

“Autumn migration strategies of *Acrocephalus* warblers (Passeriformes) on the south-eastern flyway within the Western Palearctic bird migration system”

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The reed warbler (*Acrocephalus scirpaceus*), sedge warbler (*A. schoenobaenus*) and great reed warbler (*A. arundinaceus*) are common species of passerines associated with reedbeds. They migrate long distances, covering the area between breeding areas in the Western Palearctic and wintering grounds in sub-Saharan Africa. To date, knowledge of the migration strategies of these species has been based on data collected along the western route, i.e. in northern and western Europe and West Africa. In contrast, populations flying the south-eastern (hereafter: eastern) route, i.e. through central and south-eastern Europe and through the eastern part of Africa, have been poorly studied. The eastern and western routes differ, among other things, in the width of the large ecological barriers - the Mediterranean Sea and the Sahara - hence populations travelling along the different routes have to adapt to the different geographical, climatic and habitat conditions encountered along the way. In this dissertation, I analysed material collected in autumn at ten bird ringing stations located along the eastern route from Poland to Egypt. These stations worked as part of the international SEEN network (SE European Bird Migration Network). I focused on analysing data on mass, fatness scale, body condition index and calculating potential flight distances on accumulated energy reserves. Based on the results, I described the fattening strategies of these species along the eastern pathway, also referring to the two large ecological barriers of the Western Palearctic, the Mediterranean Sea and the Sahara Desert. I showed differences in the fattening strategies of closely related species and between adults and juveniles within the species. Juvenile reed warblers migrate through Central Europe to Asia Minor using a short-jumping strategy. In contrast, the majority of juvenile sedge warblers taking off from the northern shores of the Mediterranean could potentially fly not only over this area, but also cross the Sahara without having to replenish reserves along the way. Similar inter-species differences in strategies were described on the western route with the exception that there, sedge warblers accumulated such

high fatness at higher latitudes, i.e. in southern Great Britain and in northern France. Young great reed warblers, on the other hand, migrated across Europe in short steps before increasing their fatness significantly in Turkey. On these reserves they would be able to cross the Sahara without replenishing their reserves along the way, which resembles the migration strategy of juvenile sedge warblers. Comparison of juvenile and adult fat reserves revealed differences in fattening strategies and overcoming ecological barriers between age groups within the species. In all species, juveniles and adults gradually increased their energy reserves on the way south from central Europe, and shortly before crossing the Mediterranean, these reached the values with the greatest disproportion between age groups. In the reed warbler, adult birds had significantly higher fat reserves in Turkey, while juvenile birds had similarly high fat reserves in both age groups. After crossing the Mediterranean Sea and crossing the Sahara, the pattern became more complicated due to, among other things, disparities in the numbers of individuals captured. Nonetheless, it appears that high-fat reed warblers do not stop in north-east Africa, as evidenced by the very sparse numbers of birds captured in Egypt. In contrast, the numerous sedge warblers stopping in the Nile Delta are likely to be individuals that have not accumulated sufficiently high stocks before flying across the Mediterranean, and are using this last abundant site before the Sahara to replenish reserves for the onward leg. In contrast, the reed warblers captured in large numbers at Egyptian stations appear to be continuing their strategy of migrating in short stages across the Sahara, using the natural corridor of the Nile Valley. Interestingly, reed warblers migrating along the eastern route only reached high fatness about a third of the way across the Sahara (about 1000 km south of the Nile Delta). This distinguishes the strategy used by reed warblers flying along the western route, which accumulated high fatness further north in north-west Africa, i.e. even before flying across the Sahara. In contrast, in reed warblers crossing the Sahara in spring, fatness distributions were similar at stations along the Nile Valley. This suggests a strategy of short-distance migration as far as the Nile Delta, where the birds probably only accumulate a sufficiently high fatness for their flight across

the Mediterranean. In summary, based on the results obtained, it can be concluded that the general picture of the migration strategies of sedge and reed warbler along the eastern and western routes is roughly similar, but the routes differ in the stage at which the eastern and western populations of these species accumulate high fat reserves needed to cross the Sahara. For the reed warbler, on the other hand, the results obtained were the basis for describing a fattening strategy for the first time in the literature.