= Passer predomesticus =

Passer predomesticus is a fossil passerine bird in the sparrow family Passeridae . First described in 1962 , it is known from two premaxillary (upper jaw) bones found in a Middle Pleistocene layer of the Oumm @-@ Qatafa cave in Palestine . The premaxillaries resemble those of the house and Spanish sparrows , but differ in having a deep groove instead of a crest on the lower side . Israeli palaeontologist Eitan Tchernov , who described the species , and others have considered it to be close to the ancestor of the house and Spanish sparrows , but molecular data point to an earlier origin of modern sparrow species . Occurring in a climate Tchernov described as similar to but rainier than that in Palestine today , it was considered by Tchernov as a " wild " ancestor of the modern sparrows which have a commensal association with humans , although its presence in Oumm @-@ Qatafa cave may indicate that it was associated with humans .

= = Taxonomy = =

The known material of Passer predomesticus consists of two premaxillary bones in the collections of the Hebrew University of Jerusalem . The bones were described by Israeli palaeontologist Eitan Tchernov in 1962 and reviewed by South African zoologist Miles Markus two years later . Tchernov did not unambiguously identify a type specimen and his paper was said by Robert M. Mengel , the editor of The Auk , to contain " many troublesome lapses and contradictions " . In 1975 , French palaeontologist Cécile Mourer @-@ Chauviré reported on fossil sparrows from a cave at Saint @-@ Estève @-@ Janson in southeastern France , which could not be identified as either P. predomesticus or the house sparrow (Passer domesticus) . Because no premaxillae were found , the bones could not be distinguished from those of the house sparrow .

Tchernov argued that the house sparrow and related species have undergone considerable morphological changes in adapting to a commensal relationship with humans , with the beak becoming longer and narrower . He wrote that P. predomesticus was intermediate between the house sparrow and Spanish sparrow (Passer hispaniolensis) , and suggested that it may be a primitive relative of the ancestor of the house sparrow that did not become dependent on humans . In a 1984 paper , Tchernov suggested that the period in which the house sparrow and P. predomesticus could have separated was the Würm glaciation 70 @,@ 000 ? 10 @,@ 000 years ago . Markus found that the fossil species was closest to living house sparrows from Palestine and to the great sparrow (P. motitensis) , and proposed that the house sparrow evolved in Africa . In a 1977 account of the evolution of the house sparrow , American zoologists Richard F. Johnston and William J. Klitz considered that the house sparrow evolved with the beginning of agriculture , dating any fossils that could even be assigned to the common ancestor of the house and Spanish sparrows as more recent than P. predomesticus . In his 1988 work The Sparrows , British ornithologist J. Denis Summers @-@ Smith considered that P. predomesticus was roughly contemporary with the common ancestor of the house and Spanish sparrows and that all present @-@ day Palaearctic Passer species evolved later . Drawing on more recent studies of molecular data , Ted R. Anderson stated in his 2006 Biology of the Ubiquitous House Sparrow that all Passer species have a long evolutionary history , with speciation possibly occurring as early as the Miocene .

= = Description = =

Premaxillae , the only bones from which Passer predomesticus is known , are generally relatively easy to determine in birds . Tchernov found that the two premaxillae of P. predomesticus most closely resembled the house and Spanish sparrows , but were distinct from either . In P. predomesticus , there is a central , longitudinal groove with raised margins running along the lower (ventral) side of the premaxilla . In contrast , the house and Spanish sparrows have a narrow crest in this position , which is more prominent in the house sparrow . In the great sparrow , Cape sparrow (Passer melanurus) , and southern grey @-@ headed sparrow (Passer diffusus) , this crest is more poorly developed , and they may even have a shallow groove at the front of the premaxilla , not

nearly as well @-@ developed as the groove in P. predomesticus . In P. predomesticus , the premaxilla has a maximum width of 8 @.@ 0 millimetres (0 @.@ 31 in) and the length from the tip of the premaxilla to the back of the nasal bones is 12 @.@ 0 millimetres (0 @.@ 47 in) .

= = Distribution = =

According to Tchernov 's 1962 paper , Passer predomesticus was found in the middle Acheulean (middle Pleistocene , probably more than 400 @,@ 000 years old) layer E1 of the Oumm @-@ Qatafa cave in Wadi Khareitoun near Bethlehem . In 1984 , however , Tchernov wrote that P. predomesticus was about 140 @,@ 000 years old , from the Yabrudian . Layer E1 contained remains of about 40 bird species , including a premaxilla Tchernov described as a precursor of the Dead Sea sparrow (Passer moabiticus) and a tarsometatarsus and humerus tentatively allied with the house sparrow . An undetermined Acheulean layer of the same cave also contained fossils Tchernov described as precursors of both the house and Spanish sparrows .

Although interpretations of the palaeoclimate at Oumm @-@ Qatafa have differed , Tchernov suggested that the deposits are from a Mediterranean climate , although one rainier than that today . Tchernov considered P. predomesticus a " wild " sparrow , but Anderson considered that the occurrence of P. predomesticus and the other Passer fossils in Oumm @-@ Qatafa indicates that these species lived in association with early Palaeolithic humans .