

SUPPLEMENTARY ELECTRONIC MATERIAL

DIFFERENTIAL WATERBIRD POPULATION DYNAMICS
AFTER LONG-TERM PROTECTION: THE INFLUENCE OF
DIET AND HABITAT TYPE

DIFERENTES GRUPOS TAXONÓMICOS DE AVES ACUÁTICAS
RESPONDEN CON DINÁMICAS POBLACIONALES DIFERENTES A
LA PROTECCIÓN A LARGO PLAZO: EL PAPEL DE LA DIETA Y EL
TIPO DE HÁBITAT

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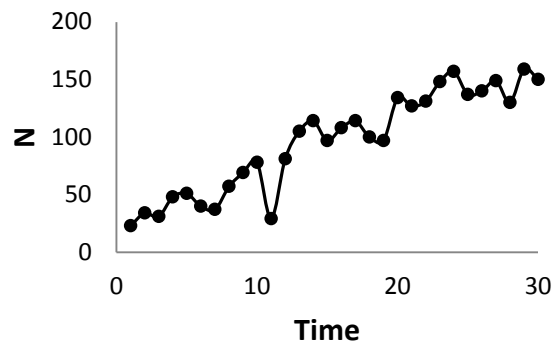
³ Wildlife Service, Generalitat Valenciana, Conselleria d'Agricultura, Medi Ambient,
Canvi Climàtic i Desenvolupament Rural, Ciutat Administrativa 9 d'Octubre, Torre 1,
46018 Valencia, Spain.

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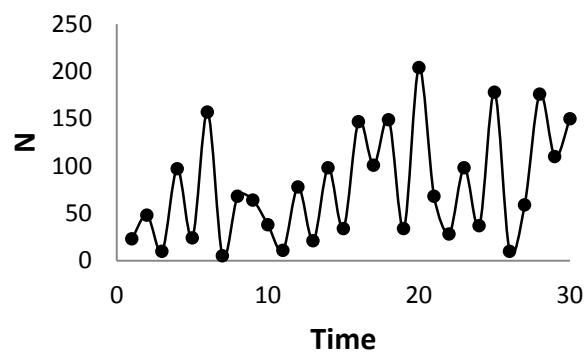
FIG. S1.—A comparison of three hypothetical series of counts (N) over time. Note that all three series start with 23 individuals and end up with 150. The geometric growth rate (λ) is 1.07 in all cases, despite the different abundance trajectories between $t = 1$ and $t = 30$ in the time series of counts. Lambda should only be estimated for exponential growth since it is a component of the discrete exponential growth model $N(t) = N(0) \cdot \lambda^t$

[Comparación de tres hipotéticas series de conteos (N) con el tiempo. Nótese que las 3 series empiezan con 23 individuos y acaban con 150. La tasa geométrica de crecimiento (λ) es 1,07 en todos los casos, a pesar de las diferentes trayectorias de las abundancias entre los tiempos $t = 1$ y $t = 30$ en las series de conteos Lambda sólo se debe estimar para curvas exponenciales ya que es un componente del modelo discreto de crecimiento exponencial $N(t) = N(0) \cdot \lambda^t$]

a)



b)



c)

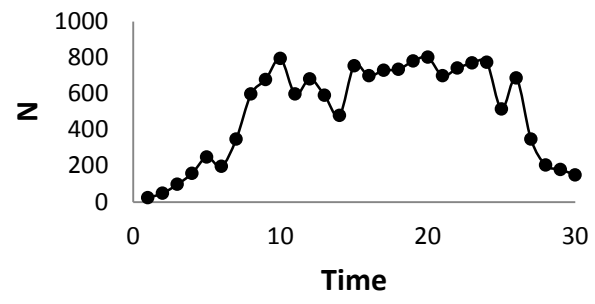


FIG. S2.—Schematic representation of the different stages of the theoretical logistic growth curve used to assign waterbird abundance curves to different classes. The class “fitting the logistic curve” means that the abundance curve roughly corresponds to the whole logistic curve rather than to a particular stage.

[Representación esquemática de los diferentes estadios de la curva de crecimiento logístico empleados para asignar las curvas de abundancia de aves acuáticas a diferentes tipologías. La tipología “ajustándose a la curva logística” significa que las curvas de abundancia corresponden aproximadamente a toda la curva de crecimiento logístico y no sólo a una parte de la misma.]

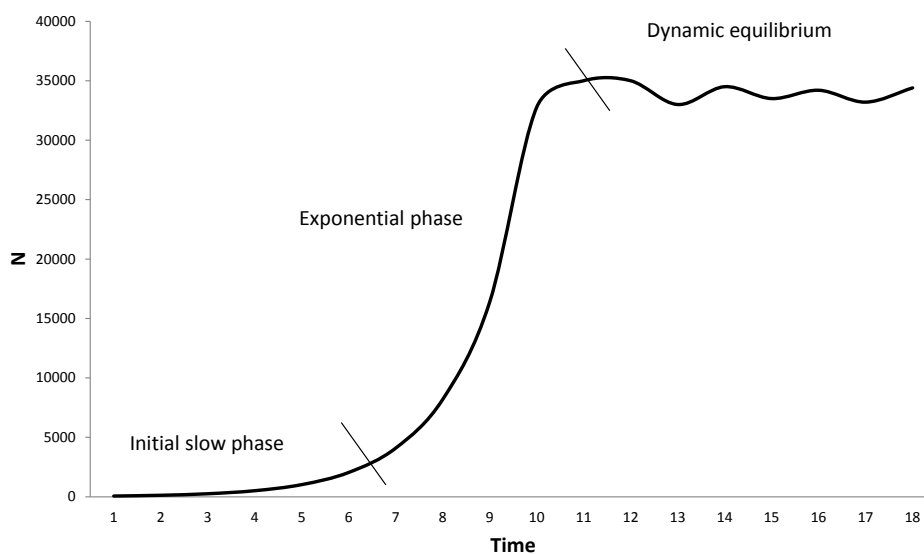


TABLE S1

Degree of fit and deviance explained by the GAM models fitted to abundance data of our study waterbirds during breeding and wintering.

[Grado de ajuste y devianza explicada por los modelos GAM ajustados a los datos de abundancia de las aves acuáticas estudiadas durante la invernada y la época de reproducción.]

A) Breeding

Species	r-sq(adj)	Dev. Expl. (%)
<i>Tachybaptus ruficollis</i>	0.53	62.6
<i>Podiceps cristatus</i>	0.46	61.3
<i>Podiceps nigricollis</i>	0.60	68.6
<i>Ixobrychus minutus</i>	0.59	67.6
<i>Nycticorax nycticorax</i>	0.53	55.8
<i>Ardeola ralloides</i>	0.78	93.7
<i>Bubulcus ibis</i>	0.55	62.1
<i>Egretta garzetta</i>	0.23	28.6
<i>Ardea cinerea</i>	0.05	9.6
<i>Ardea purpurea</i>	0.05	9.6
<i>Plegadis falcinellus</i>	0.99	99.7
<i>Phoenicopterus roseus</i>	0.53	73.7
<i>Tadorna tadorna</i>	0.18	26.8
<i>Anas strepera</i>	0.9	92.4
<i>Anas platyrhynchos</i>	0.55	64.4

<i>Marmaronetta angustirostris</i>	0.79	85.2
<i>Netta rufina</i>	0.38	49.6
<i>Aythya ferina</i>	0.38	49.6
<i>Oxyura leucocephala</i>	0.64	74.4
<i>Porphyrio porphyrio</i>	0.98	99
<i>Fulica cristata</i>	0.85	89.8
<i>Fulica atra</i>	0.85	89.8
<i>Himantopus himantopus</i>	0.76	83.3
<i>Recurvirostra avosetta</i>	0.02	5.7
<i>Glareola pratincola</i>	0.79	83.7
<i>Charadrius dubius</i>	0.90	92.6
<i>Charadrius alexandrinus</i>	0.73	79.3
<i>Chroicocephalus ridibundus</i>	0.83	84.3
<i>Chroicocephalus genei</i>	0.89	90.8
<i>Larus melanocephalus</i>	0.95	96.3
<i>Larus audouinii</i>	0.94	95.3
<i>Gelochelidon nilotica</i>	0.94	95.3
<i>Sterna sandvicensis</i>	0.87	89.2
<i>Sterna hirundo</i>	0.87	89.2
<i>Sternula albifrons</i>	0.43	48.7
<i>Chlydonias hybrida</i>	0.23	29.4

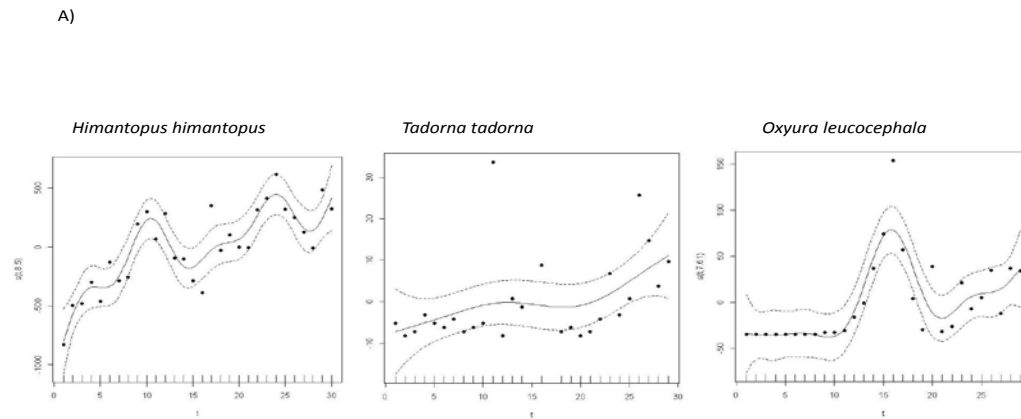
B) Wintering

Species	r-sq(adj)	Dev. Expl. (%)
<i>Tachybaptus ruficollis</i>	0.15	22.7
<i>Podiceps cristatus</i>	0.36	46.0
<i>Podiceps nigricollis</i>	0.69	76.9
<i>Phalacrocorax carbo</i>	0.73	73.9
<i>Bubulcus ibis</i>	0.81	83.8
<i>Egretta garzetta</i>	0.81	83.8
<i>Ardea cinerea</i>	0.73	77.6
<i>Plegadis falcinellus</i>	0.93	99.5
<i>Phoenicopterus roseus</i>	0.30	38.6
<i>Tadorna tadorna</i>	0.82	84.0
<i>Anas penelope</i>	0.12	14.8
<i>Anas crecca</i>	0.26	31.4
<i>Anas platyrhynchos</i>	0.92	93.6
<i>Ana acuta</i>	0.09	13.6
<i>Anas strepera</i>	0.36	45.5
<i>Anas clypeata</i>	0.44	47.9
<i>Netta rufina</i>	0.44	47.9
<i>Aythya ferina</i>	0.27	29.7
<i>Aythya fuligula</i>	0.24	27.0
<i>Oxyura leucocephala</i>	0.24	27.0
<i>Porphyrio porphyrio</i>	0.79	81.9

<i>Fulica atra</i>	0.58	69.9
<i>Himantopus himantopus</i>	0.19	26.0
<i>Recurvirostra avosetta</i>	0.023	1.35
<i>Charadrius alexandrinus</i>	0.51	60.5
<i>Pluvialis apricaria</i>	0.89	92.2
<i>Pluvialis squatarola</i>	0.17	23.2
<i>Vanellus vanellus</i>	0.19	26.0
<i>Calidris minuta</i>	0.21	25.8
<i>Calidris alpina</i>	0.12	14.9
<i>Limosa limosa</i>	6.08	11.2
<i>Chroicocephalus ridibundus</i>	0.17	31.5
<i>Larus fuscus</i>	0.68	69.5
<i>Larus michahellis</i>	0.42	46.4

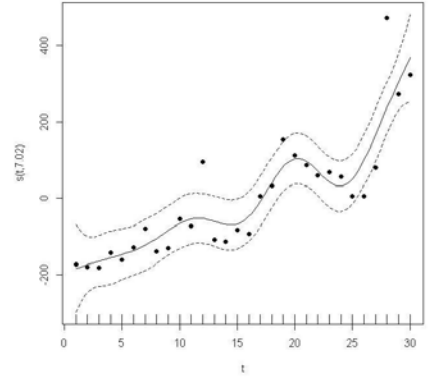
FIG. S3.—Qualitative assignment of breeding waterbird species to the different stages of the logistic growth curve. A) Initial slow phase of growth; B) Exponential Growth; C) Fitting the logistic curve; D) Dynamic equilibrium; E) No trend; F) Decreasing.

[Asignación cualitativa de las especies reproductoras de aves acuáticas a diferentes estadios de la curva de crecimiento logístico. A) Fase inicial de lento crecimiento; B) Crecimiento exponencial; C) Ajustándose a la curva logística; D) Equilibrio dinámico; E) Sin patrón definido; F) Decreciendo.]

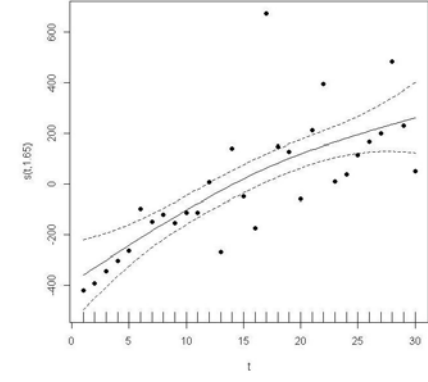


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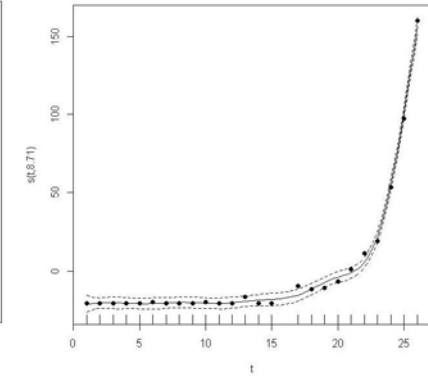
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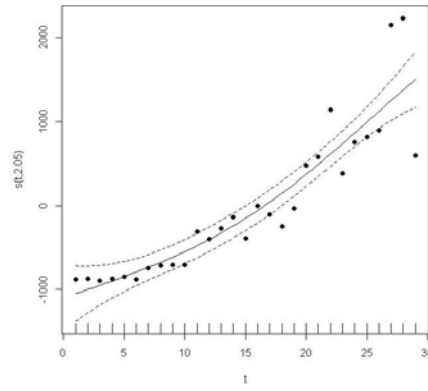
Ardea cinerea



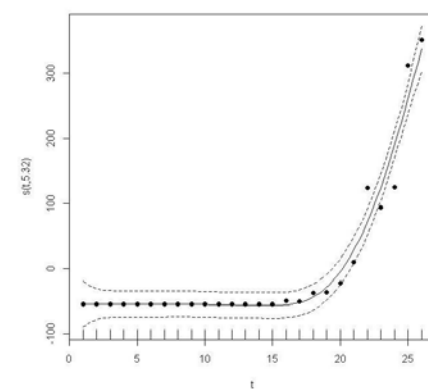
Plegadis falcinellus



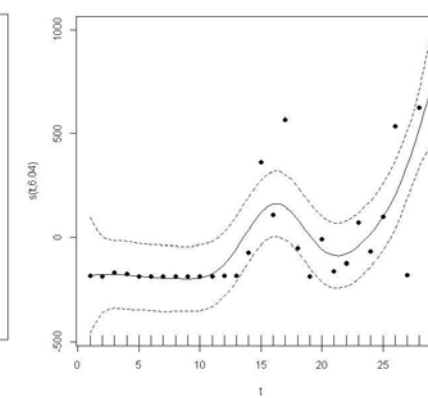
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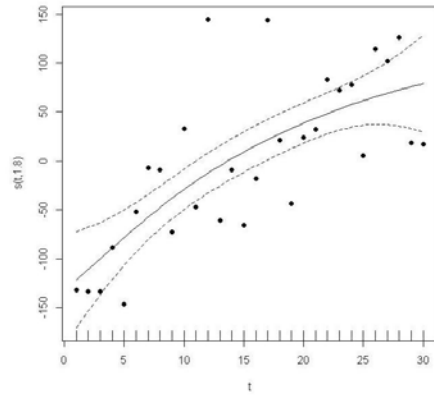
Larus melanocephalus



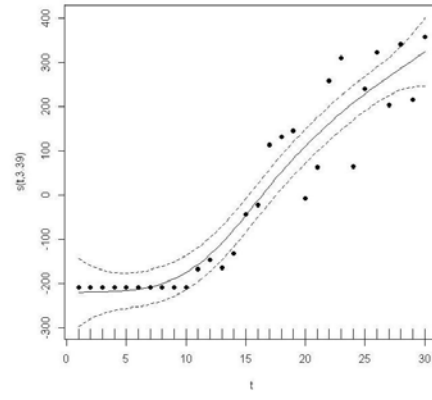
Podiceps nigricollis



Nycticorax nycticorax

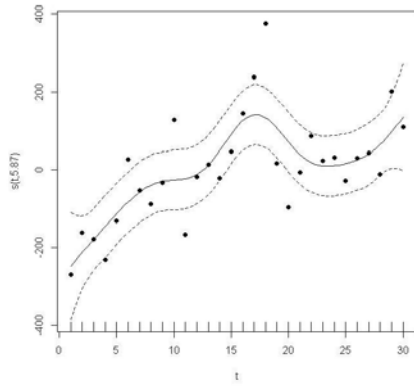


Chroicocephalus genei

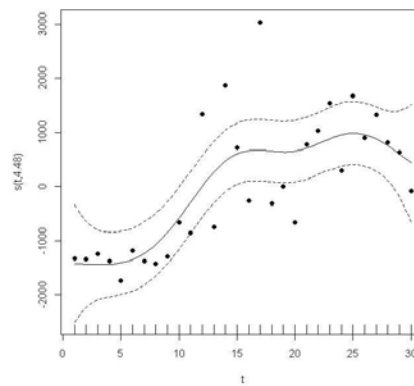


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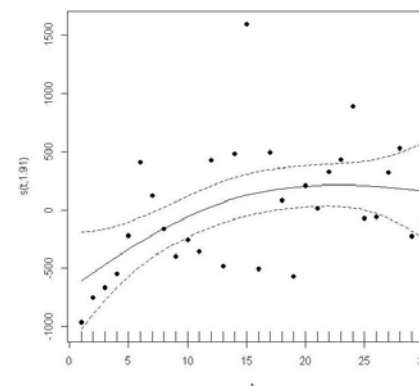
Tachybaptus ruficollis



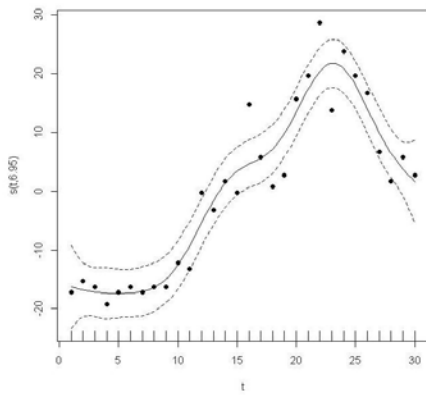
Bubulcus ibis



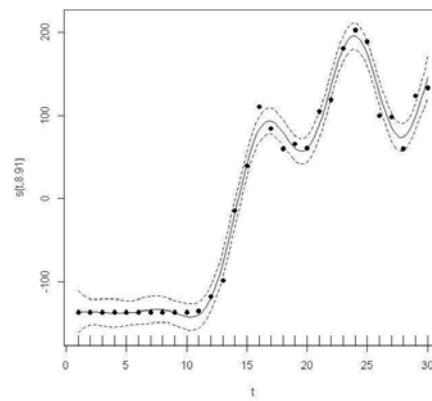
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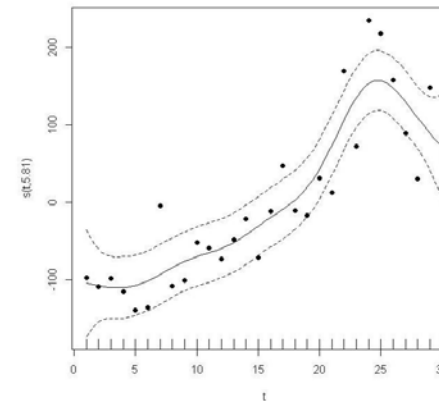
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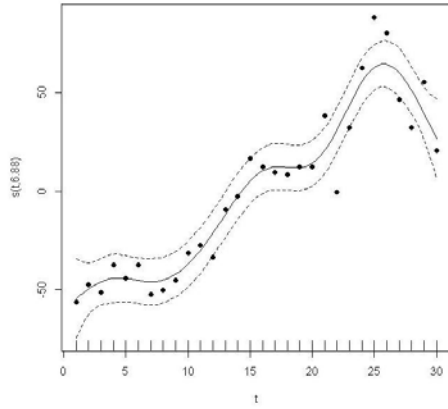
Porphyrio porphyrio



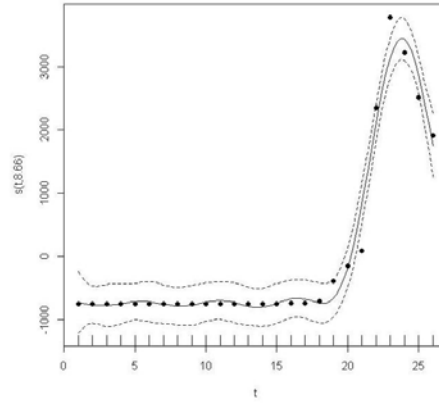
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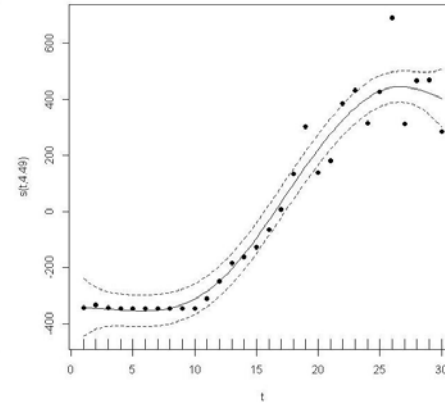
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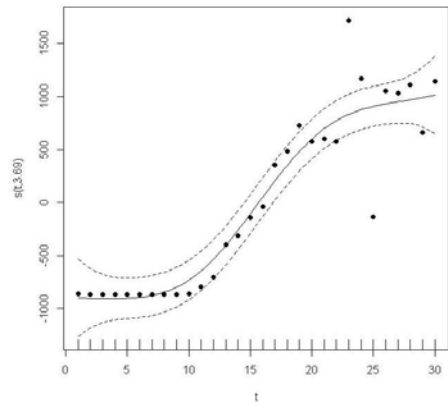
Larus audouinii



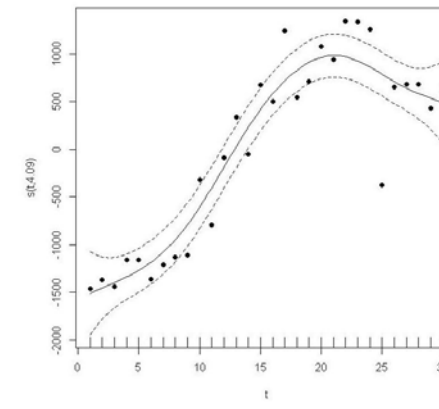
Gelochelidon nilotica



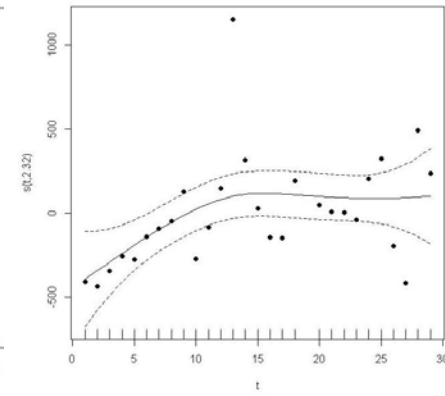
Sterna sandvicensis



Sterna hirundo

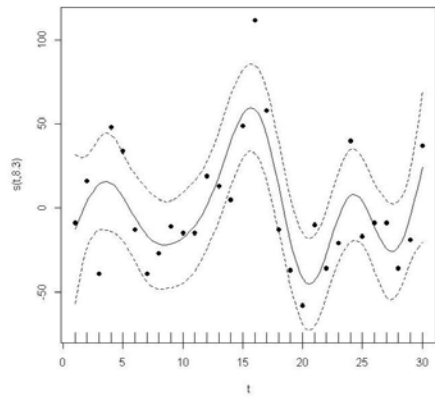


Chlidonias hybrida

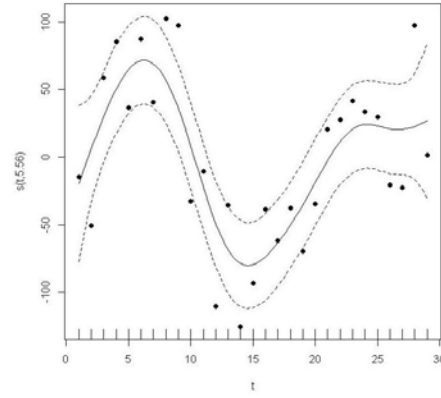


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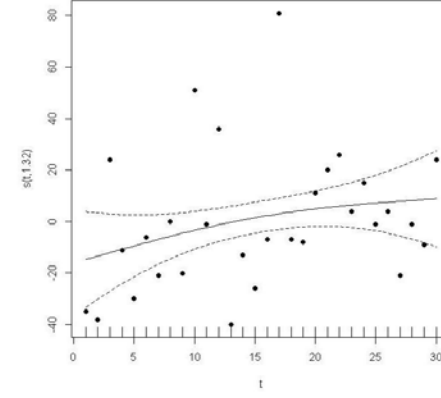
Podiceps cristatus



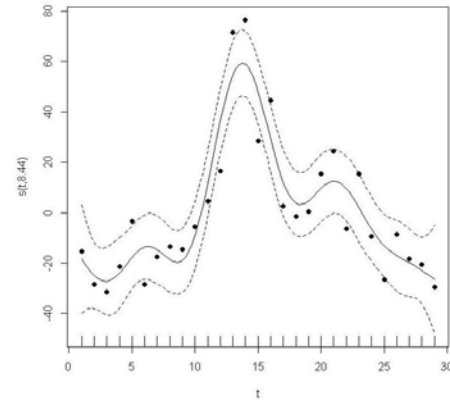
Ixobrychus minutus



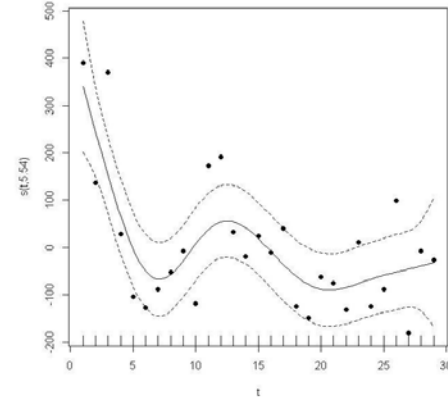
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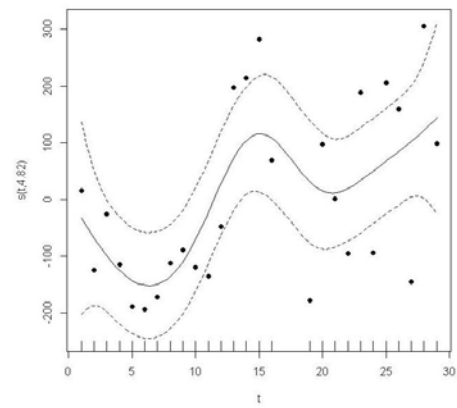
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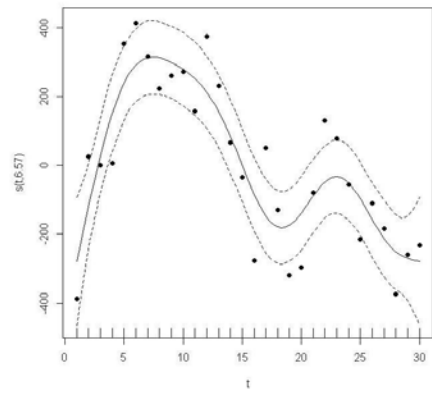
Netta rufina



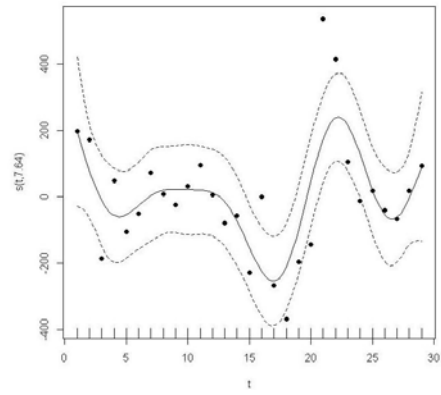
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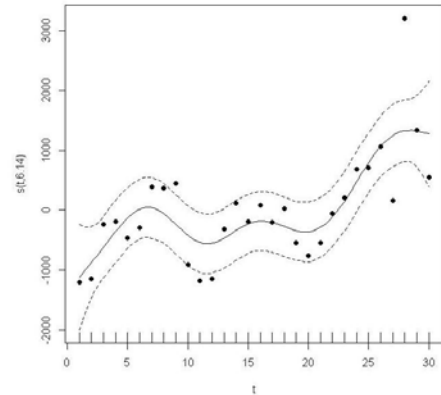
Charadrius alexandrinus



Sternula albifrons

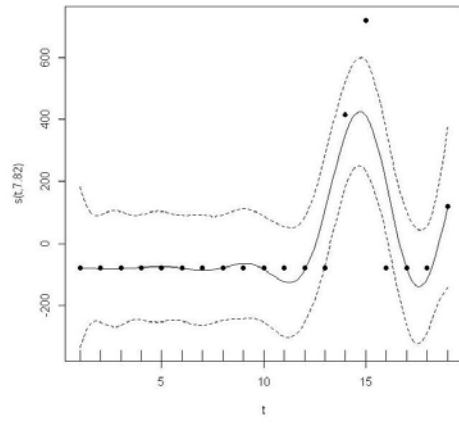


Anas platyrhynchos

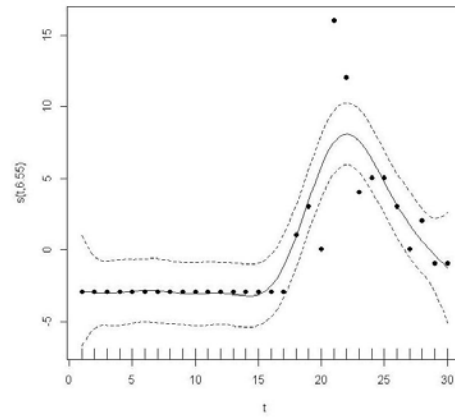


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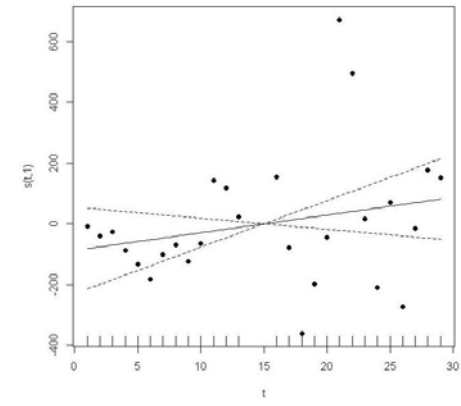
Phoenicopterus roseus



Fulica cristata



Recurvirostra avosetta



F)

Fulica atra

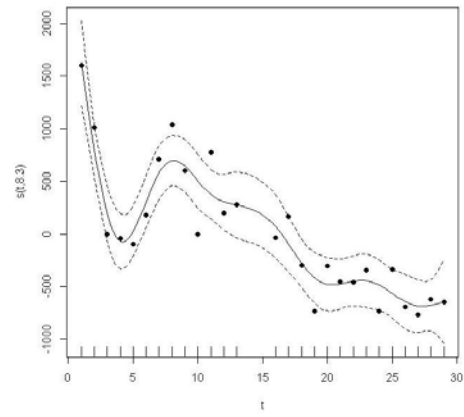
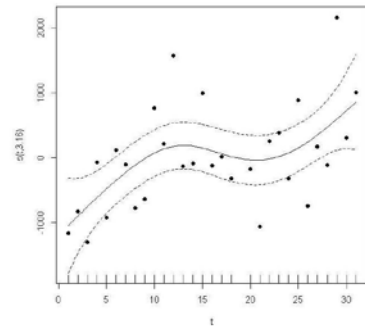


FIG. S4.— Qualitative assignment of wintering waterbird species to different stages of the logistic growth curve. A) Initial slow phase; B) Exponential Growth; C) Fitting the logistic curve; D) Dynamic equilibrium; E) No trend; F) Decreasing

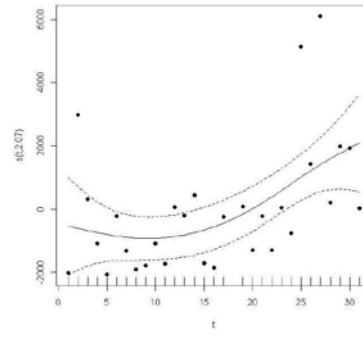
[Asignación cualitativa de las especies invernantes de aves acuáticas a diferentes estadios de la curva de crecimiento logístico. A) Fase inicial de lento crecimiento; B) Crecimiento exponencial; C) Ajustándose a la curva logística; D) Equilibrio dinámico; E) Sin patrón definido; F) Decreciendo.]

A)

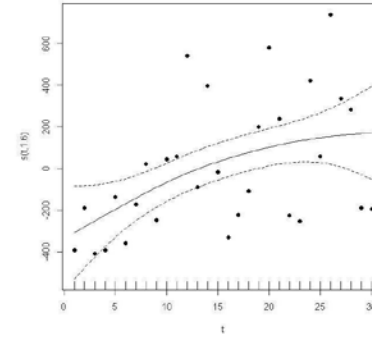
Phoenicopterus roseus



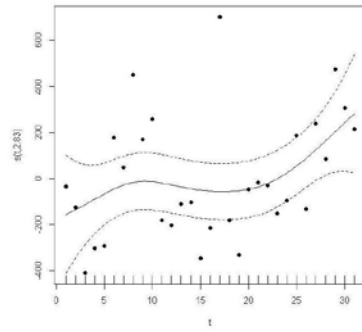
Anas crecca



Calidris minuta

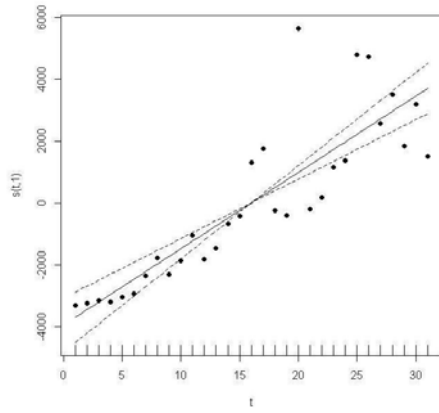


Tachybaptus ruficollis

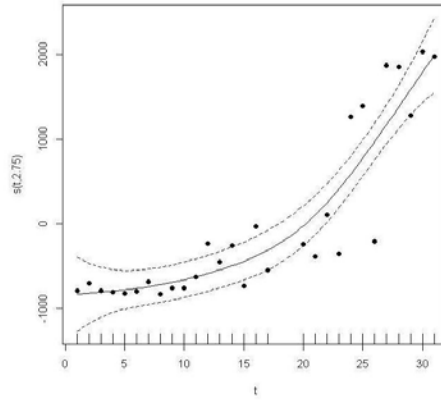


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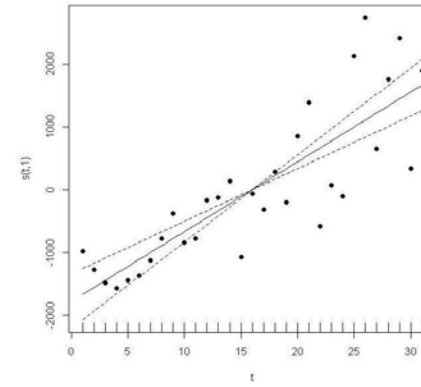
Phalacrocorax carbo



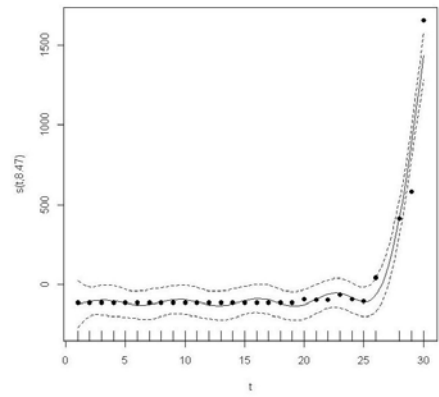
Tadorna tadorna



Larus fuscus

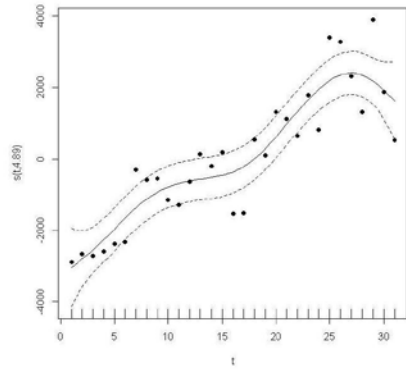


Plegadis falcinellus

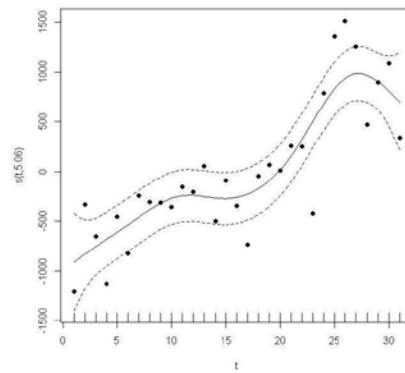


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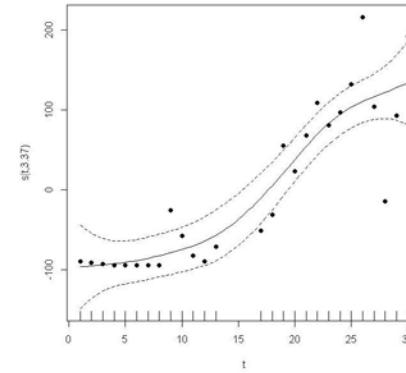
Egretta garzetta



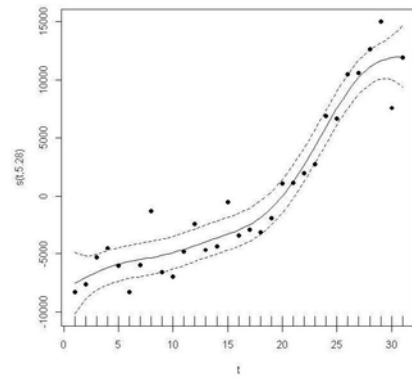
Ardea cinerea



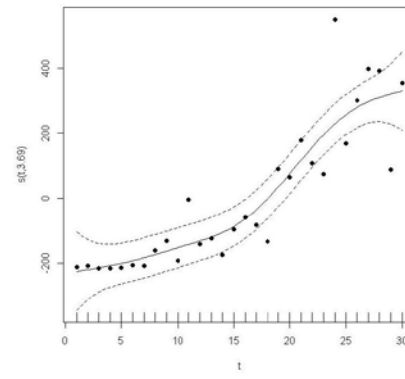
Porphyrio porphyrio



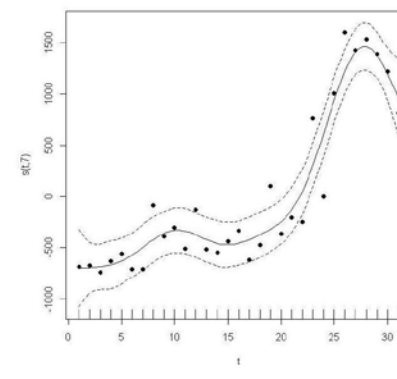
Anas platyrhynchos



Himantopus himantopus

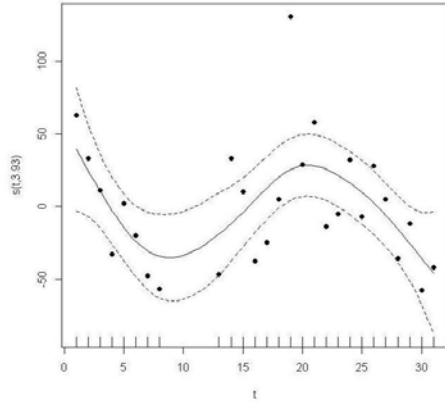


Pluvialis apricaria

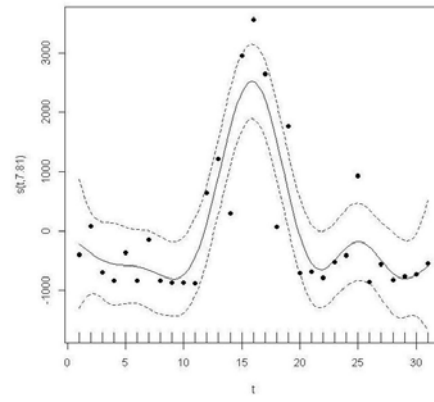


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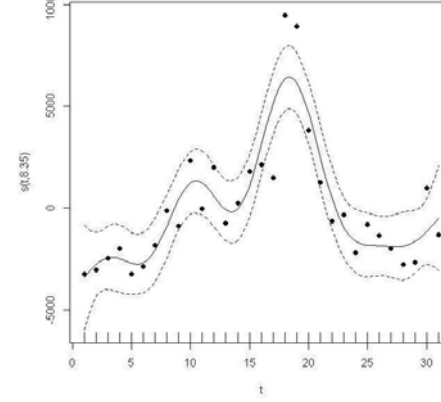
Podiceps cristatus



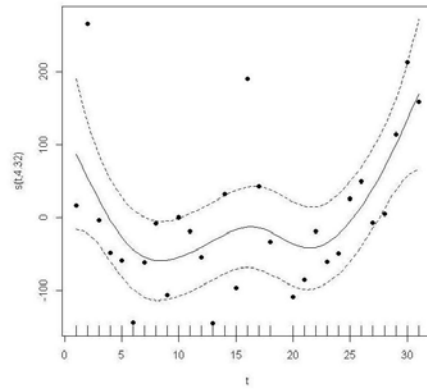
Podiceps nigricollis



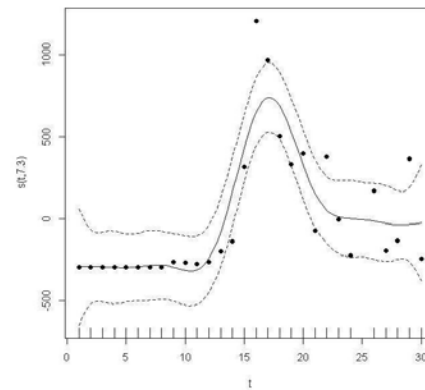
Bubulcus ibis



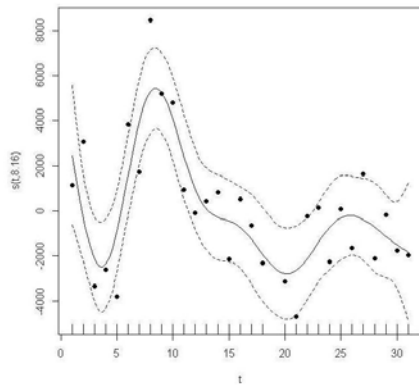
Anas strepera



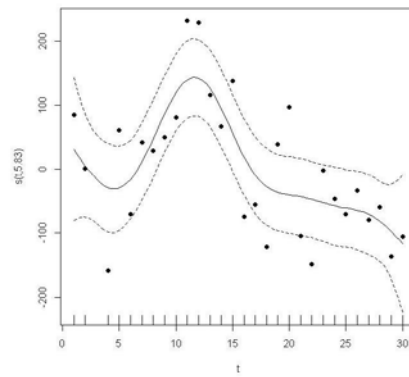
Oxyura leucocephala



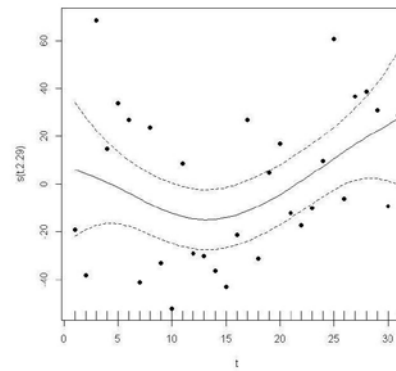
Fulica atra



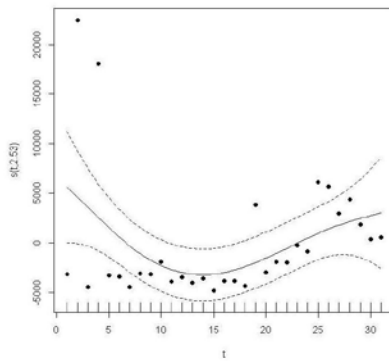
Charadrius alexandrinus



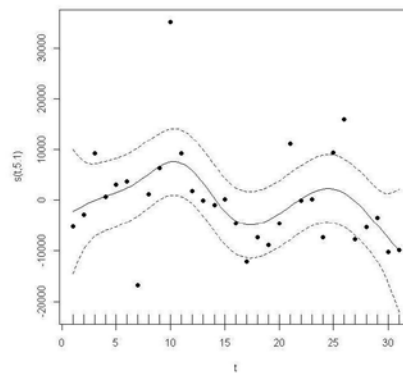
Pluvialis squatarola



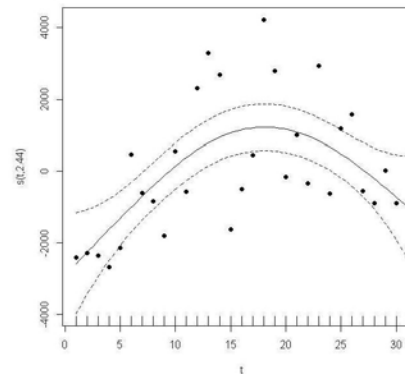
Vanellus vanellus



Chroicocephalus ridibundus

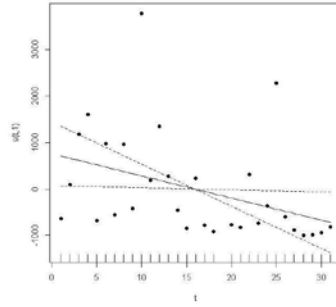


Larus michahellis

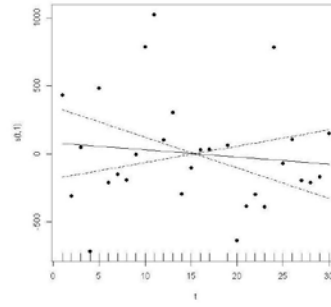


E)

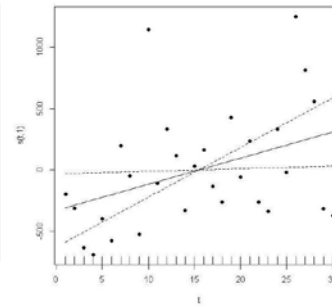
Anas penelope



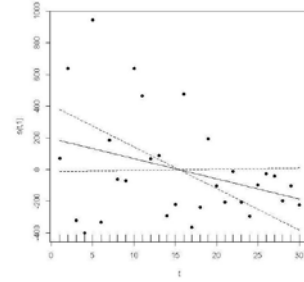
Recurvirostra avosetta



Calidris alpina



Limosa limosa



Anas clypeata

