

WINTERING WATERFOWL ENERGETICS

LEIGH FREDRICKSON

**+ ECOLOGICAL CONSIDERATIONS FOR
WETLAND MANAGEMENT IN NEBRASKA**

**CRANE TRUST
WOOD RIVER, NEBRASKA
9-11 SEPTEMBER, 2026**

50 YEARS OF OBSERVATIONS ON THREE ANATIDS IN A SOUTHERN HARDWOOD FOREST

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3 ANATIDS FROM 3 GENERA IN 3 TRIBES

BREEDING

CARININI
AIX
WOOD DUCK



MERGINI
LOPHODYTES
HOODED MERGANSER



WINTERING

ANATINI
ANAS
MALLARD

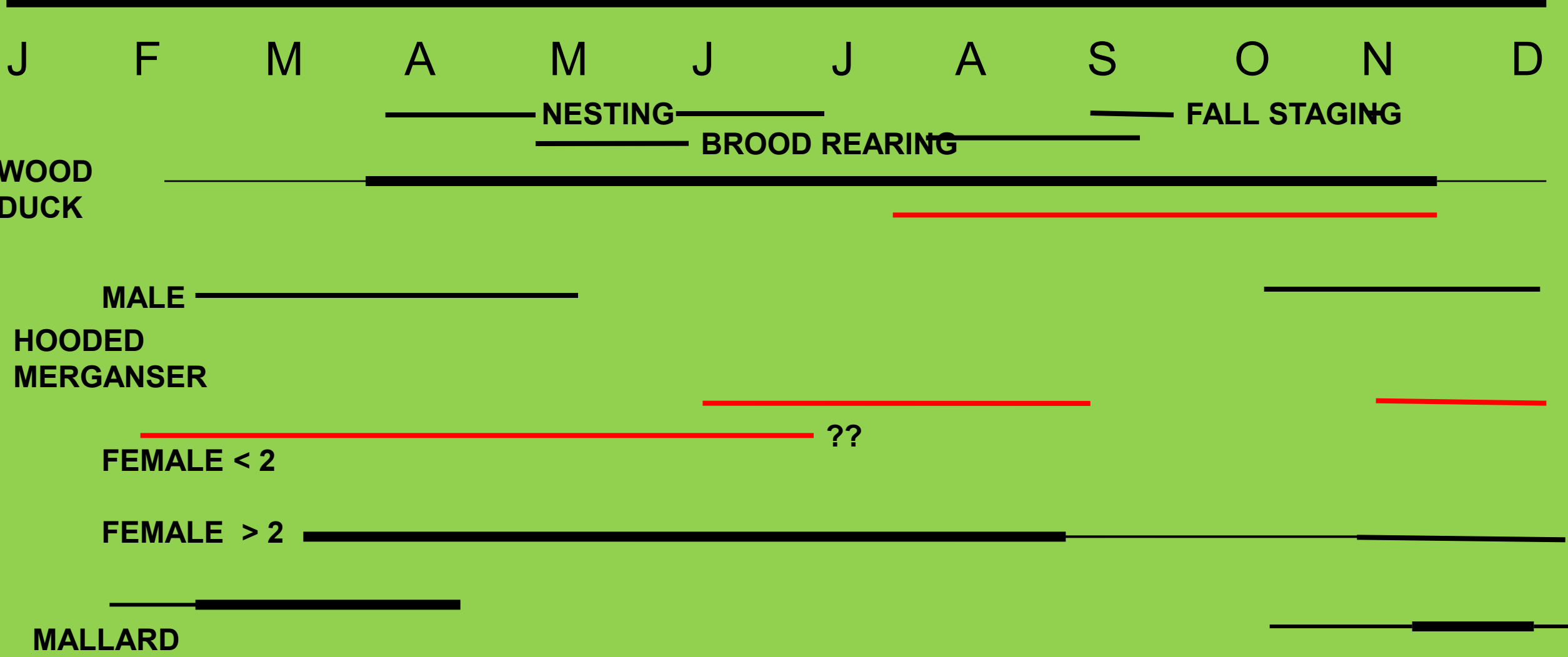


NEST LATER - MARCH
FEBRUARY

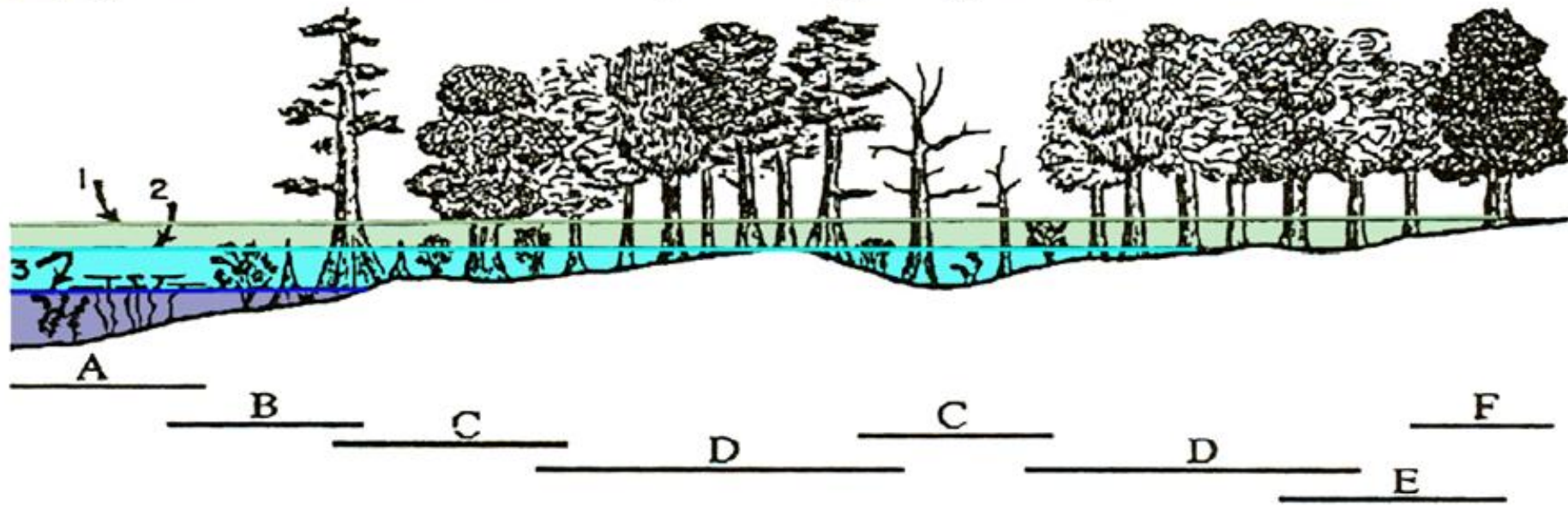
NEST EARLIER -

SIMILAR CLUTCH SIZE AND INCUBATION PERIOD

CHRONOLOGY OF USE



- 1) maximum flooding depth
- 2) mean annual dormant season flooding depth
- 3) mean annual low water depth during the growing season



HOODED MERGANSER

WOOD
DUCK

MALLARD

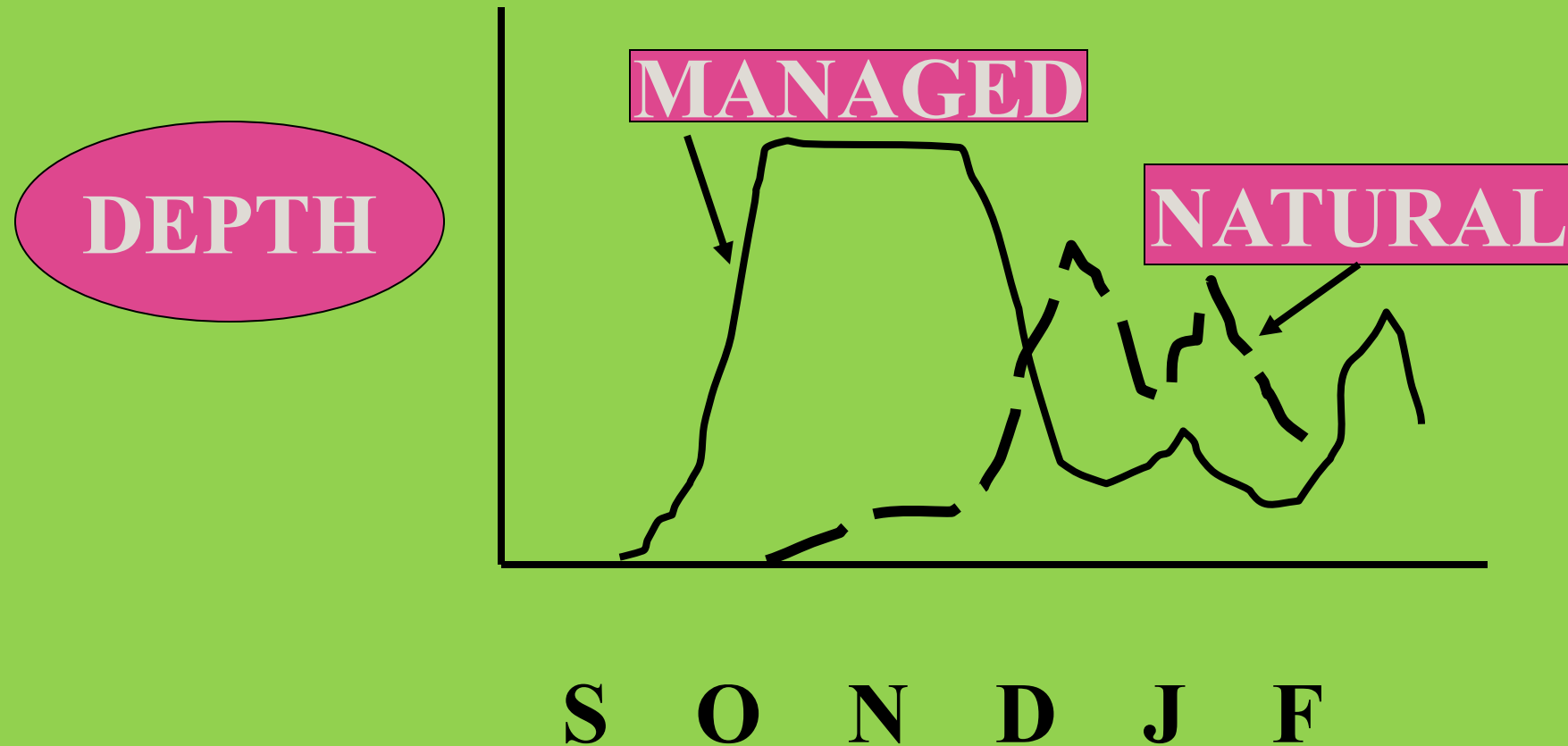
OAK DOMINATED FOREST

NON-GROWING SEASON

GROWING SEASON



GREENTREE FLOODING REGIME





DEAD TIMBER AND SHRUB/SCRUB TEMPLE ISLAND



ANAEROBIC CONDITIONS

FOREST LITTER



AQUATIC OLIGOCHAETE

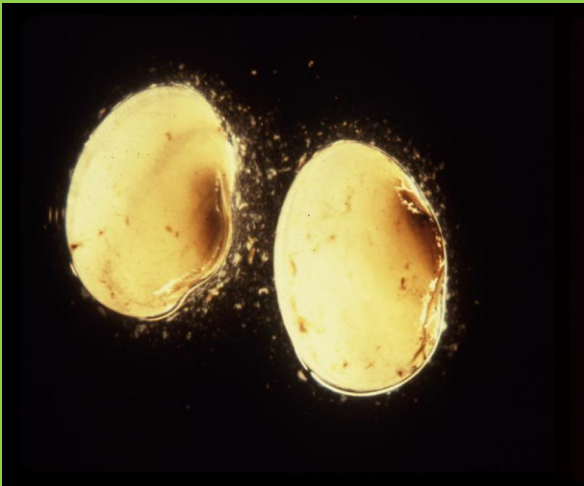


RAT-TAILED MAGGOT



AEROBIC CONDITIONS

FINGERNAIL CLAMS



ISOPOD



AMPHIPOD



CRAYFISH



LATE WINTER MOLT AND PLUMAGE FUNCTIONS

FEMALE-PREBASIC

SIGNAL

SEPARATION OF
ENERGETICALLY
EXPENSIVE ACTIVITIES

CAMOFLAUGE FOR
NESTING

DARK DOWN FOR NEST
INSULATION AND
CONCEALMENT

MALE-SUPPLEMENTAL

SIGNAL

REPLACEMENT OF
WATER WORN
PLUMAGE





1981-82

DEC

JAN

FEB

MAR

UNPAIRED

MOLTING

0

0

1

6

NOT MOLTING

5

12

6

1

PAIRED

MOLTING

8

11

24

22

NOT MOLTING

4

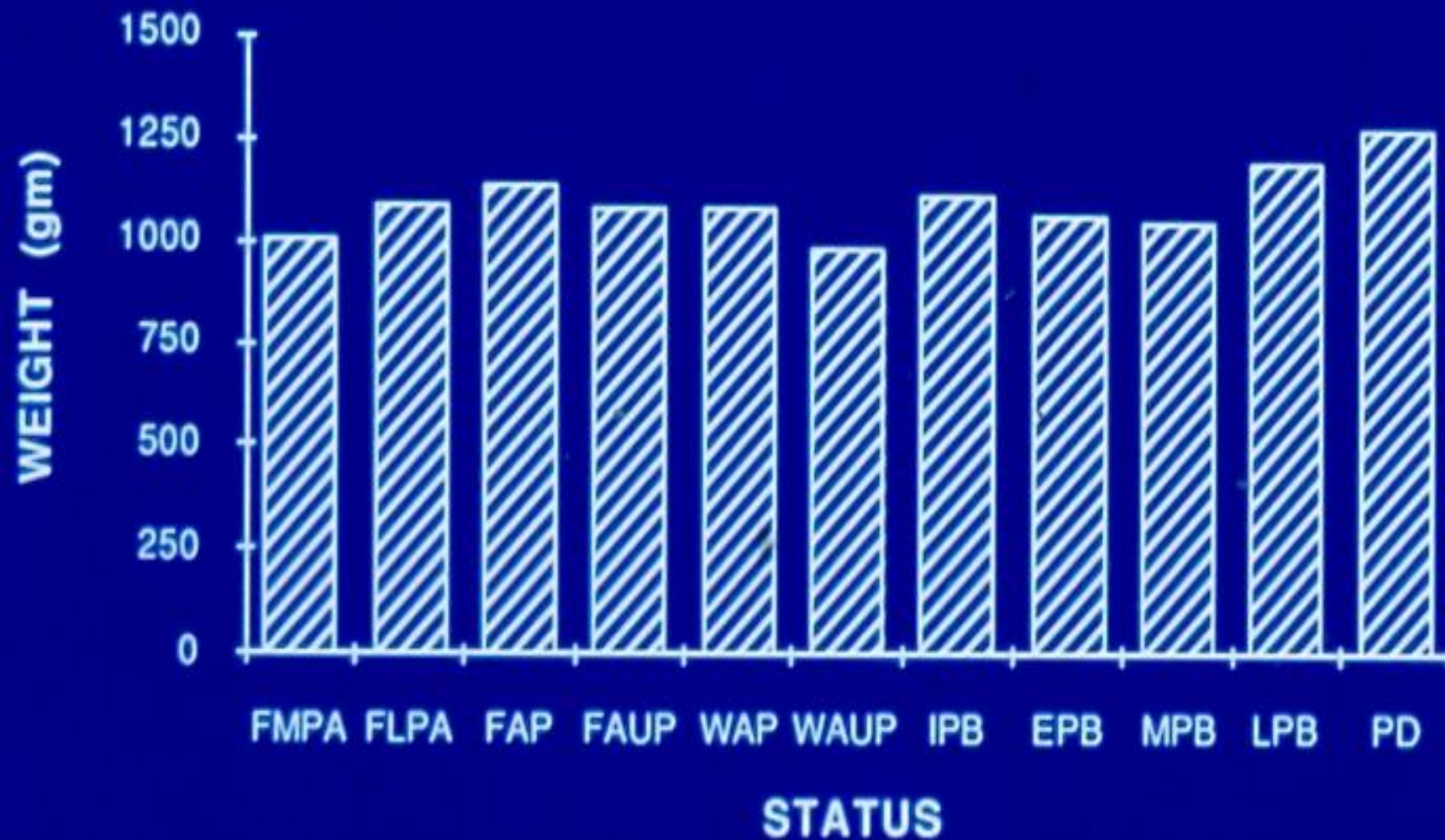
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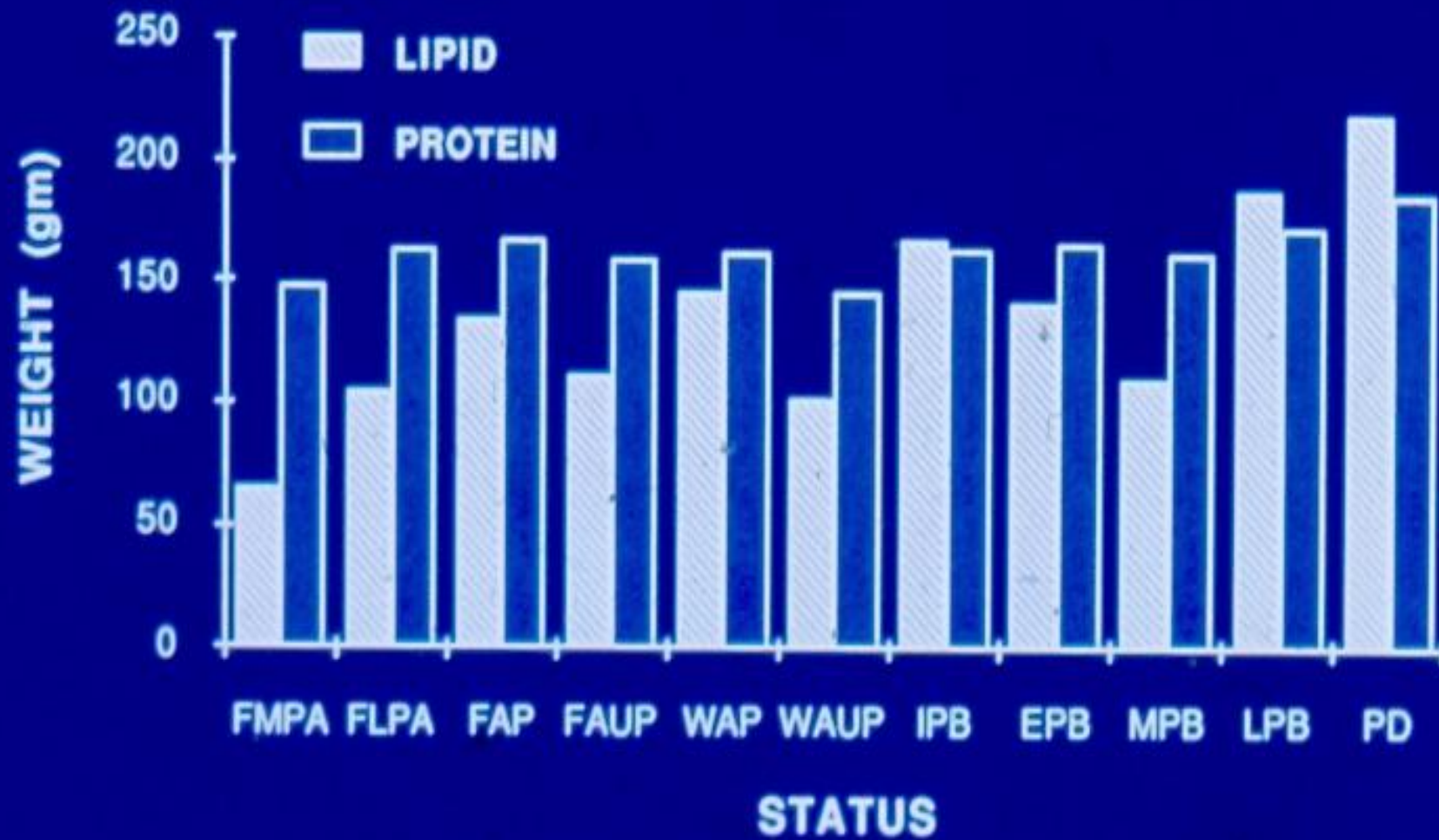
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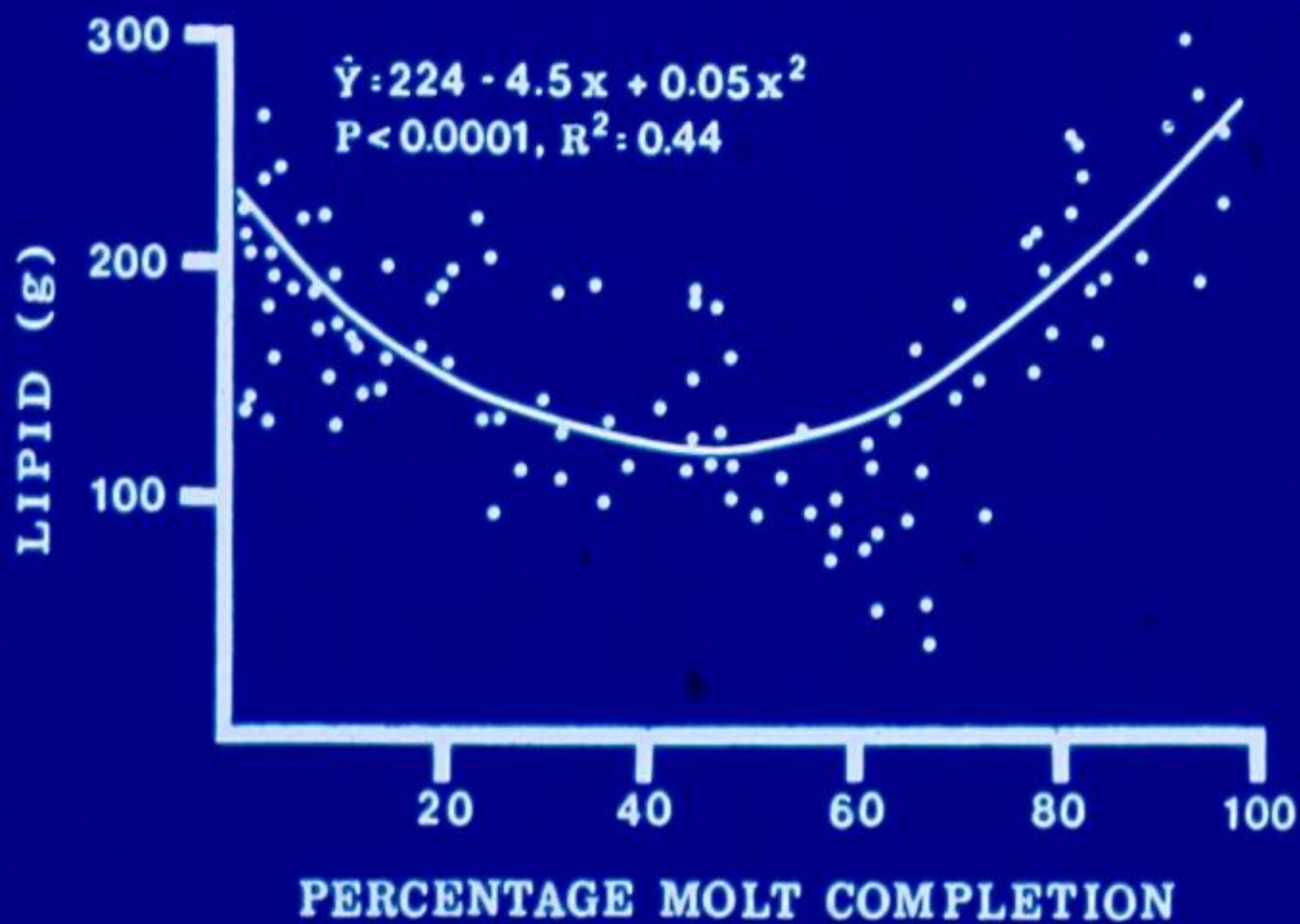
	<u>80-81</u>	<u>81-82</u>	<u>82-83</u>
1st PREBASIC INITIATION	22 JAN	15 DEC	7 DEC
1st PREBASIC COMPLETION	22 FEB	6 FEB	8 JAN
WINTER WETLAND CONDITION	DRY	SEMI-WET	WET

FEMALE MALLARD BODY WEIGHT IN WINTER

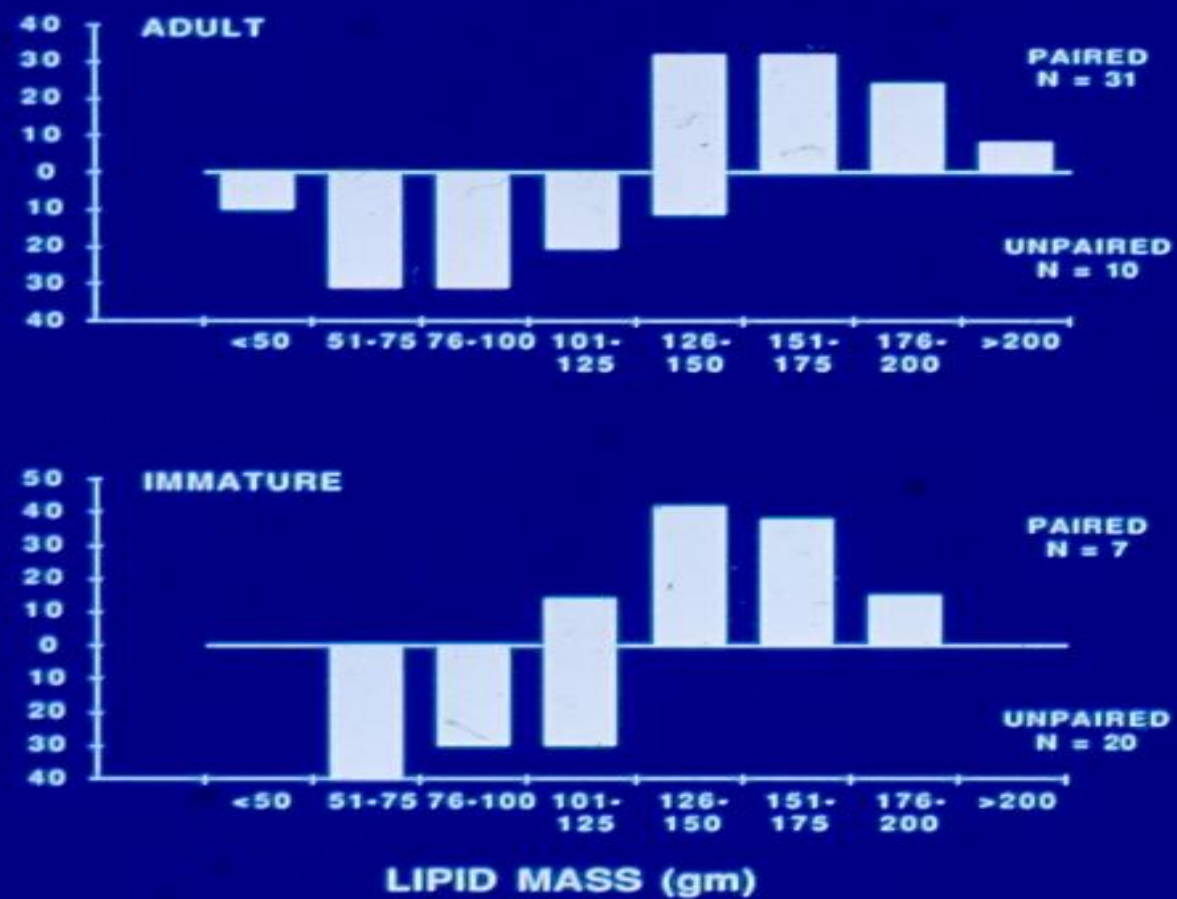


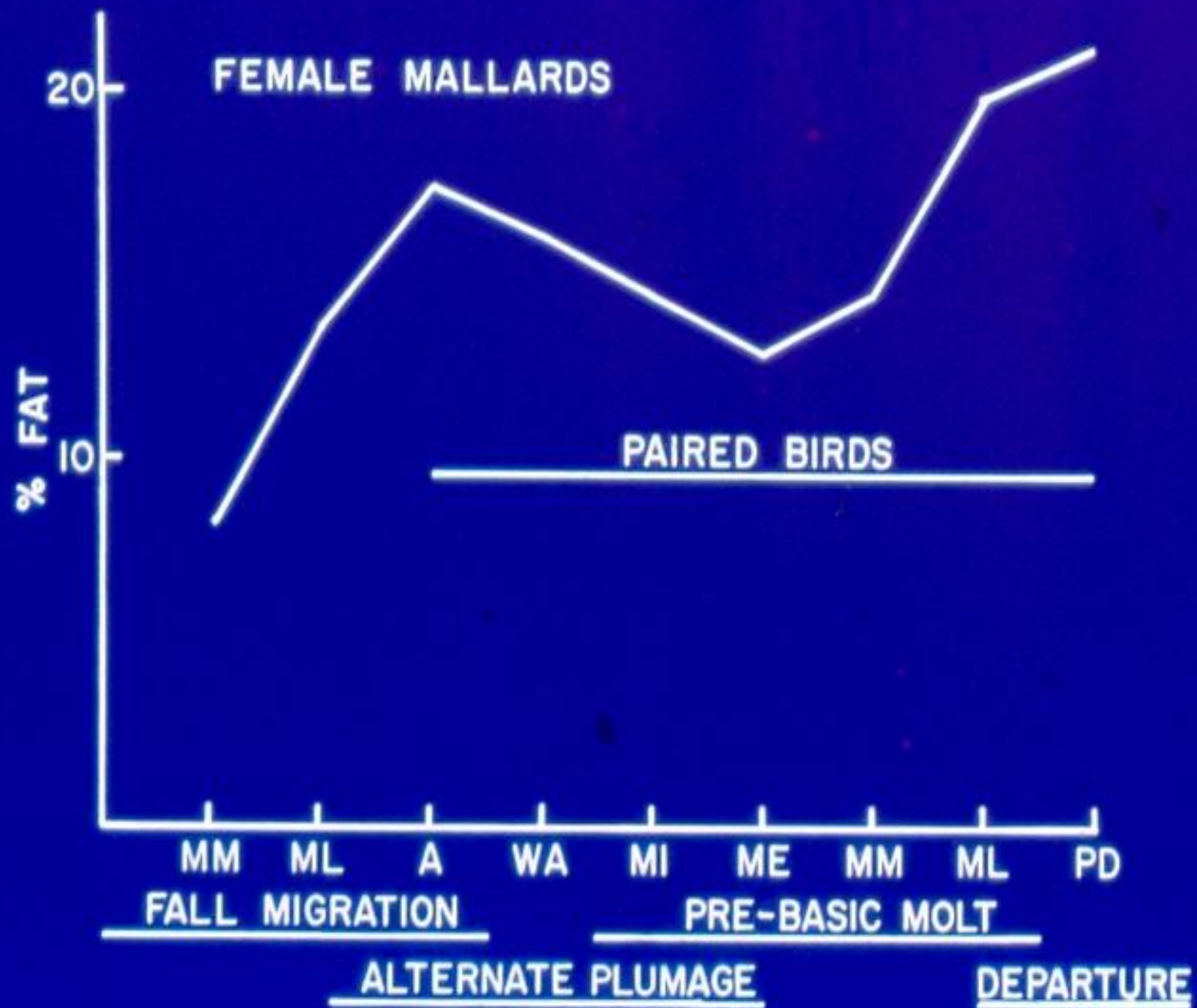
FEMALE MALLARD BODY COMPOSITION





PERCENTAGE OF FEMALES



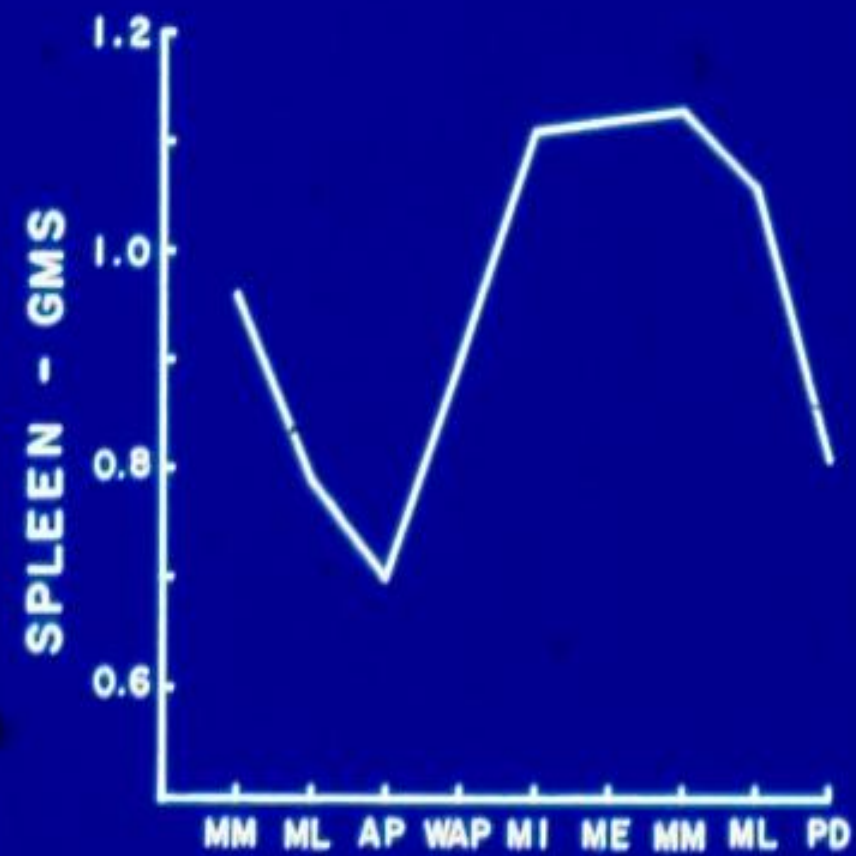
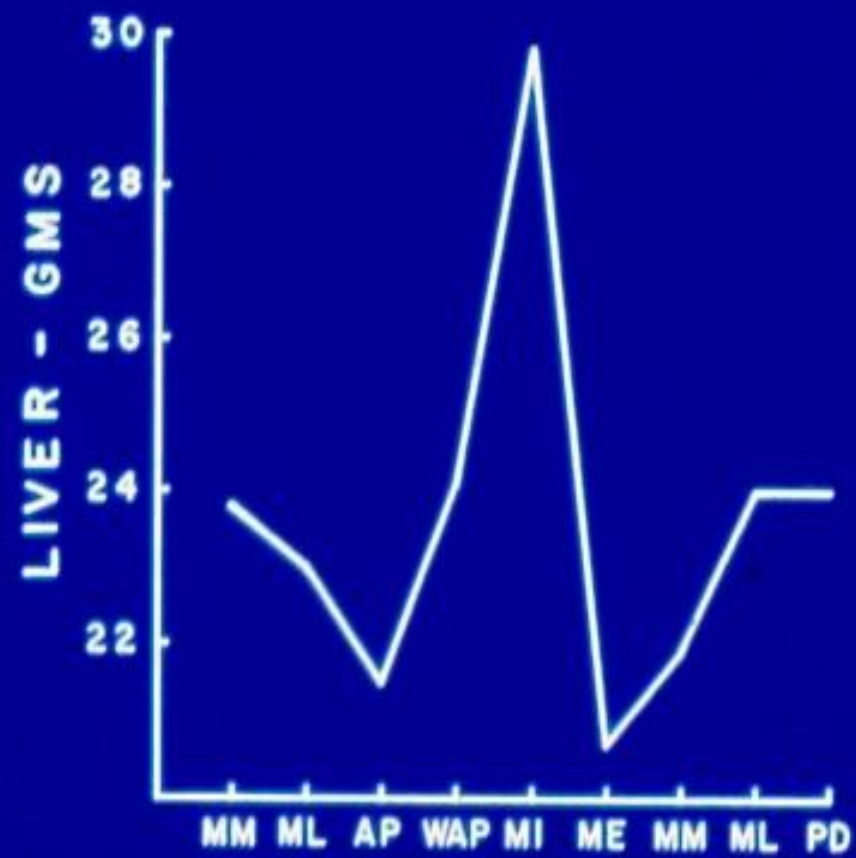


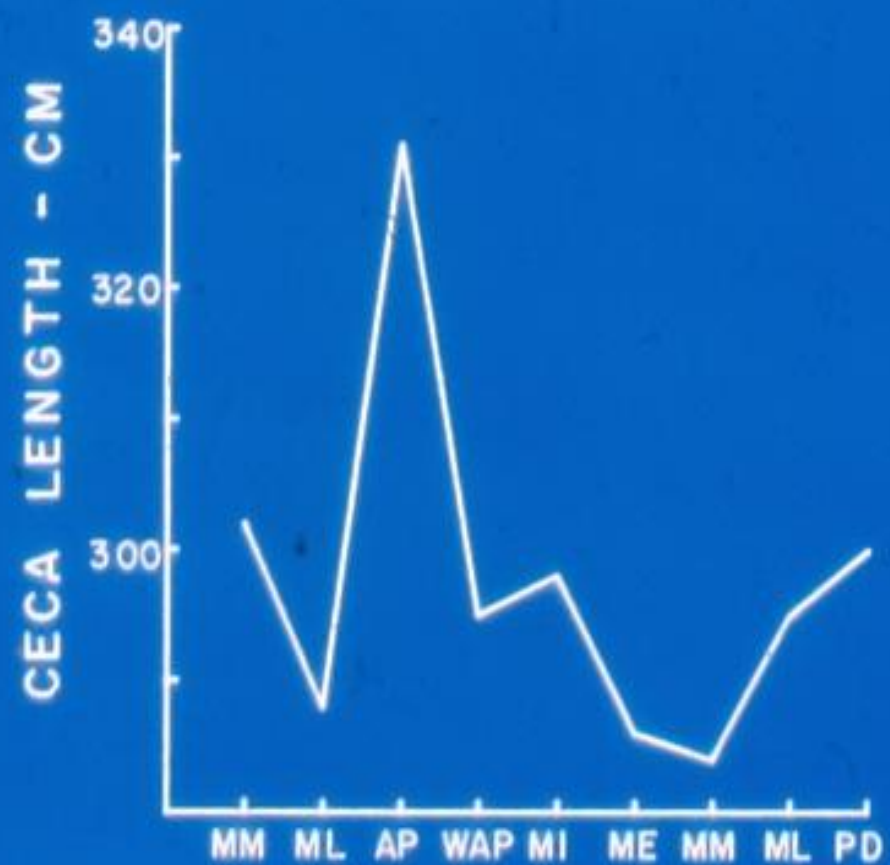
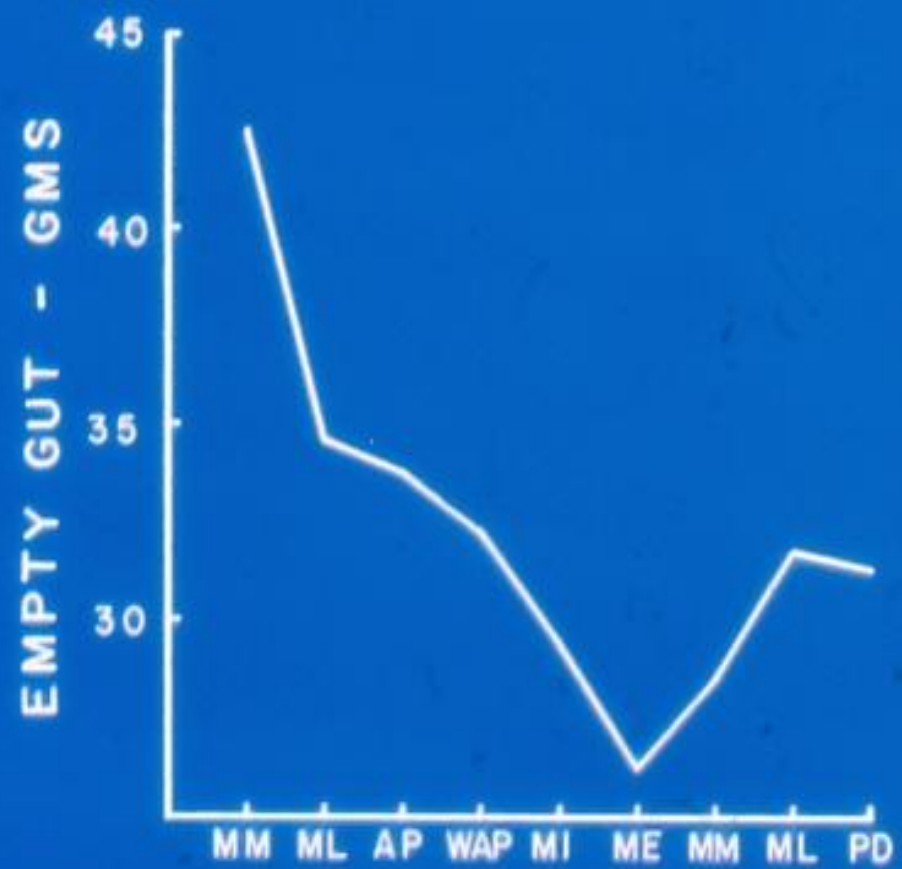
PM	$\xrightarrow{72}$	UPM
PM	$\xrightarrow{32}$	UPF
PM	$\xrightarrow{61}$	PM
PM	$\xleftarrow[5]{24}$	PF
PF	$\xrightarrow{21}$	UPM
PF	$\xrightarrow{70}$	UPF
PF	$\xrightarrow{28}$	PF
UPM	$\xleftarrow[1]{68}$	UPF
UPM	$\xrightarrow{4}$	UPM

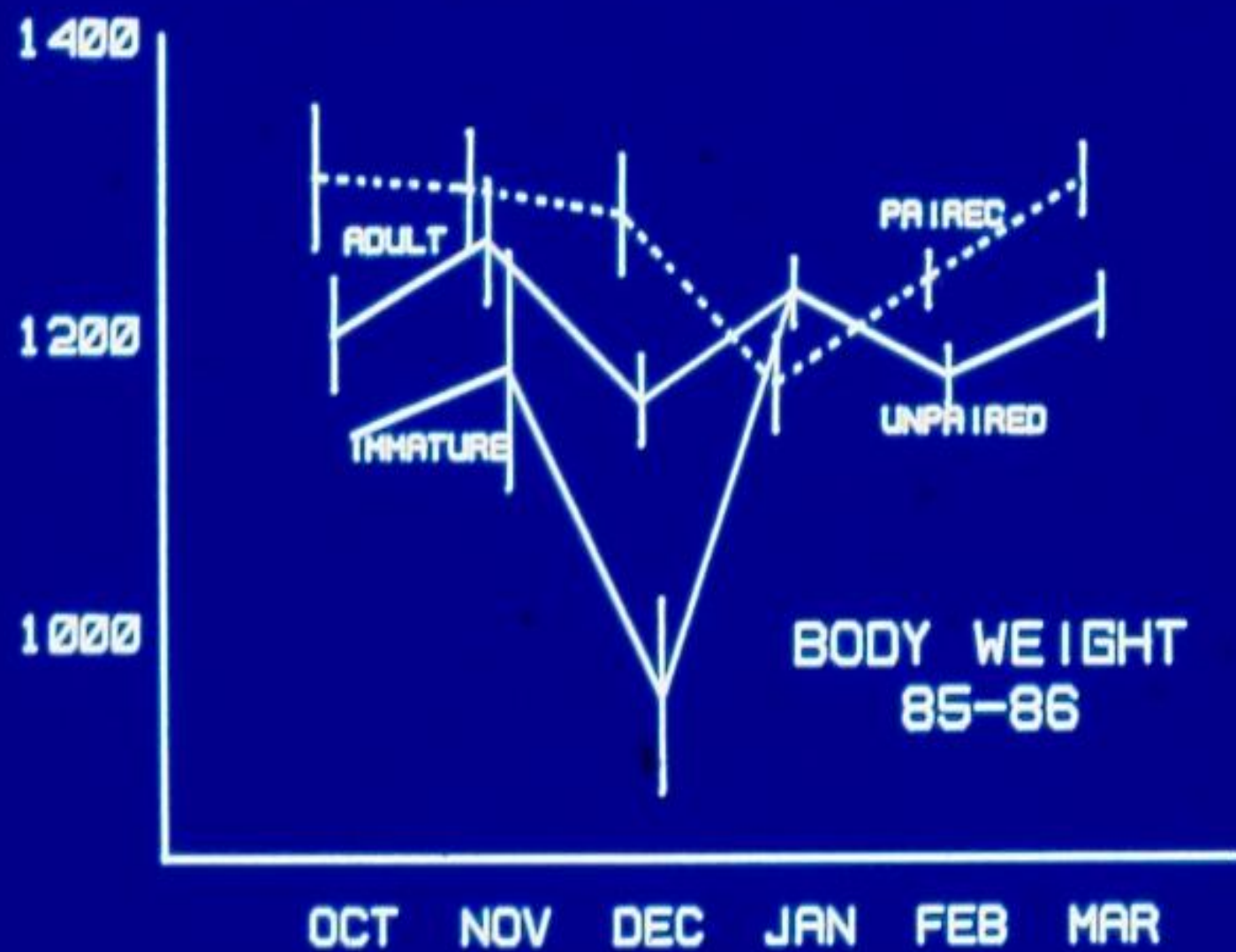
PM	>	PF	>	UPM	>	UPF
49.0		32.1		18.6		0.9

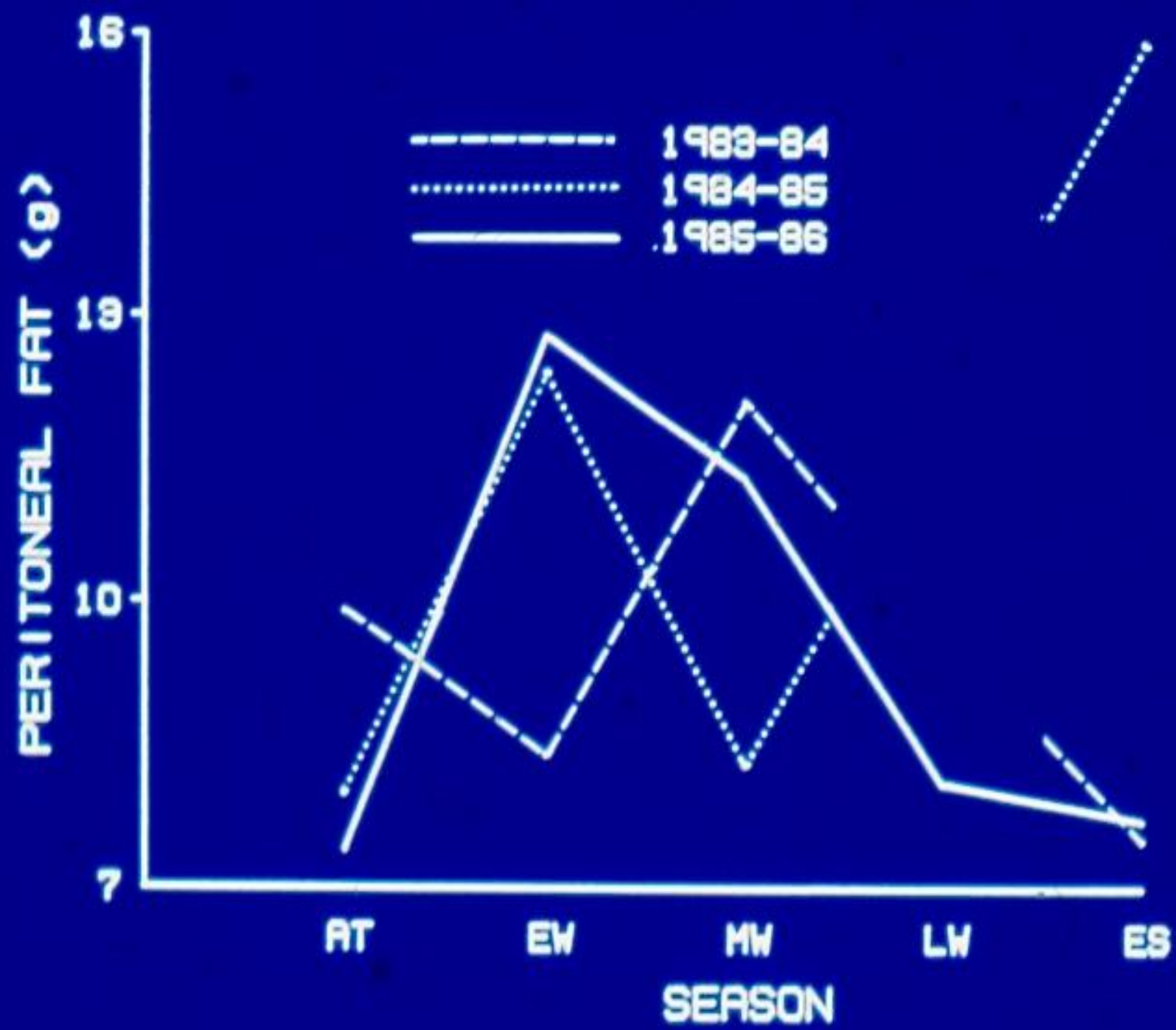
DOMINANCE RELATIONSHIPS
FEB - MAR 1982

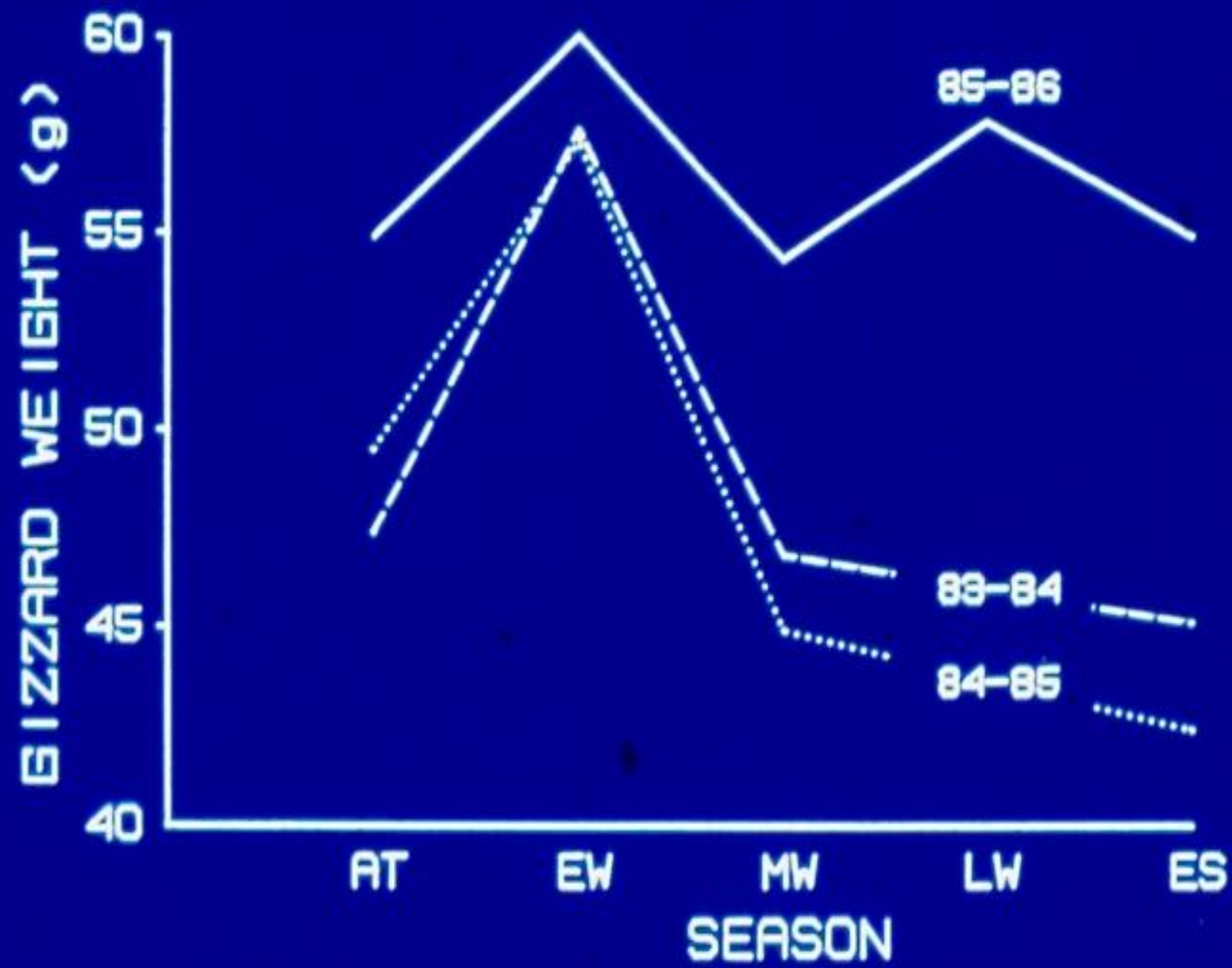
FAT DEPOT	<u>RANGE HIGH/LOW</u>	<u>EARLY MID MOLT % LOSS</u>
RIGHT LEG	5.0	27
INTESTINE	7.9	52
PERITONEAL	9.3	49
SUBCUTANEOUS	7.7	34

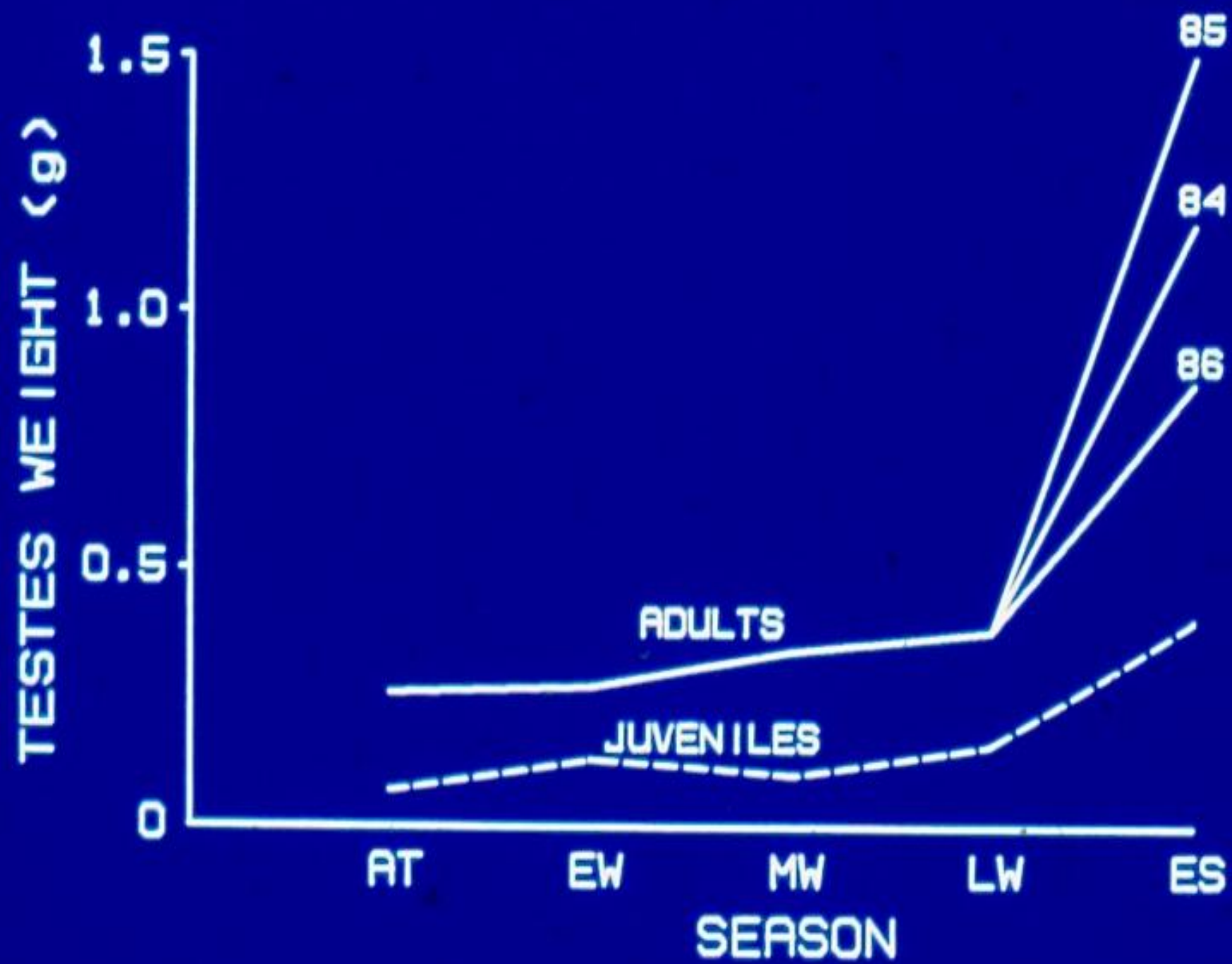




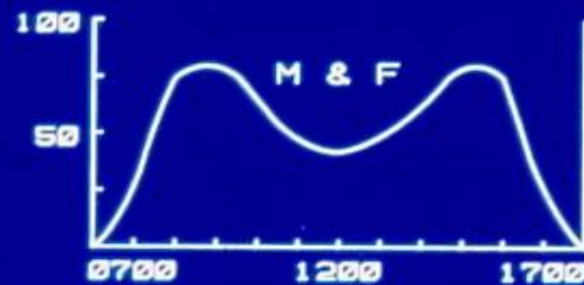




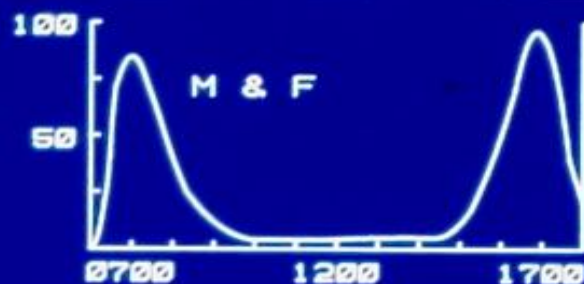




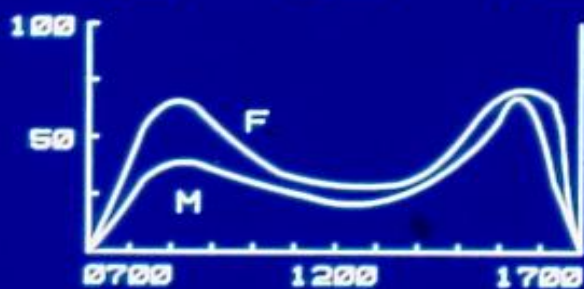
TIME SPENT FEEDING (%)



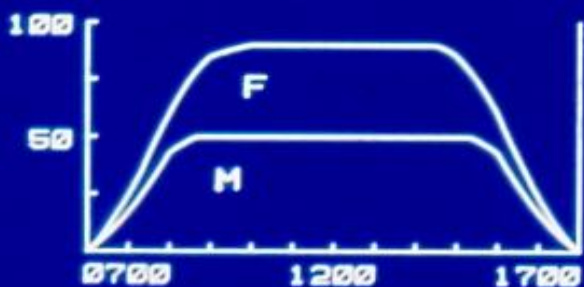
PREALTERNATE
MOLT



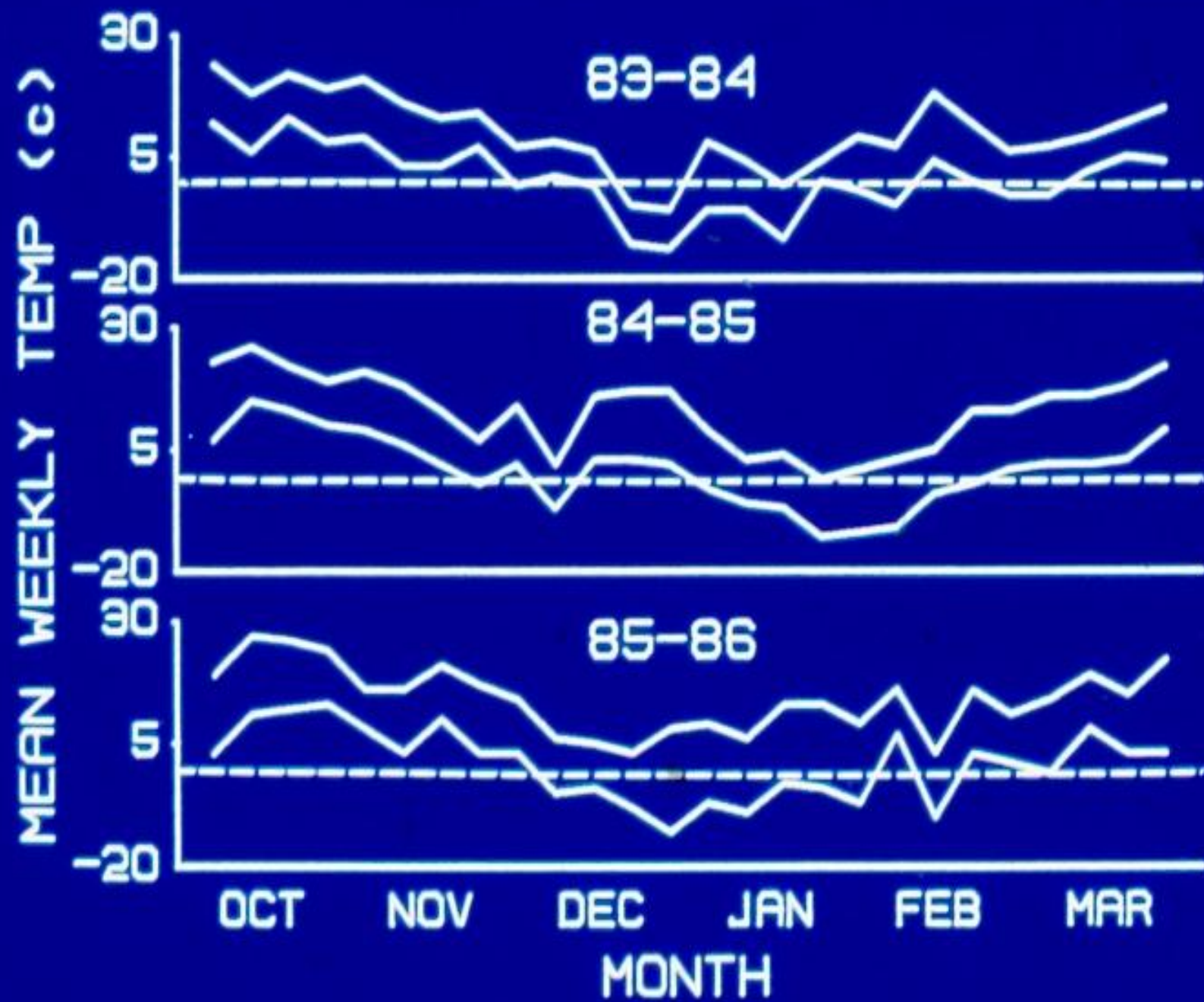
WINTER
PAIRING



EARLY
PREBASIC



MID
PREBASIC



BENEFITS OF FAVORABLE WINTER WATER (HABITAT) CONDITIONS (HEITMEYER 1985, 1988, REINECKE ET AL. 1989)

- Improved Foraging Opportunities
- Better Physical Condition
- Earlier Completion of Annual Events
- Wider Distribution
- Increased Survival and Reproduction