UNIVERSITI PUTRA MALAYSIA

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By

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DEDICATED TO MY BELOVED:

Father, Mother, Wife, Sisters, Brothers, Muataz & Ahmed .

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ABSTRACT

The purpose of the study is to determine Brown Shrike (*Lanius cristatus*) population size at grassland area of University Putra Malaysia. Transect survey method was employed for the data collection. Altogether five lines were established in the study area. Each line was surveyed for three days – two surveys for each day (in the morning and afternoon). Distance Version 2.2 software which was originally developed to allow comprehensive analysis of distance sampling data was used for the estimation of Brown Shrike density. The results of the observation during the days of sampling, shows that the density estimates of Brown Shrike is in the range of 0.35 – 0.81 birds per hectare. The population size in the 258.06 hectares UPM grassland is ranging from 131.6 – 209.3 birds. The population of Brown Shrike in the study area was considerably high compared to other areas in different part of Asia.

CHAPTER ONE

Introduction:

Since birds are largely diurnal creatures and share with us the familiar day-time world of color and sound, our association with them is, not surprisingly, a long and intimate one. Man has always had a double interest in birds-on the one hand aesthetic, personal, impractical and on the other, utilitarian. The later has changed with the times and with the sum of human knowledge. Long ago, when superstitions and priestly cults were the "science" of the day, the flights of birds were carefully studied for omens, as were their entrails. For centuries man tried to probe the mysteries of flight. Although he never succeeded in duplicating the effortless, endlessly flexible aerial mastery possessed by birds, he does share the air with them today. That leads inevitably to the problems of navigation and space travel, and we find ourselves turning to the birds again for evidence is accumulating that they chart their courses, during migration, by the sun and stars. Will we learn anything about navigation from them ? Conceivably, although it is likely that we will succeed only in developing something which, in comparison to the way the birds do it, will turn out to be as crude and expensive and inflexible as a propeller – driven plane when compared to a feathered wing .

Birds have helped men for thousands of years, from the geese whose warming cries saved Rome to the canaries that were used to warm coal miners of methane-gas leakage. From research currently under way, there is some reason to believe that birds may continue to provide this kind of life-saving service by warming us that the doses of chemicals and radioactive particles that we eat, drink, breath and absorb day after day may be reaching dangerous levels. Truly, birds touch us in unexpected places. They are far more to us than ducks and pheasants to be short, or chickadees and cardinals to brighten a suburban winter (Dean Amandon, 1986) .

CHAPTER TWO

2.1 Literature Review

2.1.1 Grassland Birds

Most birds are diurnal creates, as are humans. We can not help but notice their song, their antic, their spectacular color and their delicate plumage. Certainly, the main reason we study birds is because we are attracted by their beauty. In addition to their aesthetic value, birds are ideal subject for scientific studies which has on the whole passed beyond the observation / descriptive stage and has arrived at the experiments / hypothesis testing stage. Pioneering and significant contribution to many aspects of biology have been based on bird studies (Lieth and Werger, 1989) .

There are about 638 bird species in Peninsular Malaysia and Singapore which come from 78 families (Strange and Jayarjasingam, 1993).
species, 426 are classified as resident and the rest as passage migrants, winter visitors, such as Brown Shrike (*Lanius cristatus*).

Climate does have a direct influence on birds survival, especially on tender young, mainly through its extremes in temperature and rainfall. Perhaps the best evidence of climatic control of bird population is the facts that long – range gradual changes in mean annual temperature are paralleled by the gradual extensionor regression in the geographical ranges of many species (Welty and Babtista, 1988).

Microclimatic condition may also influence the species can exist in a particular area (Karr, 1983).

and humidity. Light intensity also influence the bird species distribution. According to Johns (1983), light plays an important role in determining the population of bird species in the shade and exposed environment.

Zakaria (1994) cited that diversity of birds in the tropic may be related to the physical structure of the environment. The pattern of resource availability may also affect bird species diversity (Karr 1971b, 1975, 1976, Orians 1969).

factors that may determine species diversity is seasonal microclimatic variation (Pomery 1987, Soule et al. 1980). Thus, distribution of any of these three factors may affect bird population.

Most grassland birds have been declining at alarming rate (Jhonson & Schwartz 1993). Factors responsible for decline of grassland bird populations are not entirely understood (Knopf 1994), but are believed to be a combination of loss and degradation of grassland habitat (Askins 1993, Herkert 1994); reproductive failure because of high rates of nest predation and parasitism (Jhonson and Tample 1986 , 1990), and shifts in agricultural practices, such as earlier and more frequent cutting of hayfield that make these species more susceptible to nest failure and other problems (Warner & Etter 1989) .

Most grassland birds have been constantly declining since the BBS (North American Breeding Bird Survey) was initiated in 1966, and were probably declining during the decades preceding the BBS. Factors responsible for this decline include the destruction of suitable habitats as well as increased mowing of remaining grassland for hay production (Reynolds, 1994).

There has been a dramatic drop in Illinois grassland bird population over that last half century, with some species now on the critical list. This is due in a large part to major change in agriculture. According to Angelo Capparella, some of the lands get mowed before the young birds can leave. A lot of grassland bird habitat has simply been lost to row crop agriculture (Jome, 1998).

As the quantity of grassland habitat declined in the Midwest in USA, an increasing proportion was present in small, isolated patches (Samson 1980, Harkert 1991). Although the impact of habitat fragmentation has not been as well as studied in grassland birds as in forest birds (Askins, 1993) .

Loss of habitat is usually considered to be the major factor contributing to wildlife population declines and is generally considered to be the greatest threat to present day wildlife populations. If wildlife has no place to rise young successfully, feed, and survive hardships, their populations cannot be maintained. For several species of birds, habitat loss is widely suspected to be a major factor behind current population declines .

There is evidence that many grassland birds require a minimum area of contiguous habitat. In a study of 14 tallgrass prairies (0.5 – 510 hectare) in Missouri(USA), Samaon (1980) found that garsshopper sparrows occurred in <30% of prairies <10 ha and that upland sandpipers and Henslow's sparrows were absent from prairies <10 ha. Herket (1991) surveyed birds in 24 grasslands (0.5 – 650 ha) in Illinois. Twelve sites were tallgrass prairies remnants, 4 were restored prairies, and 8 were coll–season grass stand. The density of grassland –dependent birds was significantly lower in smaller than larger tracts. Small grasslands (<30 ha) were dominated by habitat generalists, including edge species .

Renken and Dinsmore (1987) and Herkert (1994a,b) recommended a rotational system of management (mowed, grazed, or burned) on a regular rotation schedule. Such a rotation schedule would provide a diversity of habitats within a grassland each year and ensure the availability of suitable cover for birds at both ends of the management spectrum .

During the last quarter of a century, endemic bird species of the North American grassland have shown steeper, more consistent, and more geographical widespread declines than any other behavioral or ecological group, including neotropical migrants (Droege and Sauer 1993, Knopf 1994). From 1966 through 1991, populations of 83% of native grassland species declined ; 10 of these 32 grassland species had statistically significant declines averaging 3.5% per year .

Reproductive success is a better measure of habitat quality than use or abundance (Van Horne, 1983). A major reason many grassland bird species are declining may be an inability to raise young (Johnso and Temple, 1990). In fragmented landscapes, high rates of nest predation and nest parasitism by brown–headed cowbirds significantly reduce the ability of many avian species to successfully reproduce. Although few studies related grassland area to reproductive success, there is evidence that grassland birds have lower reproductive rates in habitat islands than in large habitat blocks. Wray et al. (1982) reported a high rate of nest predation (43 % of 185 nests) for 4 sparrow species on a 42 hectares reclaimed surface mine in West Virginia. The high predation rate was attributed to the close proximity of forest and pasture. Johnosn and Temple (1986, 1990) compared reproductive success of 5 species of grassland birds between large (130 – 486 ha) and small (16 – 32 ha) grasslands in Minnesota. Birds nesting in small tracts experienced higher nest predation rates than those in large grasslands, and both nest predation rates and parasitism were higher in grasslands with woody edges. Grassland birds that nested < 45 m from a forest edge had lower reproductive success than those that nested farther away .

Management implications include the acquisition of large grassland tracts and minimization of edges effects through reduction of woody along edges and within grasslands (Wines 1963; Wray et al. 1982; Johnson and Temple 1986, 1990; Burger et al. 1994).
herbicides, or chemical means on habitat use, nesting density, and reproductive success of grassland– nesting birds most be examined (Askins, 1993) .

Management strategies to benefit grassland birds center on protecting or establishing large, contiguous grassland tracts, maintaining structurally diverse habitat, eliminating catastrophic midseason mowing, reducing edge, and eliminating or controlling woody encroachment (Herkert, 1991).
and Vickery et al. (1994) believed that large grasslands were necessary to support a diverse grassland avifauna as small grasslands were dominated by habitat generalists and, thus, were of little conservation value to most grassland birds. Herkert et al. (1993) recommended that grassland restorations aimed at benefiting bird species most sensitive to habitat fragmentation be > / = 50 ha, preferably >100 ha. Small grasslands (<30 ha) benefit grassland birds with a moderate or low sensitivity to habitat fragmentation. Where grassland restorations > / = 30 ha are not possible, Herkert et al. (1993) recommended establishing several small grasslands, 6 – 8 ha

minimum size, within 0.4 – km of each other, and using adjacent grassland habitats (e.g. , pastures, hayfields, waterways) as corridors between tracts .

In the absence of management (mowing, grazing, or burning) grassland vegetative productivity declines and extensive invasion of woody plants occurs (Bragg, 1982, Hulbert, 1986). These factors lead to the rapid transformation of grassland into Savannah or forest. Despite the widespread use of mowing, grazing, and burning as management techniques, their effects on breeding bird communities inhabiting midwestern grasslands are poorly understood (Herket, 1991) .

Recent declines in grassland avifauna have corresponded with dramatic shifts in agricultural land use (Herkert, 1991 and Knopf, 1994). Modern agricultural practices have resulted in a shift from small grains to row crops, large farm and field sizes, decreased landscape and crop diversity, increased use of pesticides and other agricultural chemicals, and declines in acreage devoted to pasture and hay (Farris and Cole, 1981). In Ohio, < 0.5 % the state's original 2.591 km square of native tallgrass prairie remains (Troutman et al. 1979, Hands et al. 1989). Additionally, the amount of secondary grassland habitat (pastures and hayfields) has recently declined. Since 1950, pasture acreage declined 61% and hayfield acreage declined 46% in glaciated Ohio (U.S. Dep. Of Commer. 1984, Oh. Agric. Statistics Serv. 1989). This extensive loss of native and secondary grassland habitats and the present intensity of rowcrop agriculture probably ranks grassland habitat the most highly fragmented and endangered ecosystem in the midwestern United States (Herkert, 1994).

2.1.2 Brown Shrike :

According to Lord Medway (1970) the earliest observations each year in different parts of Southeast Asia indicate that the southward migratory journey is relatively rapid. In Malaya, migrants arrive from the first week of September to the third week of October. At a lowland netting station during 1964-68 a major part of the total catch was taken in the months of September and October. Only a small proportion of these early shrikes wintered in the netting area. No distant recoveries were reported, and the subsequent movements of birds that were not retrapped are unknown.

A ringing study of the migratory Brown Shrike in west Malaysia shown that the proportion of returns after one year was 11%, and after two years 1% only. Most returning birds were present in the netting area during the latter part of the winter of initial ringing ; it is suggested tentatively that imprinting of the wintering grounds may occur during this period. Ecologically in Malaya Brown Shrike occupies a new habitat only gradually being filled by the resident Rufous-backed Shrike (*Lanius schach*). There is no evidence of interaction between the two species (Medway, 1970).

According to Serveringhaus (1996) about 24% of autumn transients Brown Shrikes arrived before any wintering birds, while 37% of wintering birds arrived during autumn transient time. The frequency of aggression recorded was significantly related to the number of birds seen along the transect that day. Among ringed birds that returned during transient time, 80% returned directly to their previous territories, but some waited for the departure of transient birds before establishing territories. On average of 25% of ringed wintering shrikes returned to the study site in the subsequent years, while no transient returned. This low site tenacity may be, in part, a result of a high persecution rate along the migration route .

According to Medway (1970) immature Brown Shrikes are not identifiable to race even in the hand. Further confirmation of the racial identity of the Shemya specimen is warranted. This season's bird eventually molted into adult plumage exhibiting a bright rufous crown and relatively indistinct supercilium characteristic of the *L.C. cristatus / confusus* subspecies group (Dean, 1982) . This group is far more likely to reach North America than *L.C. lucionensis* on geographical grounds, as it includes the most northerly populations .

The Brown Shrike *L.C. cristatus* is more problematical. Compared with the Isabelline shrike, birds of the nominate from display rather russet upperparts and basically concolorous mantle and rump, while the tail is rused-brown or ochraceous rather than rufous. The underparts frequently display an extensive russet flush . Certain eastern races, however, are rather grayer above and have a visibly rufous–tinged rump. There is normally no visible white primary patch, though on a few individuals a race of white remains unconcealed by the coverts. Immature are visibly barred, though generally less extensively than the Red-backed (Dean, 1982) .

The Brown Shrike *Lanius cristatus* is acommon migratory species in eastern Asia (Mayr and Greenway 1960, Medway , 1970, McClure, 1974). It is a strongly territorial predator which occurs in Taiwan both as an autumn and spring migrant and as a winter resident (Severinghaus, 1991) .

Brown Shrike were seen fighting, chasing and making aggressive calls towards each other in 1987 and along the transect in the autumn of 1989. During fighting, two birds would grapple with each other, separating only when they had tumbled to the ground (Severinghaus, 1996) .

According to Severinghaus (1996) the majority of wintering Brown Shrikes arrived during the transient period although somewhat later than most of the transient birds. Wintering Brown Shrikes establish territories upon arrival at a cost of frequent territorial defence, as shown by eight of the ten ringed wintering birds. Alerstam and Lindstroem (1990) suggests that optimal bird migration strategy may be to arrive at the destinations .

If breeding habitat were limiting migrant populations, then more optimal winter habitat should be available than necessary, and individuals should be highly selective with regard to habitat on the wintering ground – avoiding suboptimal habitats (Brown 1969, Fretwell and Lucas, 1970, Krohn, 1992).

2.1.3 Grassland

Grassland can be described as a type of vegetation that is subjected to periodic drought, is dominant by grass and grass–like species, and grows where there are fewer than 10 – 15 trees per hectare. This definition is somewhat arbitrary and is one of several that may be used in discussion of grasslands and the area they cover. Different vernacular terms are used depending on the part of the world under consideration ; thus grasslands may be called steppes in Eurasia, prairies in North America, llanos, cerrador or pampas in South America, savannas in Africa and rangeland in Australia.

It has been estimated that grasslands covered approximately 40% of the earth's surface prior to the impact of man and his domestic animals (Clements & Shelford, 1939). Estimates of the area of grassland present today are generally much lower than this but are very variable. One of the highest estimates suggests that grasslands occupy 27% of the world's nature vegetation cover (Knystatuas, 1987). However, in Malaysia, open land habitat is largely man made.