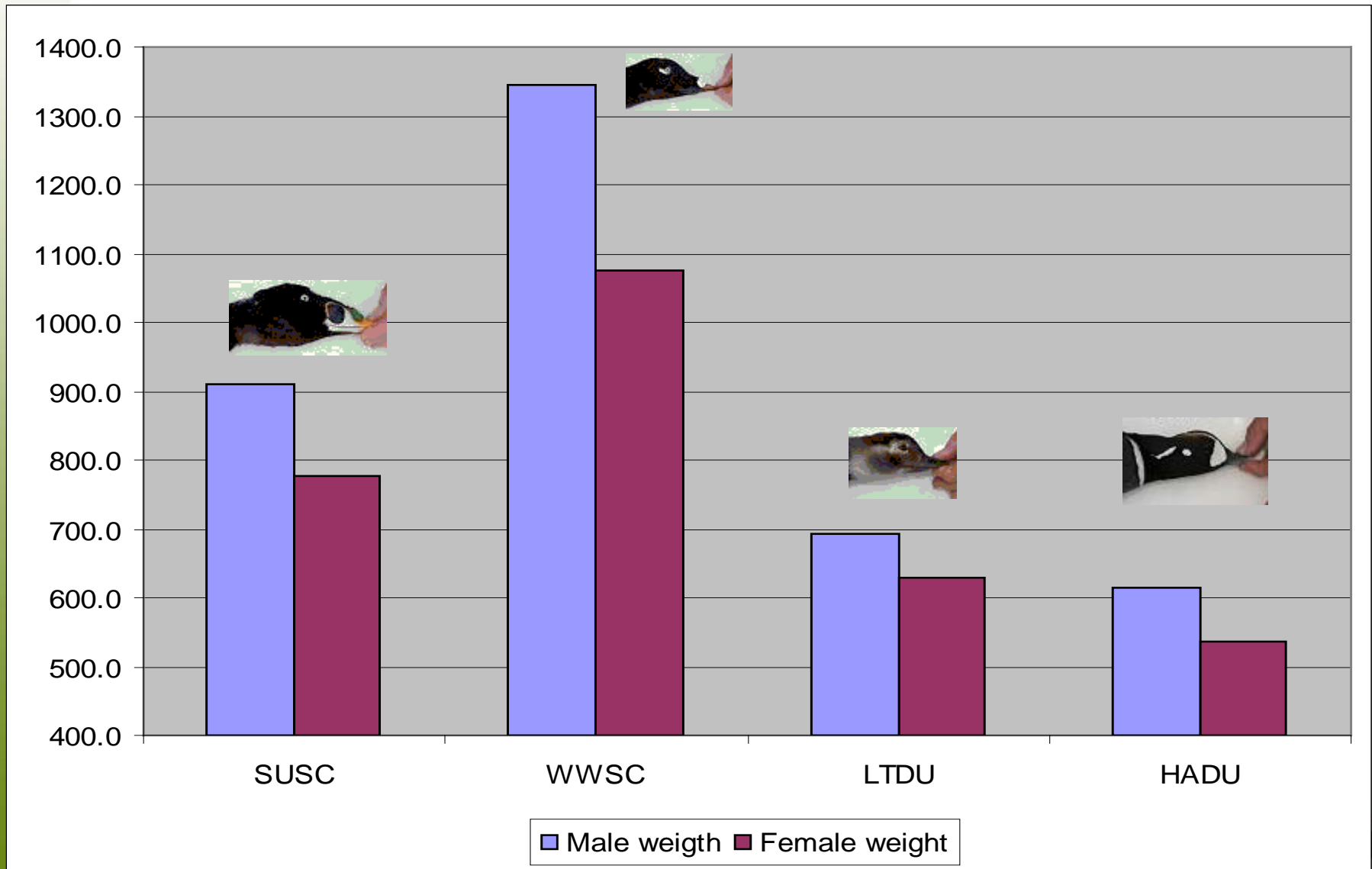




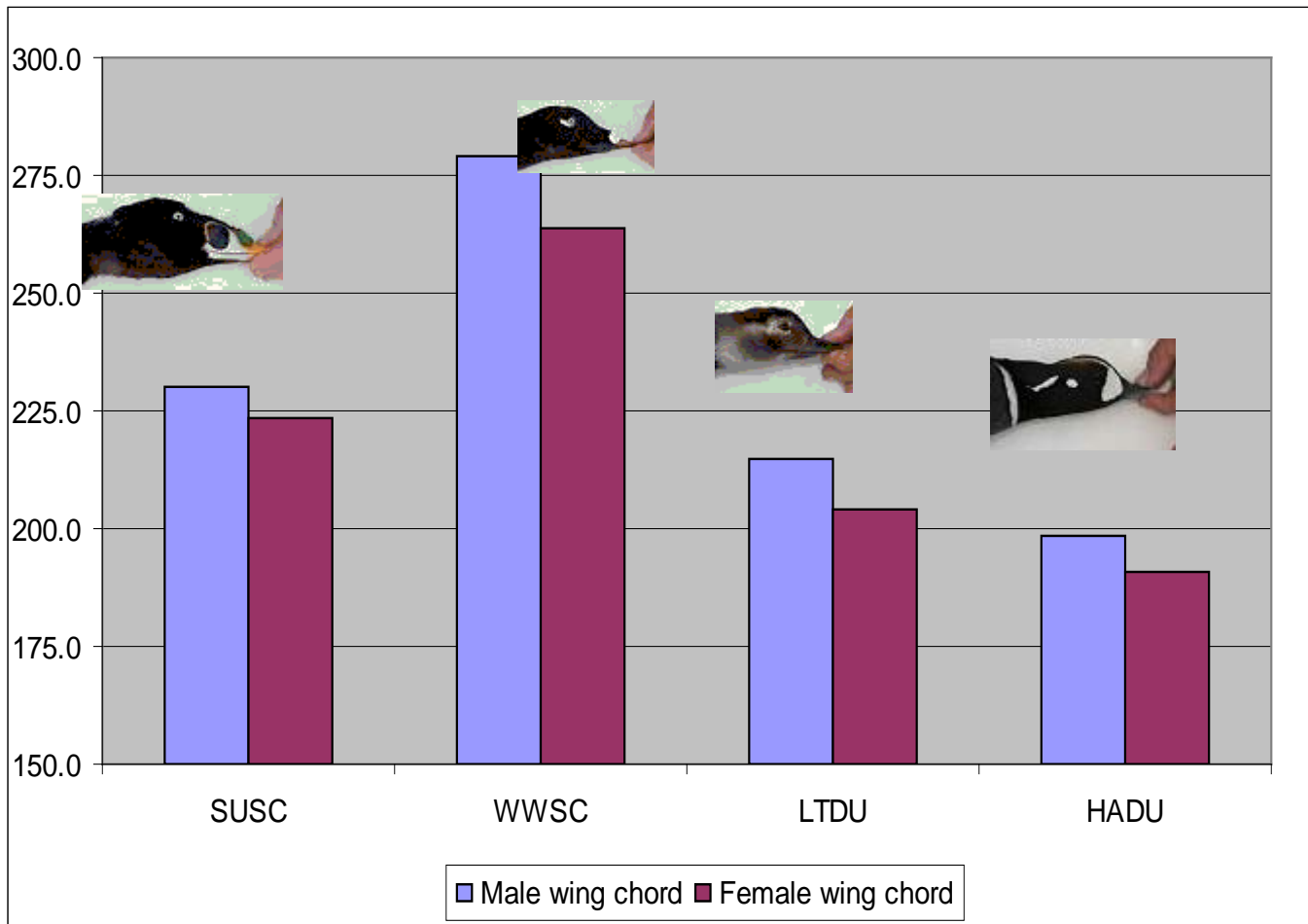
Preliminary results

- **Morphometry**

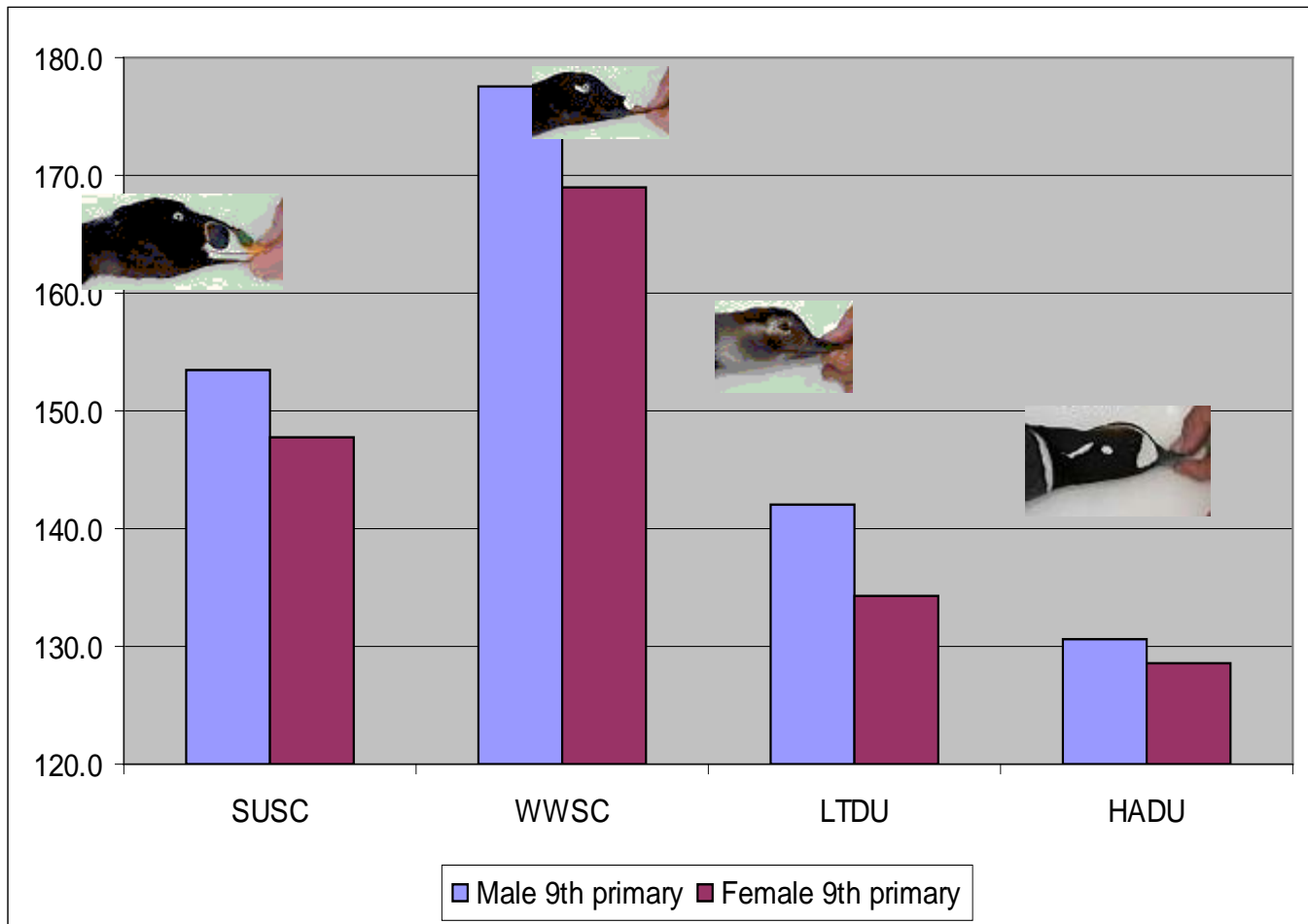
Comparison of male and female weights



Male and female Wing Chord



Length of 9th primary



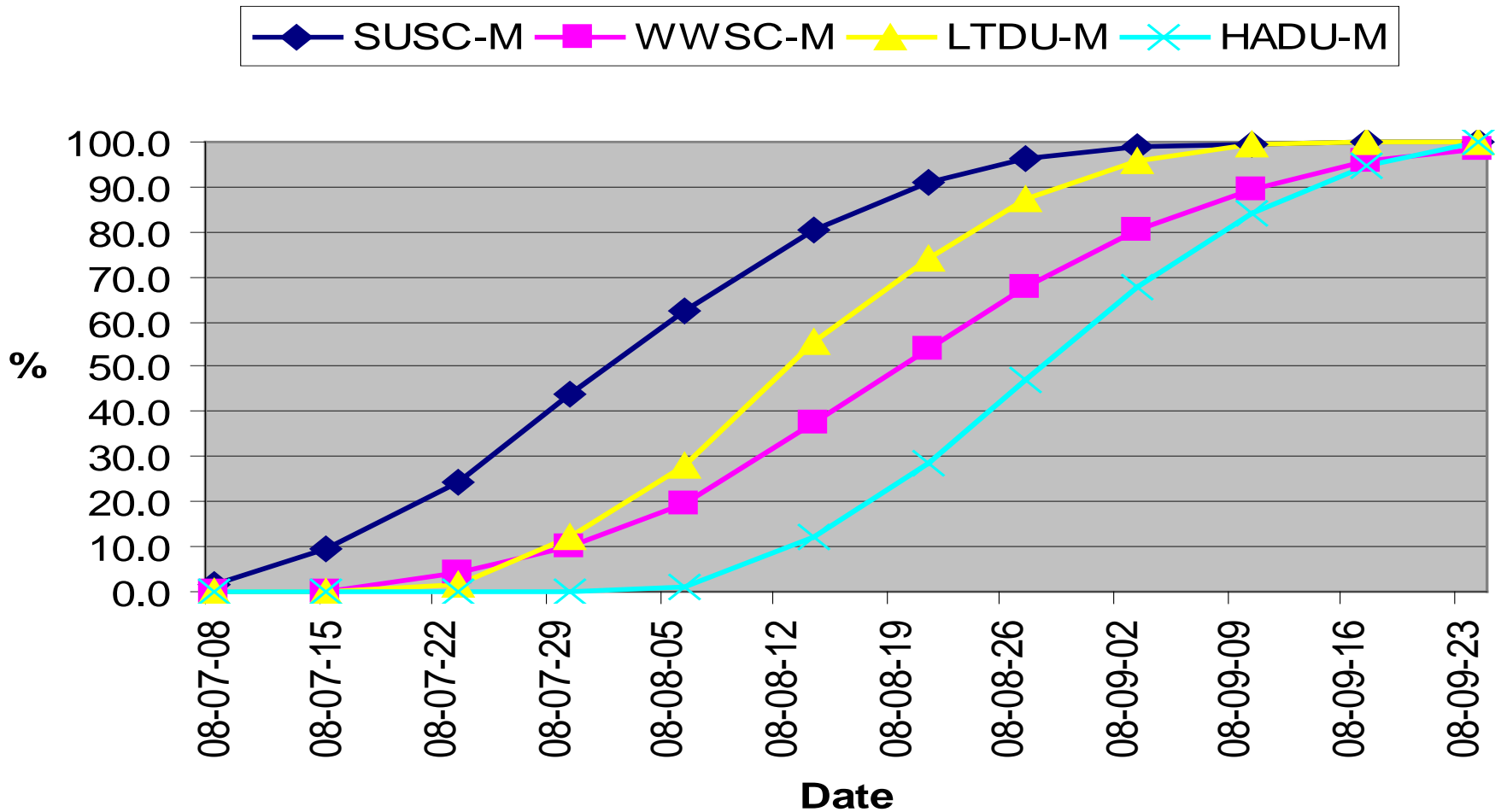
Correlation between morphometric measurements (males and females of all species)

	Weight	Tarsus	Culmen	Culmen width	9th primary
Weight					
Tarsus	0.917				
Culmen	0.917	0.913			
Cul-width	0.935	0.866	0.973		
9th	0.985	0.925	0.929	0.954	
Wing	0.986	0.922	0.909	0.930	0.996

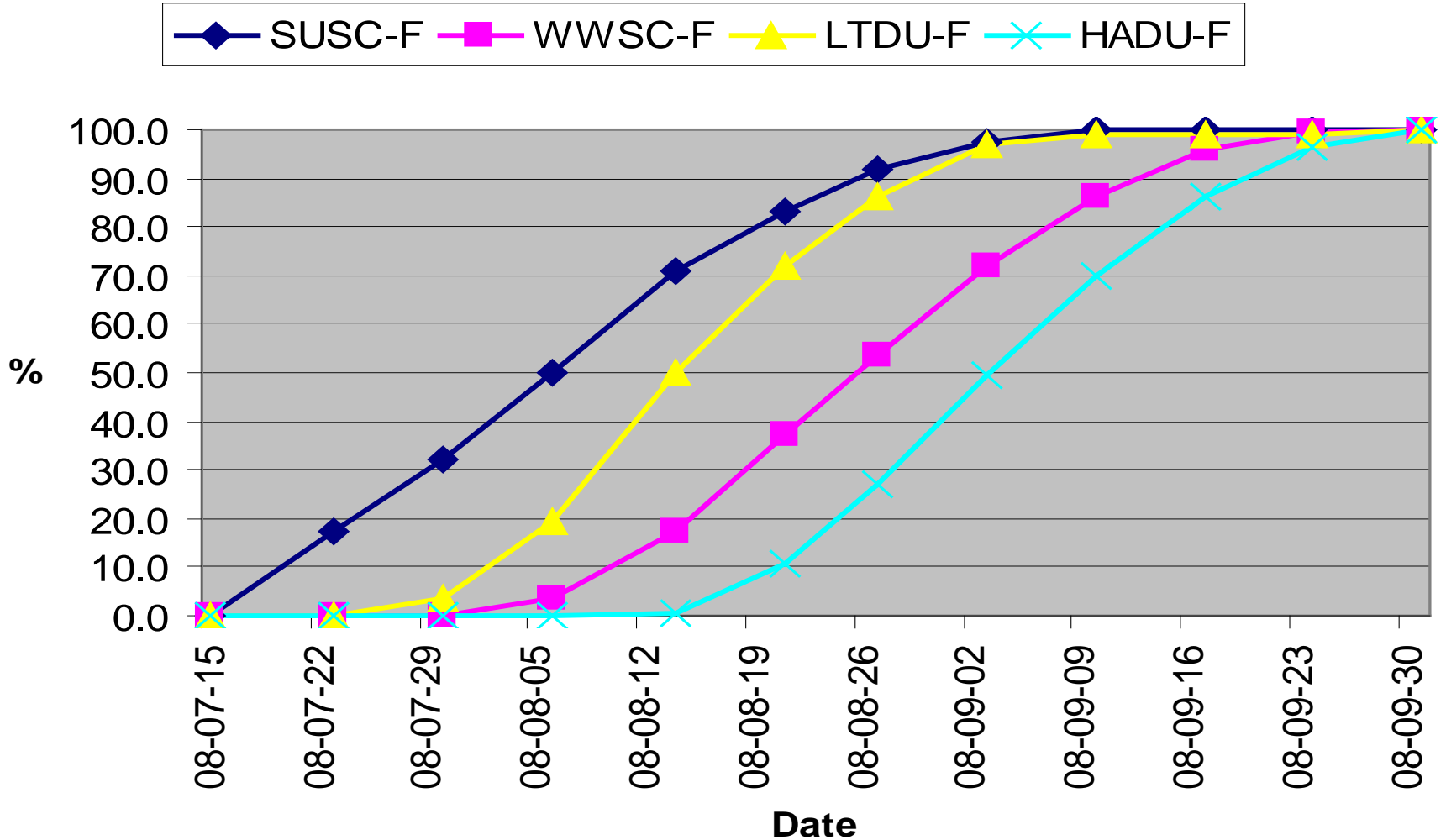
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- **Differences in moult chronology between species**



Comparison of moult chronology between species: males

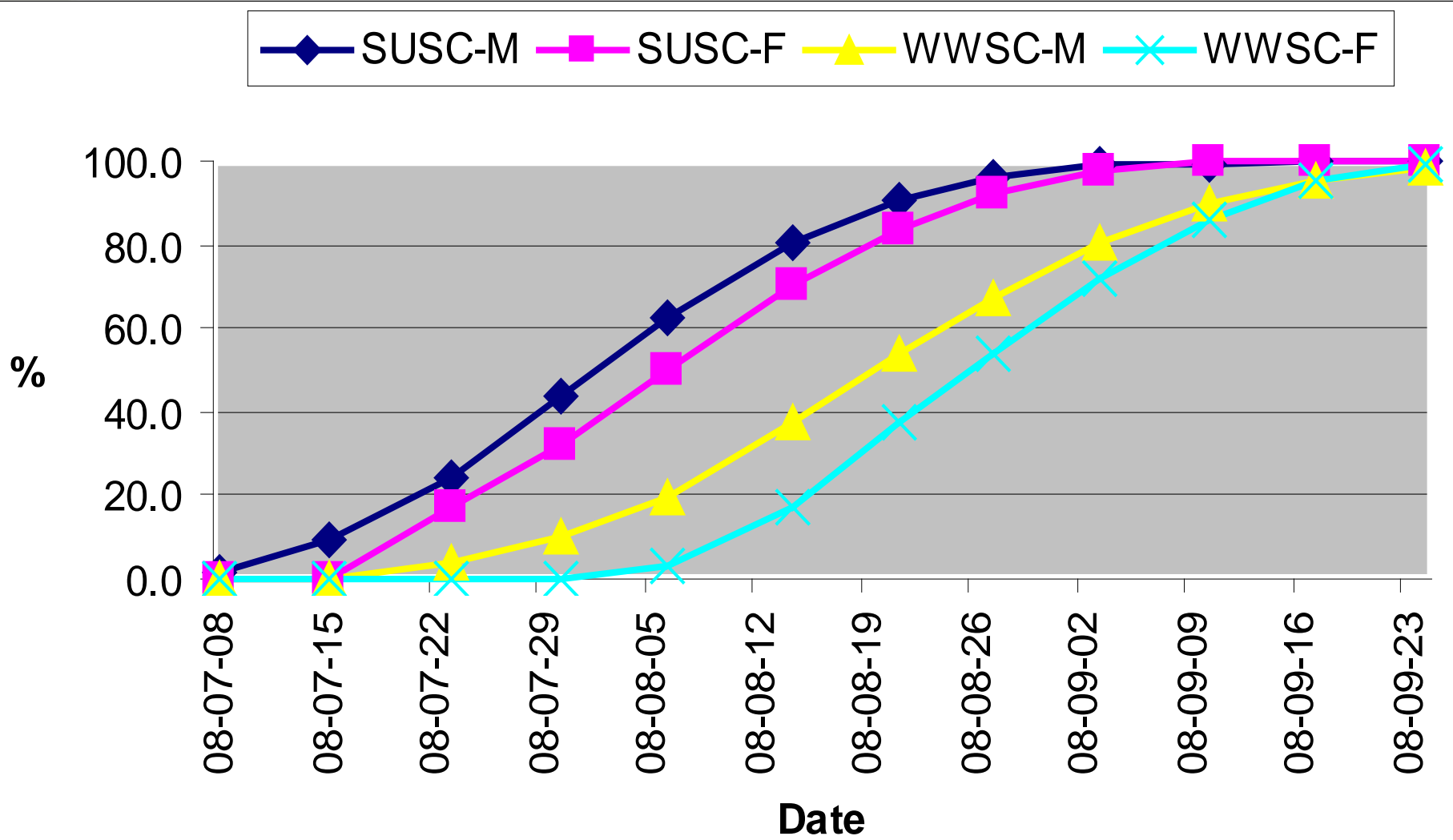


Comparison of moult chronology between species: females

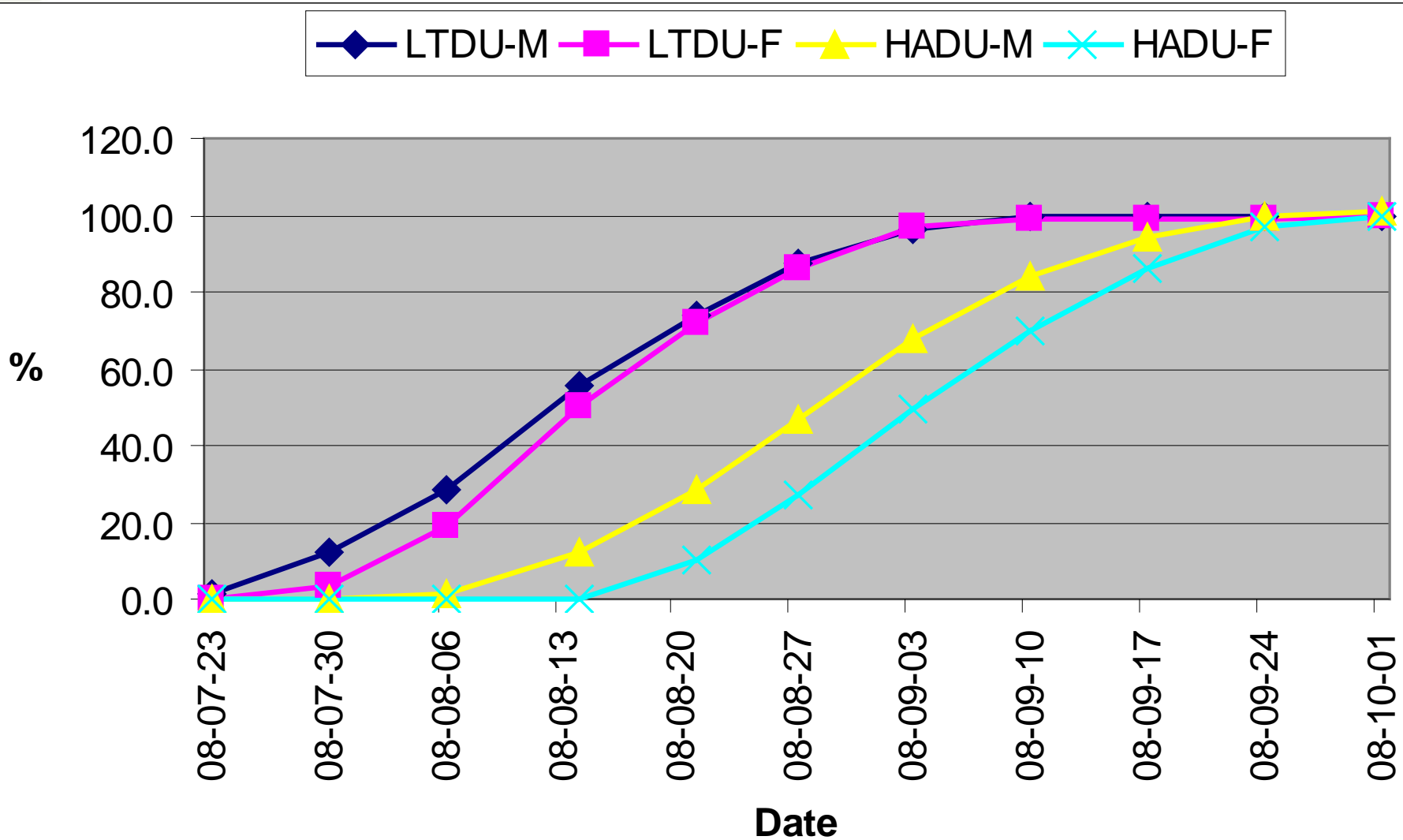


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- **Differences in moult chronology between sexes**

Difference in moult chronology between males and females



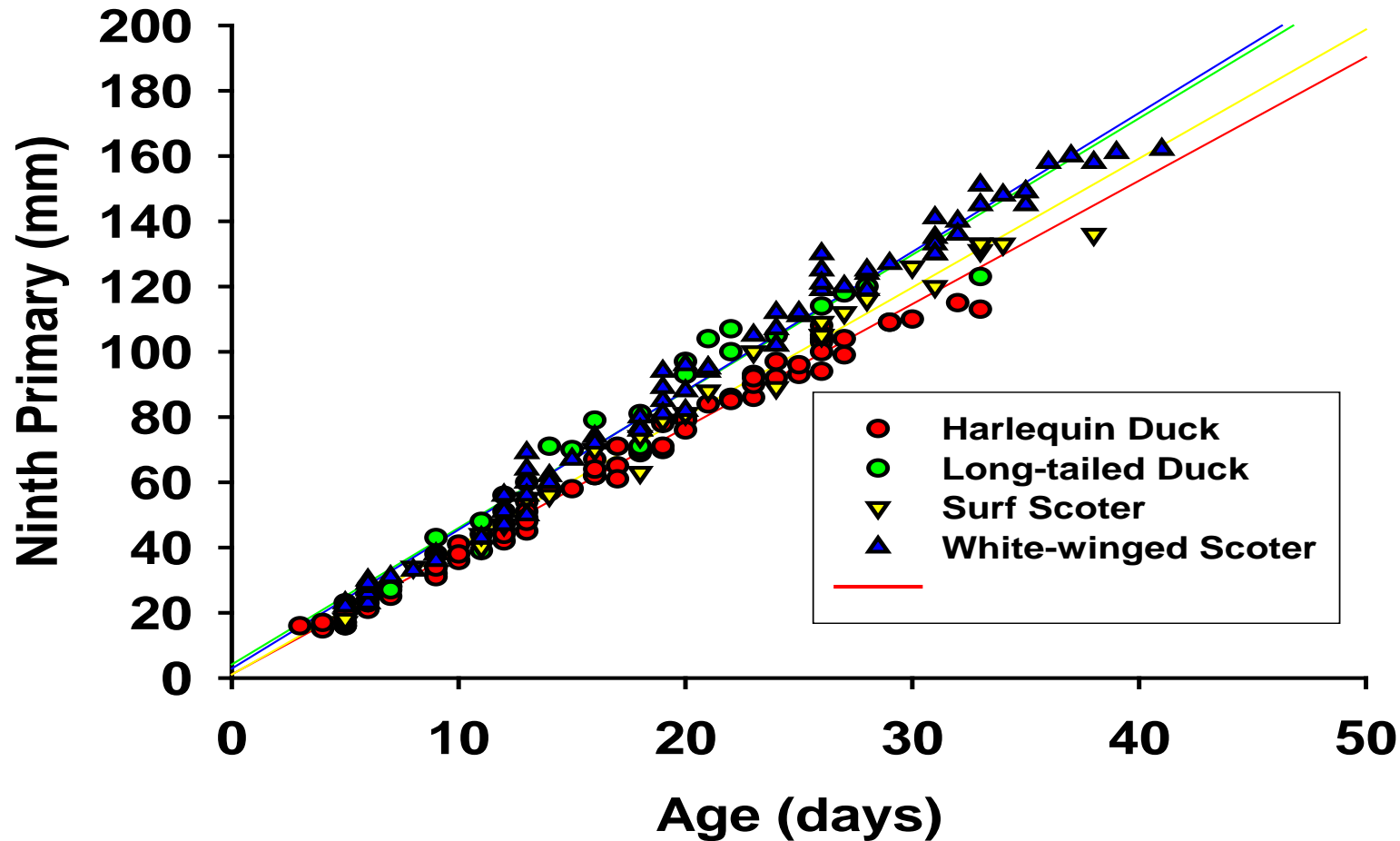
Difference in moult chronology between males and females



Preliminary statistics (Anova)

- Males initiated moult 7.2 ± 2.4 days earlier than females ($P = 0.0044$)
- LTDU started moult 17.9 ± 3.6 days earlier than HADU ($P = 0.0002$)
- SUSC started 23.8 ± 3.4 days earlier than HADU ($P = 0.0000$)

-
- WWSC 15.7 ± 2.7 days earlier than HADU
(P = 0.000)
 - WWSC 8.1 ± 3.5 days later than SUSC
(P = 0.1538)
 - WWSC and LTDU: $+2.2 \pm 3.5$ days (P = 0.9397)
 - SUSC and LTDU: -5.9 ± 4.1 days (P = 0.5660)





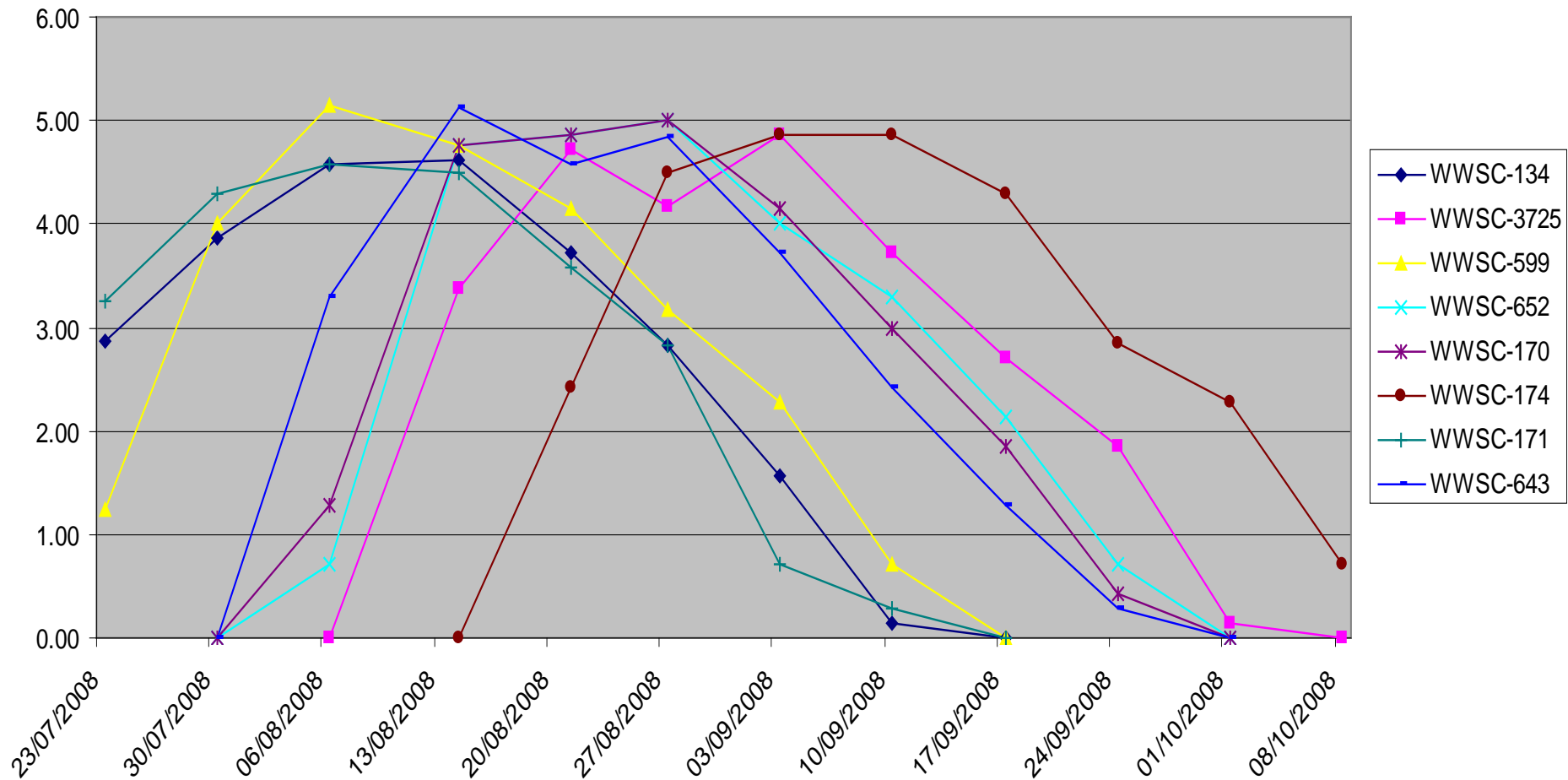
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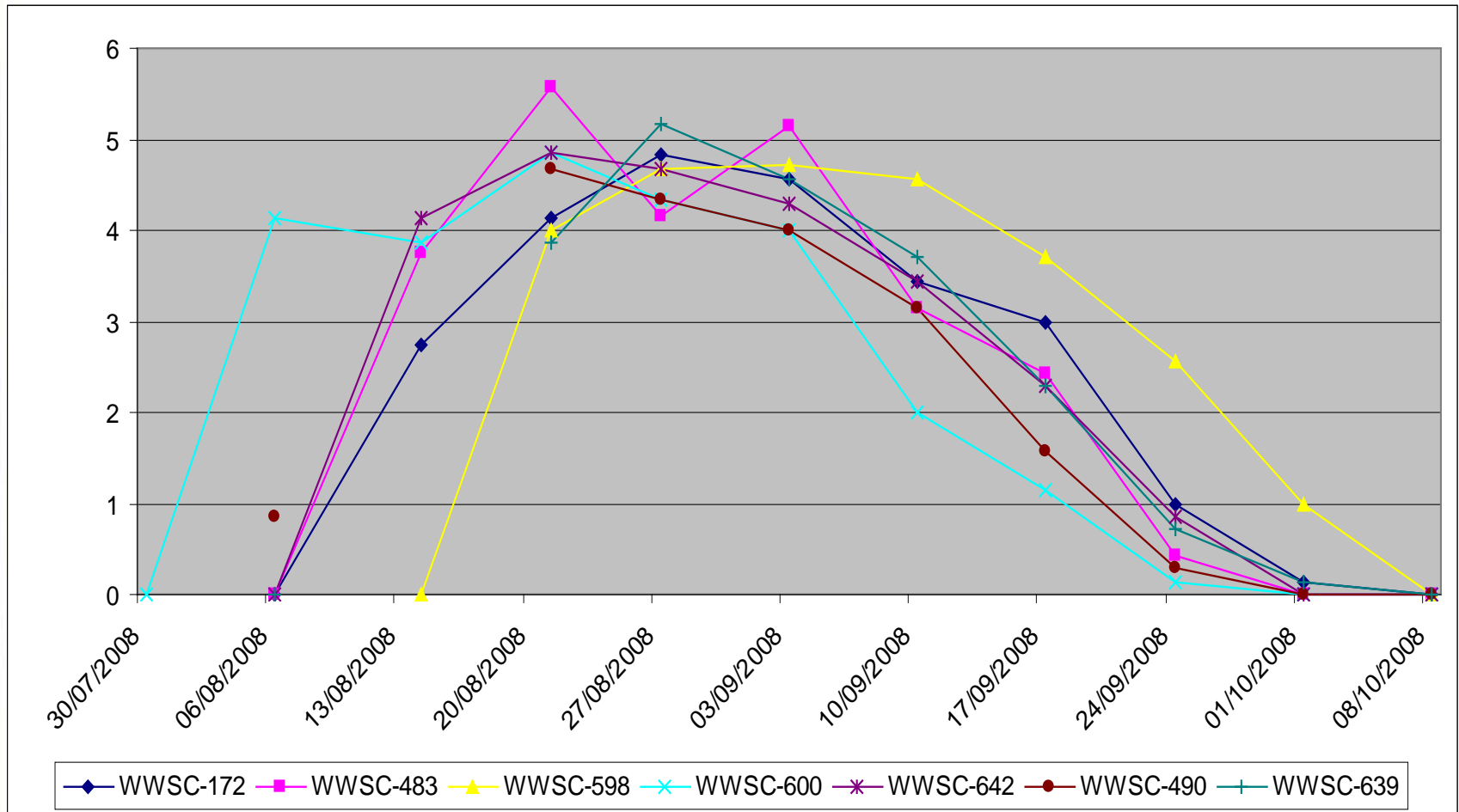
9th primary growth rate

- **Not constant**
- **Slow in first week**
- **Fast in following 3 weeks**
- **Slowing gradually in last 3 weeks**
- **Seems to slow down after flight capability has been regained**

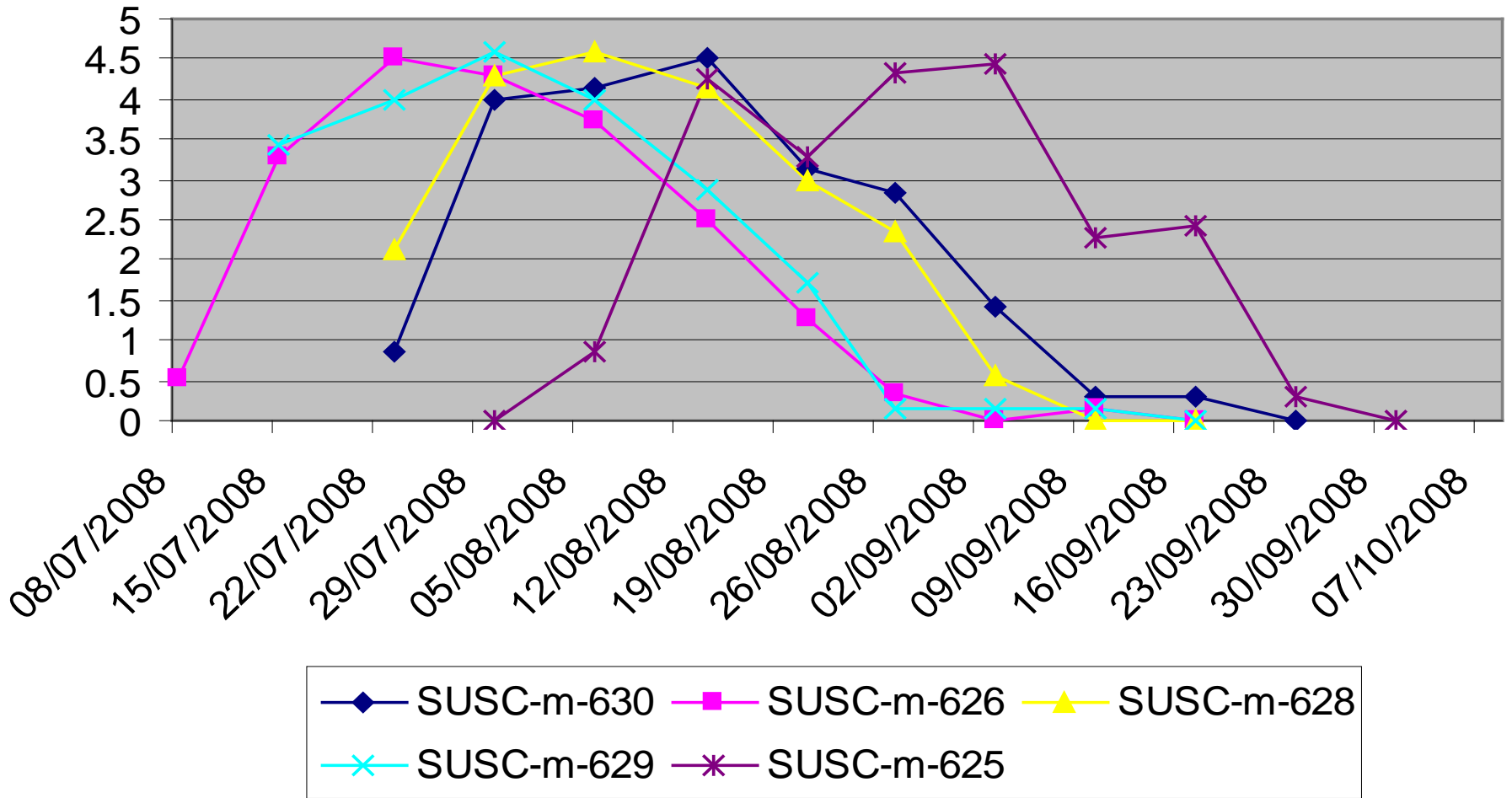
White-winged Scoter males (Growth: mm/day)



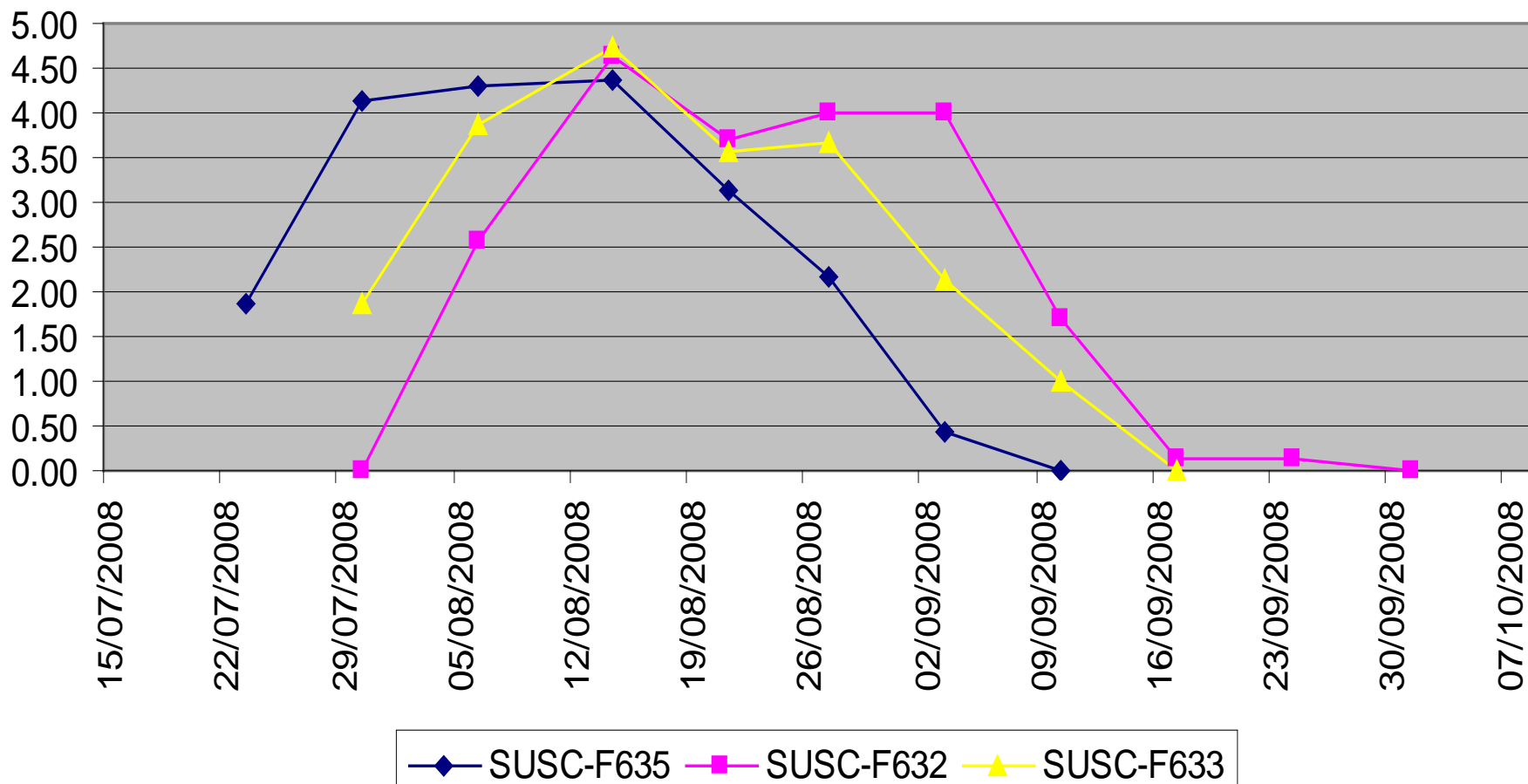
White-winged Scoter females (Growth: mm/day)



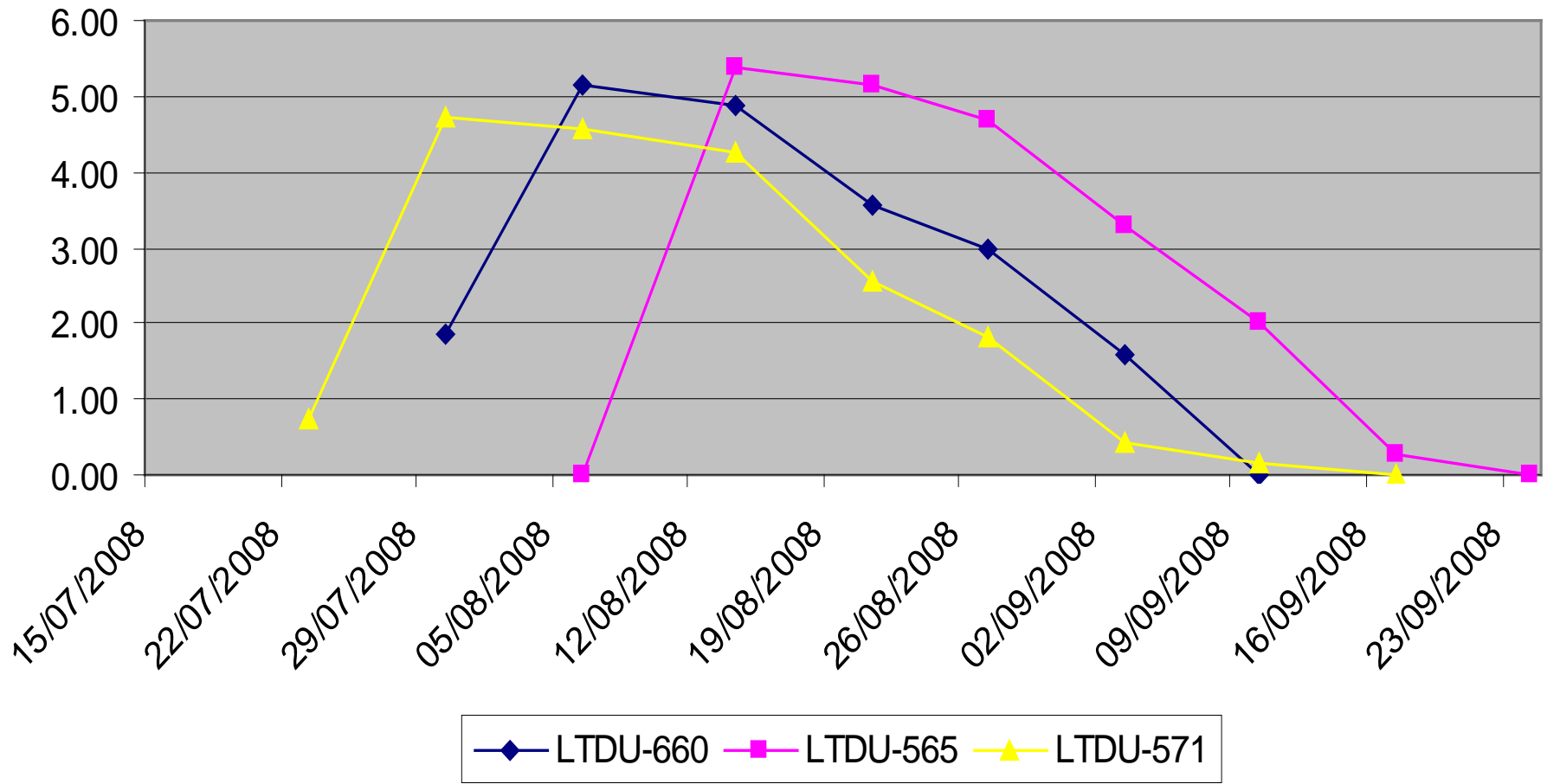
Surf Scoter males: growth (mm/day)



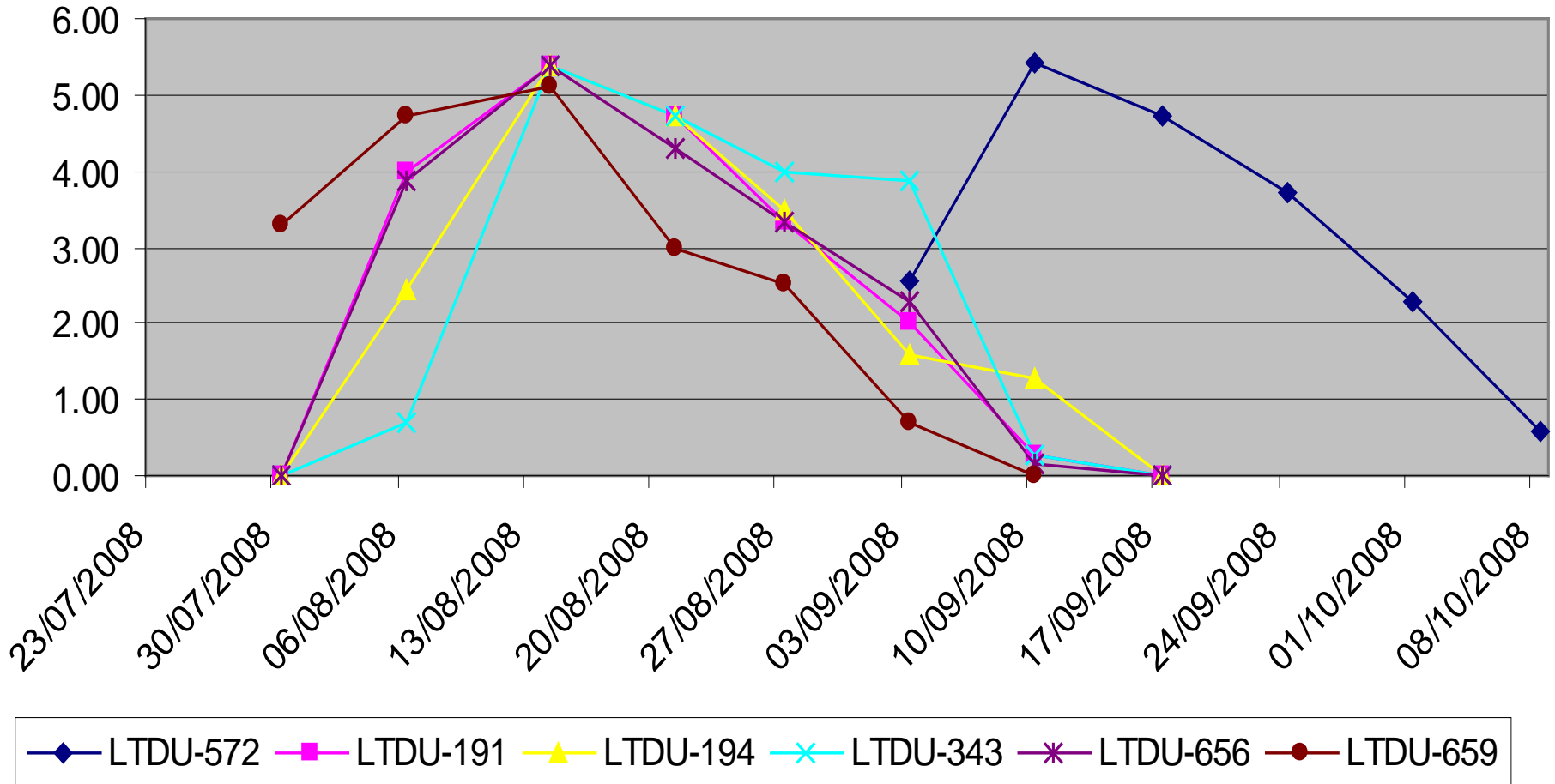
Surf Scoter females: growth rate (mm/day)



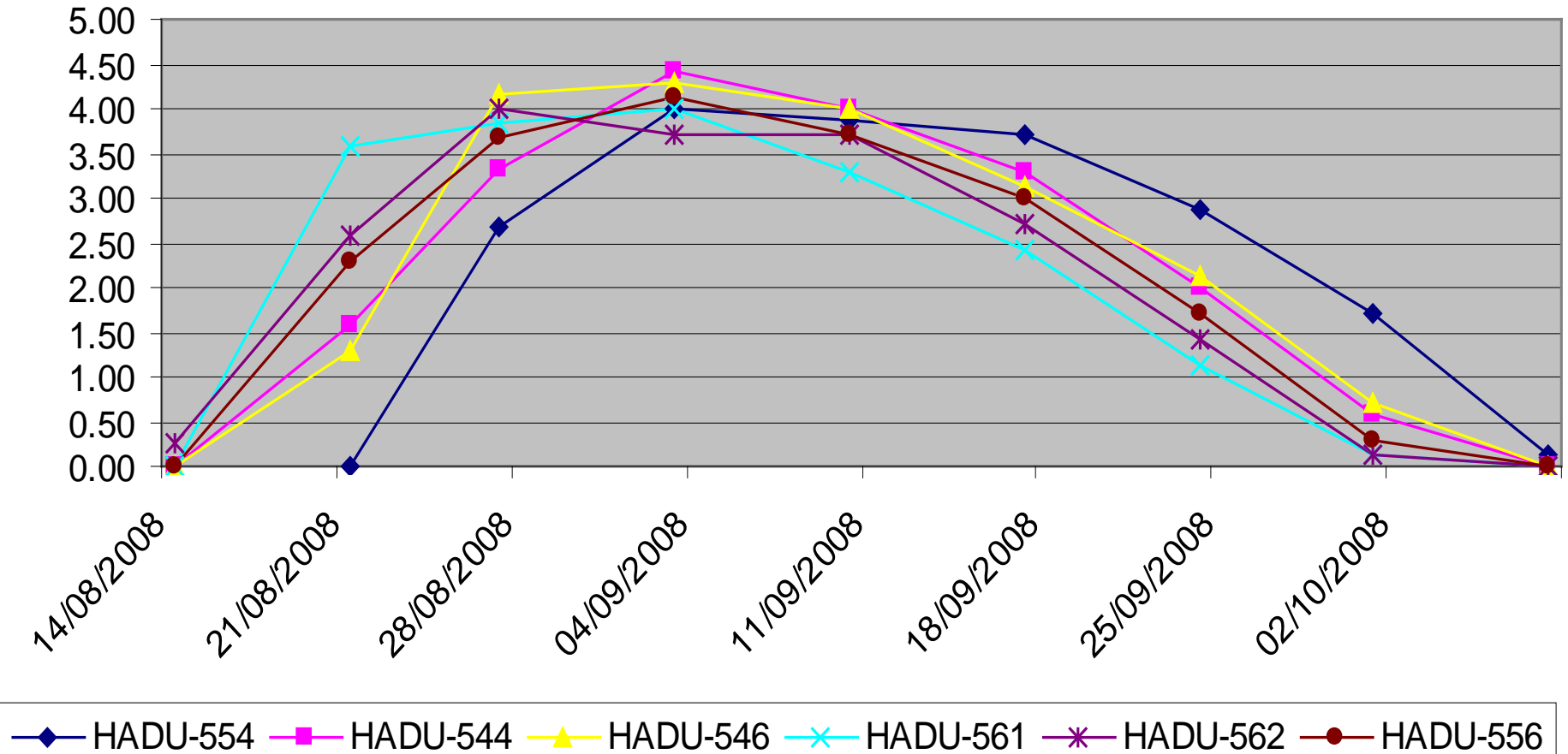
Long-tailed Duck males: growth rate (mmm/day)



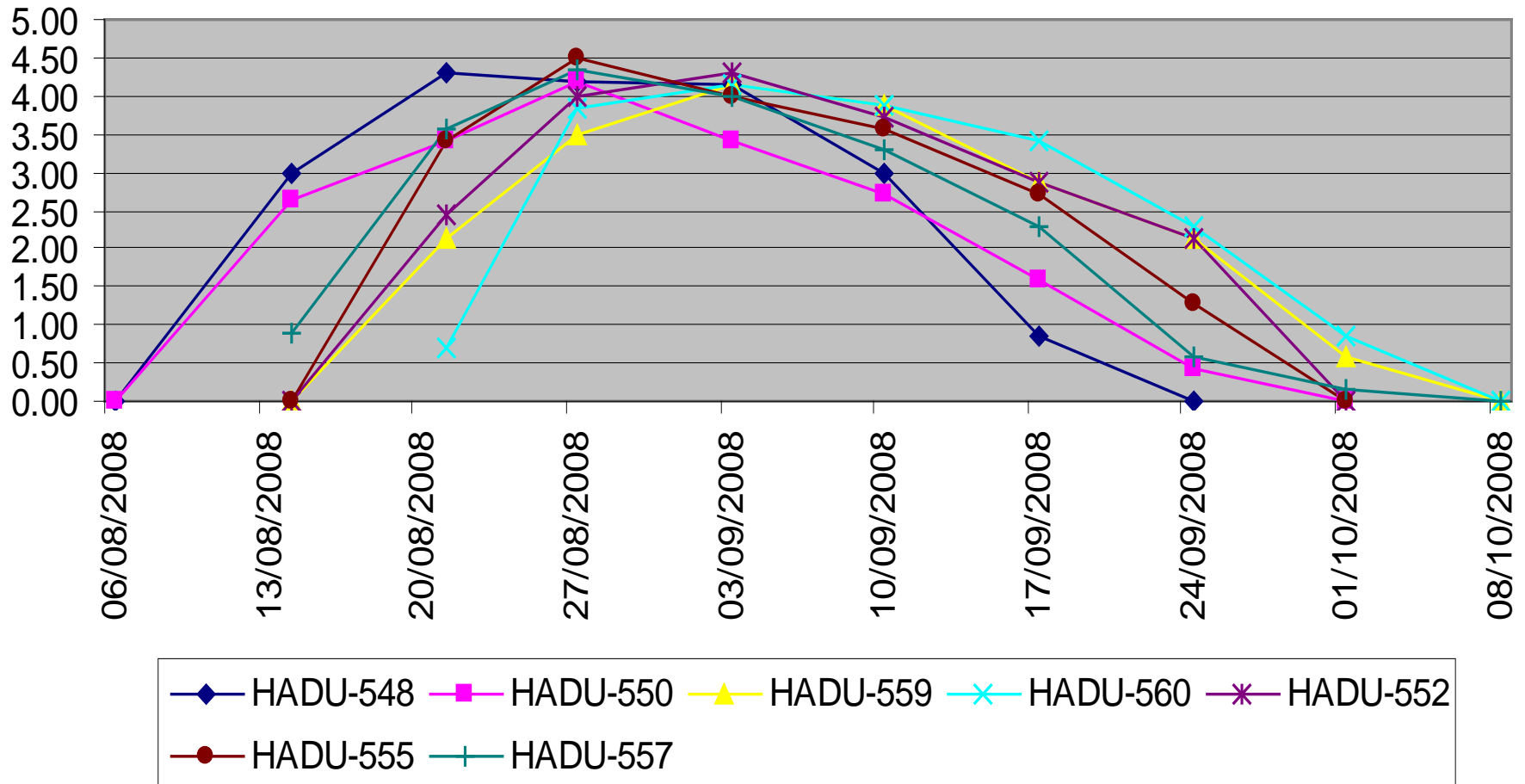
Long-tailed Duck females: growth rate (mm/day)



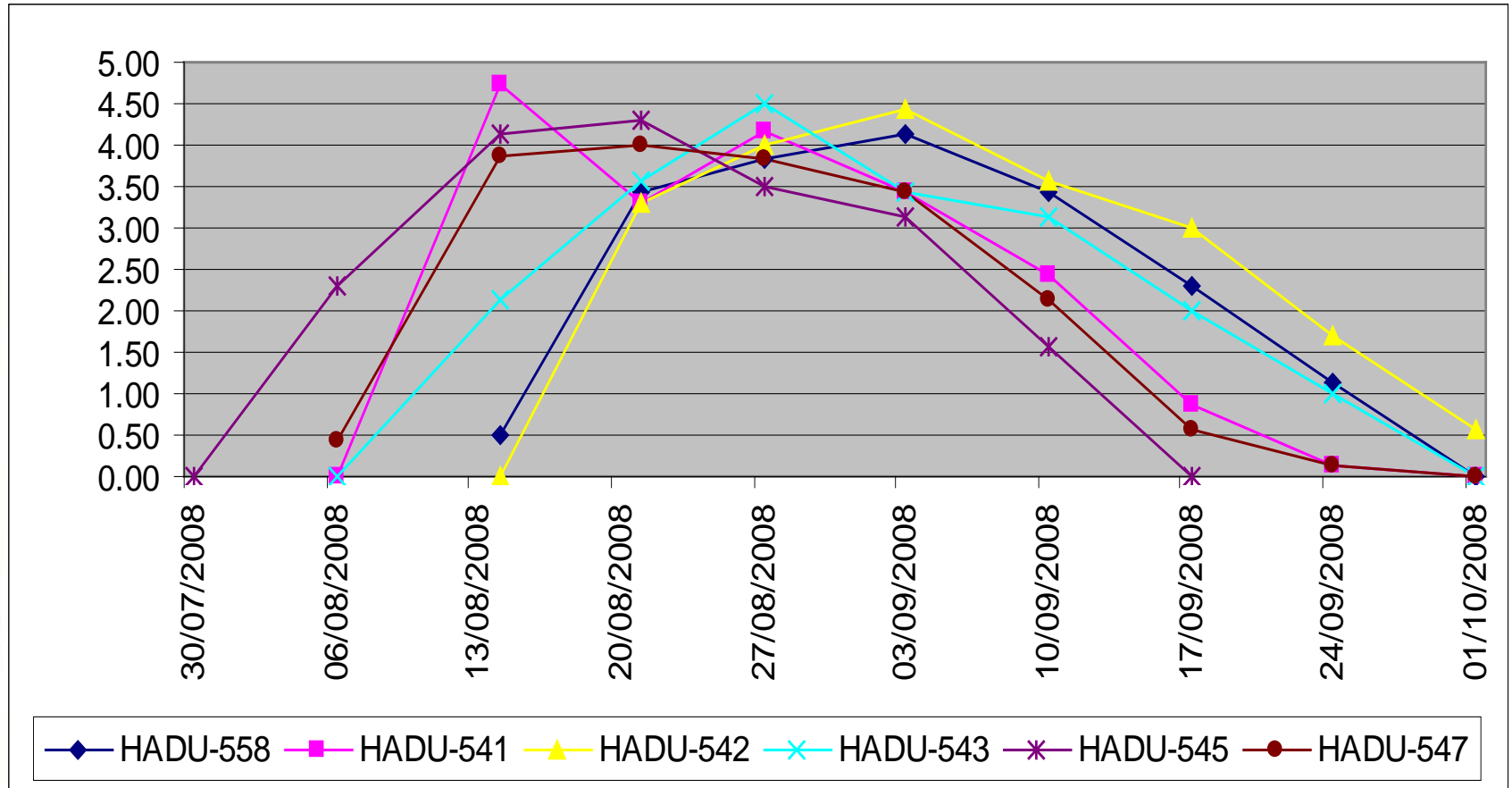
Harlequin Duck females: growth (mm/day)



Harlequin Duck males: growth rate (mm3day)



Harlequin Duck males: growth rate (mm/day)



Mean growth rate (mm/day)

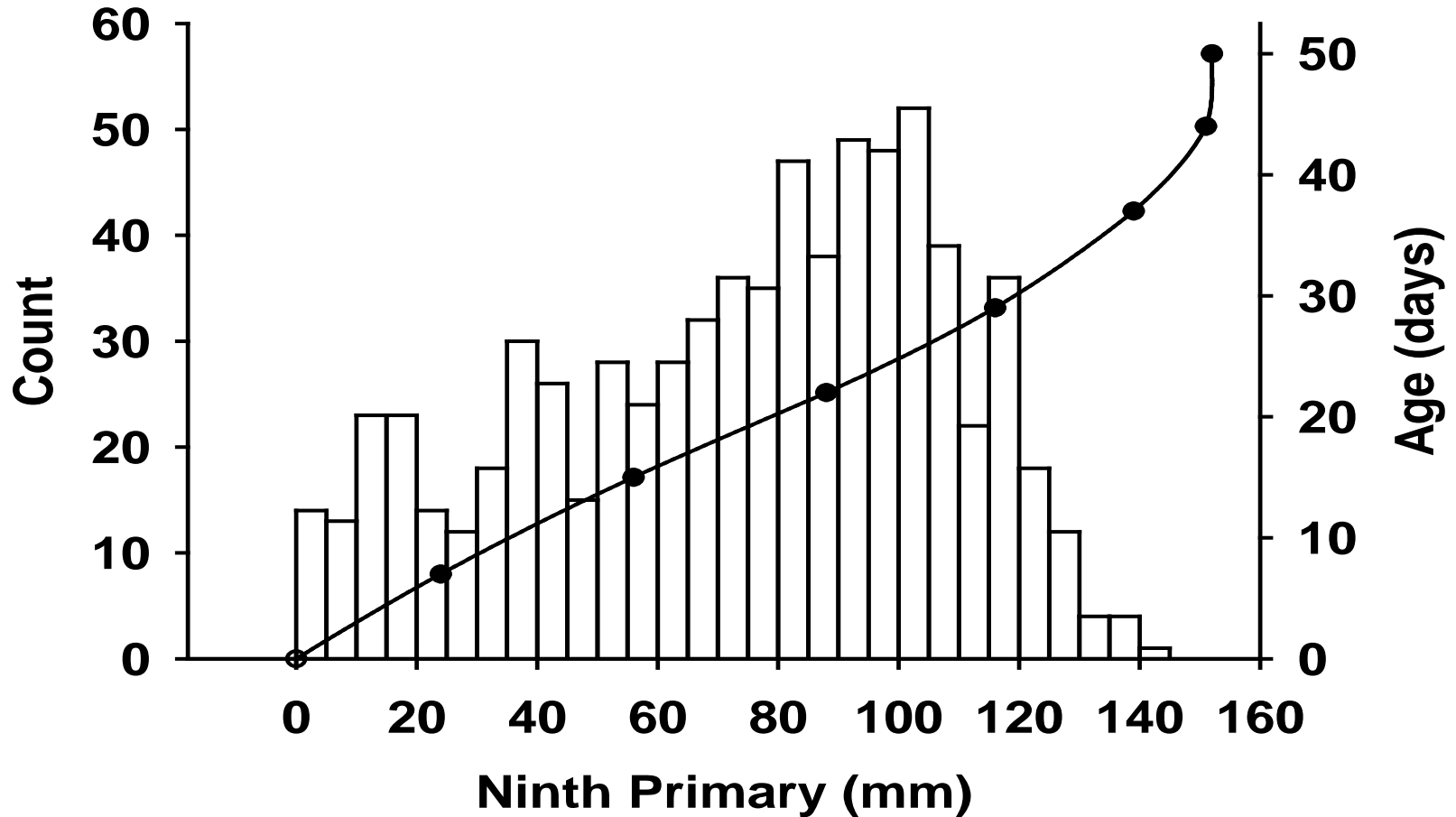
(3 weeks with the greatest growth rates)

	Males (9th mm)	Females
WWSC	4.66 (178)	4.58 (169)
SUSC	4.26 (154)	4.19 (148)
LTDU	4.70 (142)	4.57 (134)
HADU	3.94 (131)	3.90 (129)
BAGO (van de Wetering 1997)	3.30 to 4.10 2.35 to 4.62	

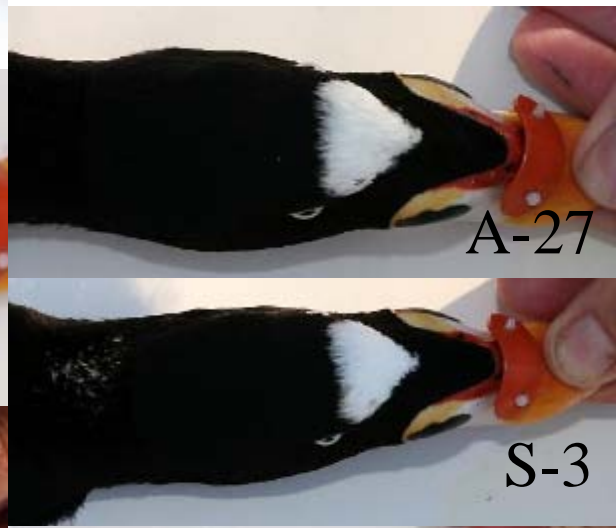
Length of flightless period (80%)

	Males	Females
WWSC	36	31
SUSC	33	32
LTDU	28	26
HADU	31	29

9th primary length in captured moulting Surf Scoters on the Labrador coast



Surf Scoter 629





July 8 (old)



July 15 (old)



July 23 (old)



July 30 (0)



August 6 (6)



August 14 (40)



August 21 (63)



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August 27 (89)



September 3
(120)



September 10
(136)



September 17
(153)



September 24
(155)



October 8 (155)





Merci

Thank you

