

**MIGRATION OF THE TURTLE DOVE *STREPTOPELIA TURTUR* L.
IN THE REGION OF VOJVODINA (YUGOSLAVIA)**

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ABSTRACT - Since 1965 a mass migration of Turtle Doves has been recorded in Vojvodina, probably as a consequence of the increase in sunflower cultivations.

On the basis of the hunting results from 1971 to 1975, the places of main concentrations and the migration ways in Vojvodina are shown. These are regions of Northern and Central Backa and Northern and South-Eastern Banat. The migrations is more intensive in Backa. A number of over 100.000 migrating Turtle Doves per year is estimated, and the damage to sunflower crops is discussed.

KEY WORDS: Turtle Doves / migration / crop damage.

The region of Vojvodina (Fig. 1) is well-known for intensive migration of birds. It lies on the migratory pathway of birds of the orders Anseriformes, Charadriiformes, and also Passeriformes (Antal *et al.* 1969, Matvejev *et al.* 1972).

The frequency of traditional migrant birds of these orders has however considerably dropped in recent years (Dimitrijevic 1979) thus reflecting the general decline over a large of the Euro-Asian continent (Droz-dov 1967).

At the time when the frequency of most traditional migrants in Vojvodina dropped significantly, a new migrant species appeared there, the Turtle Doves *Streptopelia turtur*, whose frequency far exceeds that of the traditional migrants. According to locally available informations, massive migrations of Turtle Doves were first noted in this area about 1965. These migrations are rather short in duration but quite intensive, especial-

ly in the autumn. Spring migrations take place in late April and early May, and autumn migrations between the second decade of August and the first half of September. While spring migrations are uninterrupted and of rather short duration, autumn migrations are discontinuous and extending over a longer period. In autumn migrations, regular nictemeral displacements were observed between the feeding, watering and roosting places, which are typical for individual migrating "waves" as they pass.

In view of the significance of this phenomenon on the population and ecology of the Turtle Doves, I present here a preliminary analysis of shooting results, which are useful in determining the numbers of migrants, their dispersion, and other relevant factors.

METHODS

Standard ecological methods are not adequate to study the Turtle Doves migration over the entire region of Vojvodina because it takes place simultaneously over a large area; massive concentrations of migrants are usually found in very limited areas which cannot be predicted in advance; the frequency of migrants on microlocalities is so large that it is impossible to assess them even as a rough approximation. In view of these facts, the intensity of migrations is judged indirectly in terms of hunting results. These results can be used as proportional indicators of the frequency and density of populations, and they also enable us to follow geographical changes in migratory pathways.

The validity of hunting result data for these investigations can be measured from the following data: (1) from 90,000 to 120,000 specimens of Turtle Doves get shot in the region of Vojvodina every year; (2) shooting is evenly developed over the entire region, except for the district of southern Banat; (3) the intensity of shooting of this species is not dependent on the quality of the hunting organization; (4) during each shooting season, some 5,000 individual shooting reports become available.

Since shooting is done in territorial units of unequal size (i.e., territories of individual hunting clubs), shooting results are best expressed in terms of shooting density (number of specimens shot per hectare), which provides a uniform measure of the shooting conditions, in view of the already mentioned mass concentrations of this species.

RESULTS AND DISCUSSION

Summary data of shooting density for the years 1971-75 are shown in Fig. 1. The average shooting density for the period 1971-1975 is given in Fig. 2

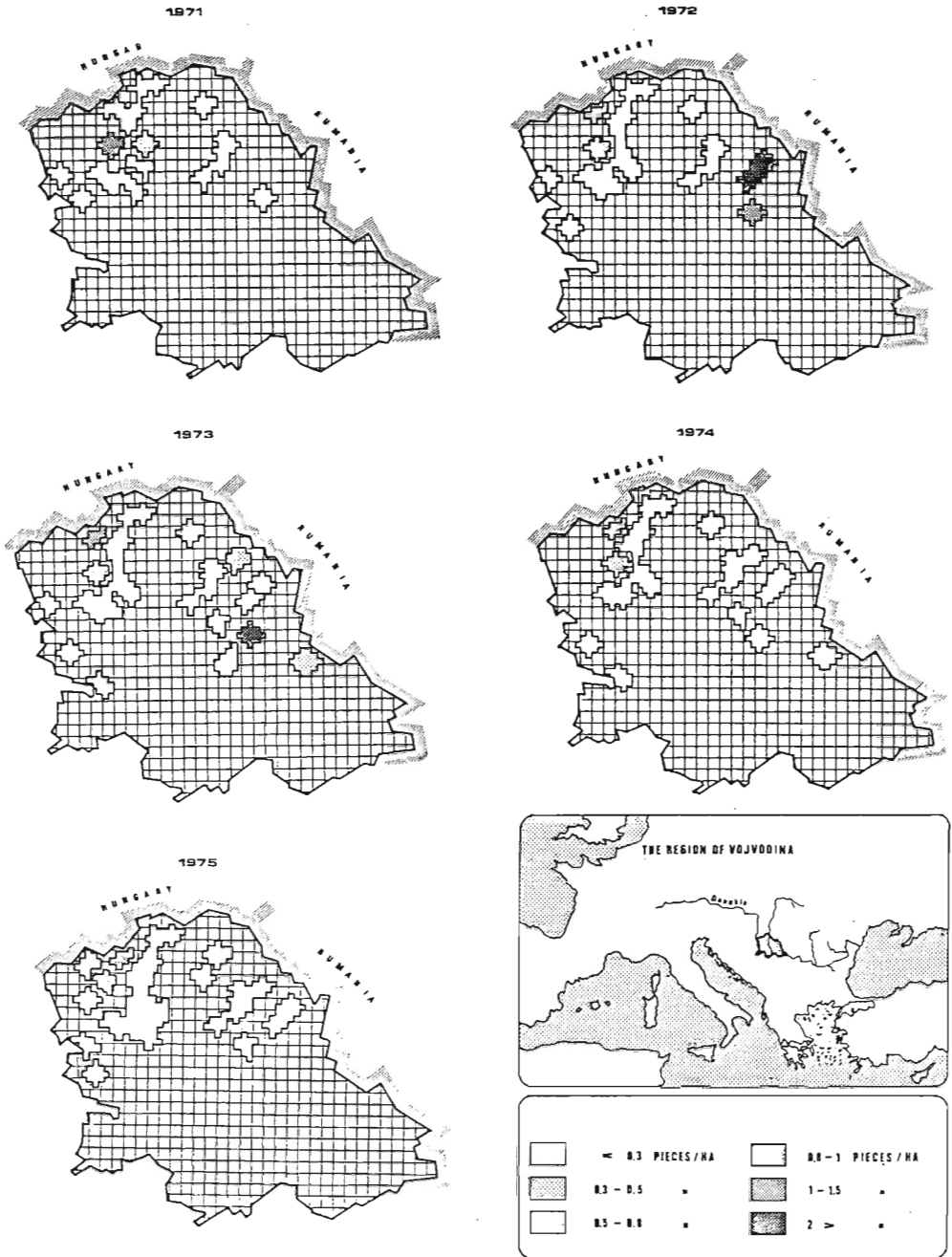


FIGURE 1 - Density of Turtle Doves during migration in Vojvodina, 1971 to 1975, as no. birds shot/ha.

These data enable us to determine the major points of Turtle Doves concentrations during migrations. The areas of highest concentration are those of northern Bačka and northeastern Banat. Except for the year 1972, the concentrations were higher in Bačka. The main lines of migration are Sombor-Subotica, Mokrino-Hetin, and Konak-Šurjan, while the most massive concentrations along these main lines are at Bajmok, S. Miletić, V. Stepa, V. Livade, and Šurjan. At these locations, shooting in absolute number is the highest.

THE PERIOD 1971-1975

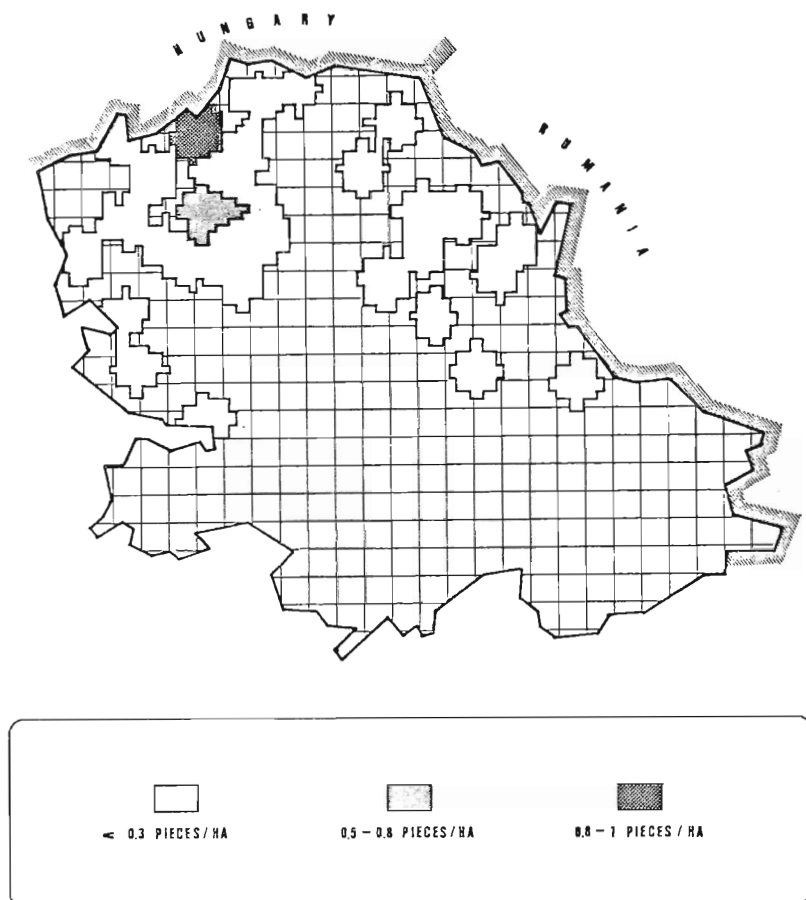


FIGURE 2 - Average density of migrating Turtle Doves, 1971-1975.

Leaving the lines of penetration, the migrating wave of Turtle Doves is in the direction of central Bácska and along the Danube Valley in Bačka, while the movement in Banat is clearly in the direction of the Tisa Valley. Figure 3 shows the lines of migration, with the thickness of the line indicating shooting results in absolute terms. The southernmost line of massive concentration of Turtle Doves is Novi Sad-B. Palanka in Bačka and Zrenjanin-Konak in Banat (Data for southern Banat are not available). It is noteworthy that migratory concentrations are not found to the South of these two lines (i.e. in Srem and western Banat).

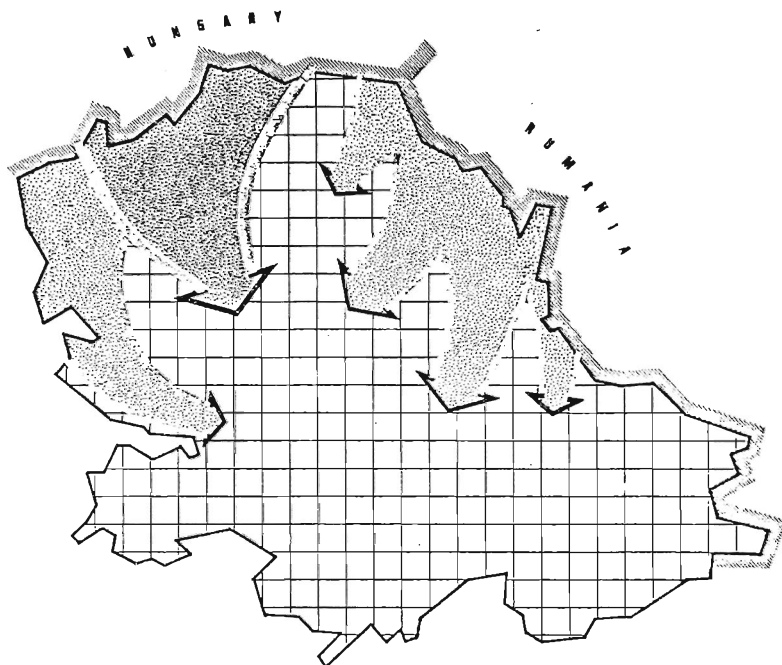


FIGURE 3 - Main directions and intensity of migration of Turtle Doves.

During the autumn migration the physical fitness of the birds improves with time. the first migrants (about 10th August) are distinctly thin, while those shot towards the end of the migrating period are normally well fed, with 5-7 mm of fat. In 1974 and 1975, the flight of Turtle Doves was monitored in the Begej Valley near Žitiste. The birds flew early in the morning, at an altitude of 100-250 metres, in flocks from 15 to 100 birds

(30-40 birds on average). Between 30,000 and 50,000 birds flew over that place in one day.

In the light of all the facts presented here, it may be assumed that Turtle Doves migration over Vojvodina are anthropogenically conditioned, depending on the changes in the composition and availability of sunflower seed, which provides the main source of food for these birds during migrations. Since 1950 sunflower cultivations increased from little patches to 120,000 ha of sunflower plantations per annum. The places of highest migratory concentrations are those in which this particular crop is most widespread.

This formation of new pathways of massive migration produces certain economic problems. Farmers and agricultural estate managers claim that yield of sunflower on plots lying on the lines of massive autumn migrations of Turtle Doves is so drastically reduced that they will be forced to abandon that crop altogether as uneconomical. This is the problem that future research will have to examine with particular care.

Since the absolute numbers of migrant birds are proportional to shooting results, and since 90,000 to 120,000 specimens are shot every year, it is assumed that the number of migrant birds must be over 1,000,000.

RIASSUNTO

MIGRAZIONE DELLA TORTORA *STREPTOPELIA TURTUR* IN VOJVODINA (YUGOSLAVIA)

Nella regione della Vojvodina è stata notata dal 1965 circa, una migrazione in massa di Tortore, insorta probabilmente quale conseguenza delle provocate successioni antropogene, iniziate con l'aumento dei seminativi a girasole. Sulla base dei risultati degli abbattimenti venatori nel periodo 1971-1975 sono stati individuate le zone principali di concentrazione (Fig. 1. Densità di Tortore come numero di catture per ettaro) (Fig. 2. Densità media di Tortore nel periodo 1971-1975) e le vie migratorie nella regione (Fig. 3. Principali direzioni e intensità della migrazione). Si tratta delle zone della Bačka settentrionale e centrale e del Banat settentrionale e sud-orientale. La migrazione è più intensa nelle zone ove è più sviluppata la coltivazione del girasole. Il numero di individui migranti nella regione è stimato ad oltre 1.000.000. Questi migratori danneggiano le coltivazioni di girasole.

RESUME

MIGRATION DE LA TOURTERELLE DES BOIS *STREPTOPELIA TURTUR* DANS LA REGION DE LA VOJVODINA (YUGOSLAVIE)

Dans la Vojvodina, on a remarqué depuis 1965 une migration massive de Tourterelle probablement comme conséquence des successions anthropogènes provoquées par le changement des semailles.

Sur la base des résultats des abattiments de la chasse, dès 1971 à 1975, on est parvenu à identifier les principaux lieux de concentration (Fig. 1. No. oiseaux tués par ha) (Fig. 2. No. moyen 1971-1975) et les routes migratoires dans la région (Fig. 3. Direction et intensité de la migration). Il s'agit des zones de la Bačka septentrionale et centrale et du Banat sud-oriental. La migration est plus intense dans la région où est plus intense la cultivation de tournesols.

On estime à plus d'un million le nombre de Tourterelles migratrices dans la région. Ces migrateurs endommagent les cultivations de tournesols.

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