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Short Commentary

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Variation of Dates of Bird's Spring Arrival in Eastern Europe as a New Ecogeographical Rule

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After three classical zoogeographical rules (Bergman's, Allen's and Gloger's) many other ones became known. Along our studies of bird migrations in Ukraine and nearby countries in Eastern Europe, we paid attention to terms of bird arrival during many years in different locations. Early in the spring, birds can arrive in wide span of terms depending on weather conditions but late migrants arrive at terms that are more definite.

Concerning Eastern European region, we have analyzed many year arrival terms of 18 bird species with statistic methods (Table 1).

Table 1: List of Observed Species, (Number of Locations and Records) Where their First Arrival Observed in Spring in Eastern Europe

No.	Species	Number of locations	Number of records	Regression y = ax + b
1.	White Stork *Ciconia ciconia*	11	179	y = 10,9 – 0,05x
2.	Pied Wagtail *Motacilla alba*	48	765	y = 19,3 – 0,12x
3.	Woodcock Scolopax rusticola	8	86	y = 35,4 – 0,26x
4.	Golden Oriole *Oriolus oriolus*	11	195	y = 9,7 – 0,04x
5.	Rook *Corvus frugilegus*	89	1489	y = 33,9 – 0,31x
6.	Geese *Anser sp.*	48	745	y = 21,4 – 0,14x
7.	Corncrake *Crex crex*	10	150	y = 0,07x – 5,27
8.	Skylark *Alauda arvensis*	103	1635	y = 29,2 – 0,22x
9.	Crane *Grus grus*	43	676	y =22,5 – 0,15x
10.	Cuckoo *Cuculus canorus*	103	1579	y = 8,2 – 0,03x
11.	Chaffinch *Fringilla coelebs*	21	350	y = 13,2 – 0,06x
12.	Mallard *Anas platyrhynchos*	44	630	y = 31,2 – 0,24x
13.	House Martin *Delichon urbica*	17	269	y = 12,7 – 0,06x
14.	Swift *Apus apus*	34	552	y = 12,1 – 0,06x
15.	Swallow *Hirunndo rustica*	85	1302	y = 9,5 – 0,03x
16.	Thrush Nightingale *Luscinia luscinia*	50	852	y = 5,8 – 0,01x
17.	Ducks *Anas sp.*	46	274	y = 26,4 – 0,19x
18.	Starling *Sturnus vulgaris*	86	1602	y = 40,6 – 0,36x
	Total:		13330	

It occurs that size of coefficient of variation of the terms of arrival depends on many year averages date of arrival: early arrival – large variation, late arrival – less variation. The many year average date of arrival depends on the latitude where the observations conducted: early arrival is usual at the South and the late – on the North. In other words, in low latitudes coefficient of variation is higher and in the high latitudes – is low. This regularity is common to all bird species in spite on their migratory status – early or late migrant. To prove this took an early migrant Starling (Fig.1) as an example and put observation points on the map of Eastern Europe. The same action was done with late migrant Swift (Figure 2). For easy understanding the points on the maps were supplied

with symbols C.V.% and average long-term data of arrival.

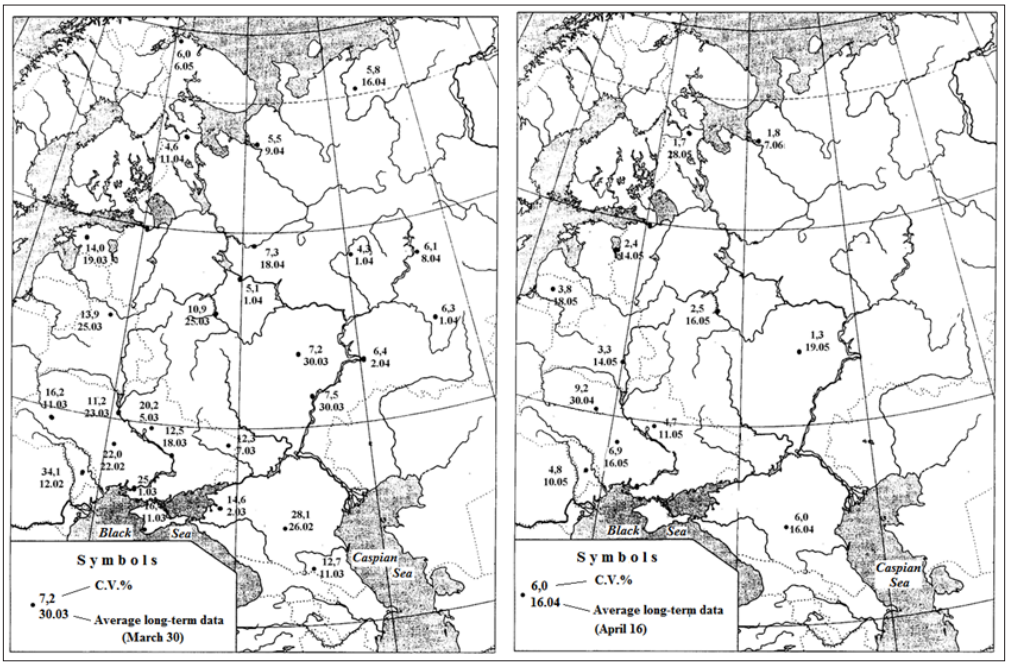

Figure 1: Starling Spring Arrival in Eastern Europe

Figure 1: Swift Spring Arrival in Eastern Europe

In both cases, the tendency of changing C.V. from South to North is evident (Figure 3, 4)

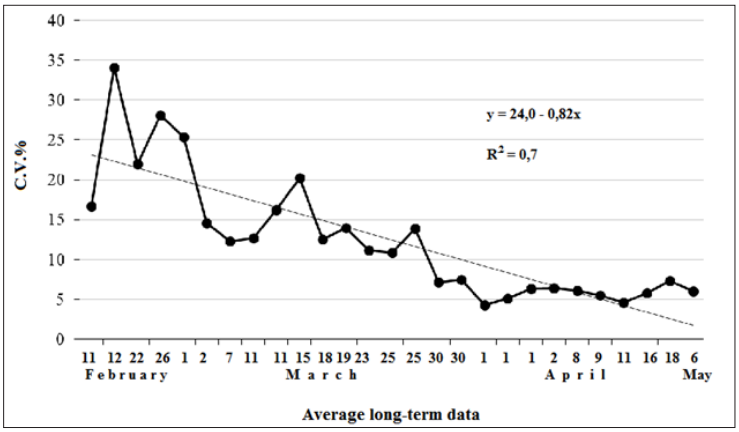

Figure 3: The Tendency of Changing Starling's Coefficient of Variation on its Spring Arrival Data for many Year Observations in Eastern Europe

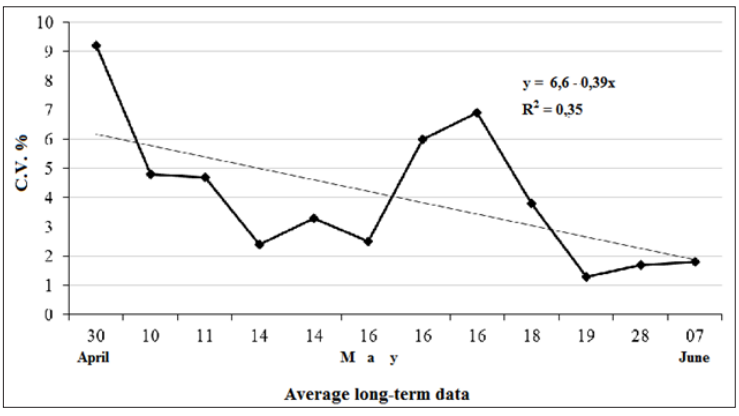

Figure 4: The Tendency of Changing Swift's Coefficient of Variation on its Spring Arrival Data for many Year Observations in Eastern Europe

The rule says that in low latitudes variation of spring arrival is higher than in high latitudes where it is lower in any migratory species in Eastern Europe.

It must be the same with migratory birds in other regions where migrations go from South to North or/and approximately in such direction in the Northern or/and mirroring in Southern Hemisphere.

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