



# 中国鸟类研究简讯

**Newsletter of China Ornithological Society**



中国动物学会鸟类学分会  
China Ornithological Society



全国鸟类环志中心  
National Bird Banding Center

朱鹮 (*Nipponia nippon*)  
摄影 于晓平



中华秋沙鸭 (*Mergus squamatus*)  
摄影 王榄



## 目 录

会议报道.....	1
研究简报.....	4
环志简报.....	24
国内外动态.....	26
新书出版.....	36
英文摘要.....	42

## Contents

Notes of Meetings .....	1
Research Reports .....	4
Bird Banding Report .....	24
News from China and Abroad .....	26
Publications .....	36
English Abstracts .....	42

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## 会议报道



### “第一届亚洲鸟类学大会”在我国成功举办

金秋时节,“第一届亚洲鸟类学大会(The 1st Asian Ornithological Conference, AOC)”于 2021 年 11 月 9—11 日在我国成功举办。会议原定在广东省珠海市举办,由于疫情防控需要,改在北京、上海和广州三地同时召开,形式为线下加线上会议。来自 29 个国家的 300 余人参会,涉及 91 所大学和科研机构,其中 146 名从事鸟类学研究的代表正式注册参会,其余参会人员则采取线上听取报告或参与圆桌讨论会的形式参会。本次会议的主题是“亚洲鸟类共享同一片蓝天”(Asian Birds Share One Blue Sky),体现了亚洲鸟类工作者团结协作,为亚洲鸟类的生存、发展和保护共同努力。

本次会议由中国动物学会鸟类学分会、广东省动物学会以及国际鸟类学家联合会(IOUS)亚洲工作组发起和筹办。中国科学院动物研究所雷富民研究员为大会主席,新加坡国立大学 Frank E. Rheindt 教授、北京师范大学张正旺教授为大会副主席,浙江大学丁平教授为学术委员会主席,中国科学院动物研究所孙悦华研究员为大会秘书长。

10 日上午的大会开幕式由孙悦华研究员主持,国际鸟类学家联合会主席 Dominique G. Homberger 教授、国际鸟类学家联合会前任主席 Lucia Liu Severinghaus 教授、中国动物学会副理事长张正旺教授、中国科学院动物研究所副所长(主持工作)詹祥江研究员、

广东省动物学会副理事长 邹发生研究员以及国际鸟类学家联合会副主席、本届亚洲鸟类学大会主席雷富民研究员先后在开幕式上致辞,祝贺首届亚洲鸟类学大会的顺利召开,热烈欢迎参加会议的各国代表。Dominique G. Homberger 和 Lucia Liu Severinghaus 教授对本届大会在疫情影响下能够顺利召开给予了充分的肯定,并高度赞扬中国学者对大会举办所做出的贡献。

本次大会邀请了美国科学院院士、哈佛大学 Scott V. Edwards 教授,新加坡国立大学 Frank E. Rheindt 教授,瑞典乌普萨拉大学 Per Alström 教授,法国巴黎第十一大学 Anders P. Møller 教授,韩国庆熙大学的 Jin-Won Lee 教授,中国科学院动物研究所雷富民研究员以及广东省科学院动物研究所的胡慧建研究员做了大会学术报告。来自亚洲、欧洲等不同国家的 68 位鸟类学工作者做了分会场报告。此外,还有 30 篇论文以墙报形式进行了展示。报告内容广泛,研究对象涵盖鸣禽、游禽、涉禽以及猛禽等多个类群,研究内容包括了鸟类行为、迁徙、生态、保护、生物地理、系统发育以及基因组进化等领域的全球最新研究热点。大会还设立了黄胸鹀保护、水鸟迁徙保护、《分子生态学》期刊投稿交流 3 个圆桌讨论会。

在 10 日晚上举行的“亚洲鸟类学发展”讨论会上,来自中国、哈萨克斯坦、印度、印尼、日本、韩国、马来西亚、蒙古、俄罗斯、新加坡、泰国、越南等国家的代表通过充分讨论,一致同意建立“亚洲鸟类学联盟(Asian

Ornithological Alliance, AOA)”。筹备讨论会提名了中国科学院动物研究所雷富民研究员和新加坡国立大学 Frank E. Rheindt 教授作为联盟的主席和副主席的候选人,并讨论了深入推进联盟构架、章程起草、会员发展、网站建设等多项事宜。会议建议将联盟秘书处设置在中国北京,同时在中国广州、中亚、东南亚、南亚、西亚等地区或国家设立地区协调办公室,以推动亚洲各国之间鸟类学学术交流与协调。会议同意将亚洲鸟类学大会(AOC)作为亚洲鸟类学联盟(AOA)的周期性会议,每2年举办一次,第二届亚洲鸟类学大会将于2023年在中国举行。

11日中午,大会圆满结束了学术交流的议程。在随后举行的闭幕式上,新加坡国立大学 Frank E. Rheindt 教授对会议进行了总结,张正旺教授代表大会组委会对为本次会议做出重要贡献的协办单位以及会议赞助方表示了感谢。本次大会的协办单位包括:中国科学院动物研究所、广东省长隆慈善基金会、广东省科学院动物研究所、海南师范大学热带岛屿生态学教育部重点实验室和《Avian Research》杂志;赞助方包括广东省科协、广东省振兴科技基金会、德鲁伊科技公司、湖南环球信士科技有限公司、“自然圈”博物学家工作室等。

第一届亚洲鸟类学大会的成功召开,是亚洲乃至世界鸟类学研究史上一个重要事件,是亚洲鸟类学发展的一个里程碑。未来亚洲鸟类学联盟的成立,不仅将为亚洲鸟类学研

究学者提供交流平台,也必将推动鸟类学这门古老而经典的学科在新时代焕发新的生命力。在当前学科和研究技术交叉融合的时代,大会对亚洲乃至整个全球的鸟类学研究和鸟类多样性保护具有重要意义。

(鸟类学分会秘书处)

## 中国青年鸟类学家研讨会暨第十七届翠鸟论坛成功举办

2021年11月11日—12日,中国青年鸟类学家研讨会暨第十七届翠鸟论坛成功在线举办。本次会议由中国动物学会鸟类学分会与北京师范大学生物多样性与生态工程教育部重点实验室共同主办。

由于疫情防控需要,本次论坛是继去年之后第二次以在线形式举办,吸引了来自北京师范大学、复旦大学、中山大学、北京林业大学、东北林业大学、海南师范大学、华东师范大学、兰州大学、台湾师范大学、荷兰格罗宁根大学、中国科学院动物研究所、中国科学院昆明动物所等60余所高校、科研机构 and 保护区的320多名研究生、教师和相关专业人员参加,展现了论坛在国内鸟类学研究者中的影响力。

本次论坛以研究生报告为主,评委会从30所高校及科研单位的83名研究生提交的报告申请中筛选了32名同学进行口头报告、32名同学做电子墙报(e-poster)展示,展示内



容涉及鸟类行为生态、系统进化、种群动态、形态适应、保护与管理等鸟类学研究的重要领域。研究生报告在数量和质量上均有显著提升,报告内容百花齐放,各具风采,展现了大家在鸟类学研究中科学问题理解程度的加深,以及解决相应科学问题的强大能力。参会者在报告之后积极踊跃地参与提问和讨论,促进了学术交流。

为进一步提升同学们的科研能力,本次论坛还特别邀请了中国林业科学研究院全国鸟类环志中心的刘冬平副研究员和中山大学的黄程博士,分别以“鸟类换羽模式与年龄判断”和“荟萃分析(Meta-analysis)入门”为题进行了两场方法学论坛讲座,深入浅出地介绍了鸟类学野外研究和数据分析的重要方法。同时,论坛还组织了“与 IBIS 期刊编辑面对面”的投稿交流活动。国际著名鸟类学期刊 IBIS 的三位中国编辑:复旦大学马志

军教授、中国科学院生态环境研究中心曹垒研究员和中山大学刘阳教授介绍了这个期刊的投稿流程,分享了投稿经验,为我国从事鸟类学研究的青年学者取得更好的成果产出提供了有力帮助。

中国动物学会鸟类学分会理事长、中国科学院动物研究所雷富民研究员和鸟类学分会秘书长、北京师范大学生命科学学院党委书记张雁云教授在开幕式上致辞,中国科学院动物所屈延华研究员、中山大学刘阳教授和北京师范大学董路教授承担了论坛的主要组织工作,并在闭幕式对论坛活动进行了学术总结,肯定了本届论坛的高水平,共同期待我国的青年鸟类学研究者取得更大的成绩。最后,通过论坛参加者的共同推选,对优秀的口头报告和墙报进行了鼓励。

(鸟类学分会秘书处)

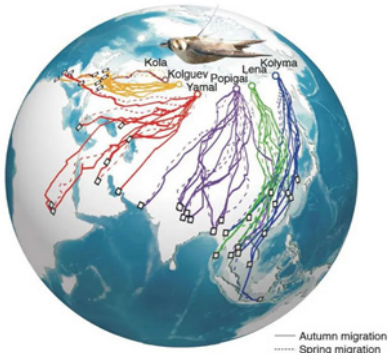
# 研究简报



## 詹祥江实验室揭秘鸟类迁徙路线形成原因和长距离迁徙关键基因

2021 年 3 月 3 日,中国科学院动物研究所詹祥江实验室在国际顶级期刊 *Nature* 杂志以封面故事发表了关于鸟类迁徙的研究论文“Climate-driven flyway changes and memory-based long-distance migration” (doi: 10.1038/s41586-021-03265-0)。

在该研究中,团队通过整合多年卫星追踪数据和种群基因组信息,建立了一套北极游隼迁徙系统,揭秘了其迁徙路线的主要形成原因和长距离迁徙关键基因。



(北京:张雁云)

## 高黎贡山生物多样性热点地区鸟类垂直分布的季节性变化规律

传统的山地格局研究多关注空间尺度上的变化,而对时间尺度上的变化关注极少。

由于很多山地鸟类会随季节在山地的海拔梯度上做垂直迁移,因此研究山地鸟类的多样性格局及其季节性变化规律,可以了解气候和环境变化对于生物多样性格局的改变提供十分宝贵的机会。近日,中山大学刘阳教授团队和西南林业大学罗旭教授团队,联合来自香港大学,南方科技大学,佛罗里达大学,普林斯顿大学的合作者们,对高黎贡山不同季节的鸟类群落和海拔分布季节性变化的研究成果,发表在国际保护地理学著名杂志 *Diversity and Distributions* 上。

研究从高黎贡山的河谷(700 m)到山脊(3400 m),划分为 9 个 300 m 的垂直海拔带,在繁殖季和越冬季各记录到鸟类 314 和 296 种。各个海拔带的鸟类群落组成在繁殖季节和非繁殖季节存在明显的变化,大量中海拔繁殖的鸟类在冬季往下垂直迁徙,导致中低海拔的冬季鸟类群落中增加了一些高海拔的物种,使得中低海拔物种丰富度在冬季有所增加。结果显示繁殖海拔和食性是重要的影响因素:繁殖在高海拔繁殖的鸟类和食虫鸟类展现出明显的向下垂直迁徙。很少有森林依赖性强的物种下迁到低海拔的农业生态系统中。研究显示了中海拔森林生境对于山地鸟类保护的重要性。

(广东:潘新园,刘阳,梁丹

云南:罗旭)

## 黑脸琵鹭保护基因组学研究发表

黑脸琵鹭 (*Platalea minor*) 曾经是东亚地区非常常见的水鸟, 但是由于种种原因。它们的种群数量下降到几百只。自 1997 年之后, 全球越冬种群普查等一系列的保育行动帮助这个物种的种群数量恢复到了几千只。但是对于它们的致威原因和种群遗传多样性现状却知之甚少。利用 2002 年台南中毒死亡的个体和后海湾意外死亡的黑脸琵鹭样本, 开展遗传学研究, 从而揭示黑脸琵鹭的濒危和遗传多样性现状。从 2017 年开始, 两岸的学者再度携手, 共同完成了黑脸琵鹭保护基因组的研究。这项研究近期发表在国际分子生态学著名期刊 *Molecular Ecology* 上。

这个研究利用了二代测序技术, 首先获得了从头测序的黑脸琵鹭基因组, 同时利用这个参考基因组, 获得了黑脸琵鹭台湾和后海湾种群的重测序数据, 并与近缘的皇家琵鹭 (*Platalea regia*) 进行比较。研究结果揭示了许多重要的信息。首先, 通过种群历史的模拟, 黑脸琵鹭在 2 万年以来, 有效种群都是维持在高而稳定的趋势的 ( $N_e = 7500-9000$ )。只是在上世纪 40 年代开始, 经历了一个短暂但是剧烈的种群震荡, 大约 99% 的种群消失殆尽, 有效数量降低到了 20, 与实际观测的现象基本符合。我们推测: 上个世纪中叶, 杀虫剂 DDT 在亚洲各地的广泛使用可能是导致它们种群数量快速减少的原因。而相同的悲剧曾在北美的白头海雕 (*Haliaeetus leucocephalus*) 身上上演过。其次, 黑脸琵鹭的种群数量虽然在近期得到恢复, 但种群保育的任务仍然十分艰巨。因为相比于澳洲琵鹭, 黑皮的种群近交和遗传负荷水平都很高。这也意味着如果未来出现不可预测的环境变化和疾病, 黑皮种群仍有可能会剧烈震荡。这个研究还发现: 台湾和后海湾越冬群体之间不具有明显的种群遗传结构, 极大可

能来自同一个繁殖种群。这个结果可能也说明, 无论是繁殖地还是越冬地, 对于黑脸琵鹭的保育工作仍然需要各个国家和地区一起协作开展。

(台湾: 李寿先; 广东: 刘阳)

## 雪鹑种群分化模式研究

北京林业大学生态与自然保护学院姚红艳博士、研究生张亚楠在王楠副教授和王鹏程博士的共同指导下, 开展了高原雉类种群分化模式的研究, 成果以 “Inter-glacial isolation caused divergence of cold-adapted species: the case of the snow partridge” 为题, 在中国动物学会主办的期刊 *Current Zoology* 上在线发表。

探究历史气候变化对种群分化过程的影响有助于我们了解气候变化对生物多样性格局的影响。第四纪冰期气候回旋导致全球不同区域具有不同生活史特征的物种产生了多样的演化历史。适应温暖环境的物种可能在冰期分布在彼此之间互相隔离的冰期避难所内, 冰期地理隔离导致种群间产生分化; 适应寒冷环境的物种可能在冰期扩张, 间冰期收缩, 在间冰期被隔离在彼此之间相互隔离的间冰期避难所内, 间冰期地理隔离导致种群间产生分化。由于在高海拔环境进行野外工作存在一定的困难, 因此目前大多数研究多关注分布在中低海拔的适应温暖环境的物种, 少有研究关注分布在极高海拔的适应寒冷环境的物种。因此, 姚红艳博士和王楠副教授以及王鹏程博士共同对分布在极高海拔环境的雪鹑 (*Lerwa lerwa*) 开展了种群分化历史研究。

雪鹑往往分布在海拔 4000 至 5500 m 之间。基于核基因和线粒体片段数据显示雪鹑有两个遗传演化单元, 彼此之间分化时间在

大约 40~44 万年前，处于中梁赧冰期后的间冰期。生态位模型显示雪鹑在冰期广布于喜马拉雅山和横断山脉的低海拔区域，在间冰期片段化地分布在以上两个区域的高海拔地区。种群有效大小历史动态模型也显示雪鹑在冰期扩张，在间冰期缩小。这一研究为揭示气候变化对不同生活史特征的物种的影响提供了案例支撑，有助于加深对青藏高原及横断山区鸟类生物多样性格局的理解。

该研究得到了国家林业局第二次全国陆生野生动物调查专项调查项目的支持。

(北京：王楠，江苏：王鹏程)

### 昼夜行为节律如何影响宿主 - 寄生虫相互作用？基于昼行性猛禽和夜行性猛禽血孢子虫感染模式的比较研究

寄生虫的感染模式，包括感染率，多样性和宿主特异性，通常受到很多生物和环境因素的影响。了解导致寄生虫感染模式发生变化的相关因素和机制可以帮助我们认识复杂的宿主 - 寄生虫相互作用，可为新发传染病的预防和防治提供参考。但目前缺乏关于昼夜节律如何影响宿主 - 寄生虫相互作用的研究。

本研究对 2007—2020 年间北京猛禽救助中心所救治猛禽的感染模式开展研究，研究对象包括 35 种猛禽个体 (1336 只)，其中昼行性猛禽 25 种 897 只，夜行性猛禽 10 种 439 只。

我们首先通过巢式 PCR 对这些猛禽物种所感染的血孢子虫进行扩增和鉴定，共鉴定到 87 个血孢子虫谱系，总感染率为 24.63%，其中昼行性猛禽的感染率为 17.95%，而夜行性猛禽的感染率为 38.72%。在控制了系统发育关系的基础上，我们进一步评估了猛禽血孢子虫感染率与昼夜行为节律等相关宿主生

物特征之间的关系，证实夜行性猛禽的血液寄生虫感染率显著高于昼行性猛禽，同时，血液变形虫 (*Haemoproteus*) 和住白细胞原虫 (*Leucocytozoon*) 在夜行性猛禽中的感染率显著高于昼行性猛禽。

最后，我们进一步分析了感染昼行性猛禽和夜行性猛禽的血液寄生虫之间的系统发育关系，以及它们在宿主 - 寄生虫网络水平上的差异，证实感染昼行性猛禽和夜行性猛禽的血液寄生虫之间并没有形成明显的系统发育分化，但夜行性导致了更加特异性的宿主 - 寄生虫网络结构，这些宿主 - 寄生虫相互作用的变化可能由宿主之间不同的易感性，以及媒介的多样性和丰富度在白天和晚上的差异所驱动的。

我们的研究首次对昼夜行为节律对鸟类血孢子虫感染模式的影响机制开展研究，在昼夜节律对宿主 - 寄生虫相互作用的塑造方面提供了新的见解，同时呼吁更多的研究对其潜在的血孢子虫感染机制进行探讨。

(北京：高凯，邓文洪)

### 广东沿海鸭科水鸟种群历史动态研究取得重要进展

广东省科学院动物研究所车先丽博士在合作导师邹发生研究员指导下，开展了广东沿海湿地鸭科水鸟历史动态的研究，成果以 “Long-term trends in the phylogenetic and functional diversity of Anatidae in South China coastal wetlands” 为题、近日在美国生态学会 (The Ecological Society of America) 主办的期刊 *Ecological Applications* 上在线发表。

历史上，鸭科水鸟曾经作为经济鸟类被大量狩猎，导致种群的急剧下降。上世纪 80 年代前，在粤东的汕头、汕尾等沿海湿地曾记录到数以万计的豆雁等大型鸭科水鸟。但

是, 邹发生研究员团队在 2014 年冬季对整个广东沿海重要湿地进行水鸟调查时, 并没有记录到豆雁等大型鸭科水鸟, 甚至像绿翅鸭等小型鸭科水鸟的记录数量也比历史记录显著减少, 这一现象引起了团队的关注。随后, 团队发掘了该地区 1950、1960、1970、1980、2000 年代的历史数据, 结合团队自己积累的 2010 年代的数据, 从群落物种、谱系和功能多样性三方面研究该地区鸭科水鸟的历史动态。

结果发现: 尽管该地区鸭科水鸟物种多样性没有显著下降, 但在谱系上雁属分支显著减少, 减少的雁属恰是体重较大的功能类群。在保护生物学上, 某一支系在局部地区的整体消失往往难以恢复。

研究呼吁应及时关注生物多样性丧失严重的地区, 加强生物多样性监测, 利用生物多样性的动态数据, 阐述生物多样性保护的重点物种和重点地区、进而采取相应的保护措施。该研究为粤港澳大湾区生物多样性保护, 建设宜居宜业宜游的国际一流湾区提供了依据。

该研究得到了广东省科学院(2018GDAS-CX-0107、2019GDASYL-0203001、2020GDASYL-20200103094)、广东省自然科学基金(2018B030324003)和国家自然科学基金(31670445)等项目的支持。

(广东: 车先丽)

## 被寄生风险影响北红尾鸲的卵识别行为

鸟类巢寄生行为是指一些鸟类(寄生者)不筑巢, 而将卵产在其他鸟类(寄主)的巢中, 让寄主代为抚育的行为。一般来说, 巢寄生会给寄主的适合度造成较大的损害, 如某些杜鹃在寄生寄主时, 会叼走寄主的一枚卵; 大杜鹃(*Cuculus canorus*) 幼鸟出壳后,

会将寄主的后代(卵和雏鸟)全部挤出巢外, 以独享养父母的饲喂等。为了应对巢寄生, 寄主进化出了一系列的策略, 如巢址选择(选择被寄生风险低的地方筑巢)、巢防御、卵识别及雏鸟识别等。其中, 最普遍且最有效的反计生策略是卵识别。

然而, 对寄主来说, 卵识别行为也有一些潜在的代价, 如识别错误和被寄主报复等。因此, 在面对寄生卵时, 寄主会做出一定的权衡, 而被寄生风险会影响寄主的决定(接受/拒绝)。最佳接受阈值假说(the optimal acceptance threshold hypothesis)认为, 当寄主感受到较高的被寄生风险时, 其拒绝寄生卵的可能性会提高。如对芦莺(*Acrocephalus scirpaceus*)的研究发现, 在繁殖季后期杜鹃离开繁殖地后, 即被寄生风险较低时, 寄主拒绝寄生卵的概率要显著低于杜鹃离开前。但目前还没有研究证明, 在同一个繁殖季内, 当被寄生风险增高时, 寄主的拒卵率是否会增高。

北红尾鸲(*Phoenicurus auroreus*)是大杜鹃的一种常见寄主。北红尾鸲可产蓝色和粉色两种色型的卵, 杜鹃寄生北红尾鸲的卵为浅蓝色。在研究地, 北红尾鸲一年可繁殖两次, 且第一次繁殖的产卵期通常在每年的4月中旬至五月上旬。而大杜鹃一般在5月中旬(2018年5月12日; 2019年5月13日)到达繁殖地, 此时大多数的北红尾鸲已进入第一次繁殖的孵化期后期或育雏期, 不适合杜鹃的寄生。

因此, 北红尾鸲在第一次繁殖(第一个产卵高峰)时被杜鹃寄生的风险很低, 而在第二次繁殖(第二个产卵高峰)时有较高的被寄生风险。根据最佳接受阈值假说, 我们预测, 北红尾鸲在第二个产高峰时对外来卵的拒绝率要显著高于第一个产卵高峰。为了验证这一假说, 我们在2019年利用人工制作的杜鹃卵模型对北红尾鸲进行了卵识别实验,

卵模型的大小和颜色模拟杜鹃的寄生卵。即在北红尾鸲的产卵期后期或孵卵期早期（孵化期前三天），在其巢中放入一枚卵模型，在其后 6 天内每天查巢一次，判断寄主是否拒绝寄生卵。

研究结果表明，北红尾鸲在第二个产卵高峰时（杜鹃到达繁殖地后）对寄生卵的拒绝率显著高于第一个产卵高峰（杜鹃到达繁殖地前），即随着被寄生风险增高，寄主拒绝寄生卵的可能性增加。该研究首次证实了寄主的拒卵强度会随着季节内被寄生风险的增加而增强，同时表明了北红尾鸲的拒卵行为是可塑的。

（北京：张敬刚，邓文洪）

## 绿孔雀保护基因组学研究

绿孔雀曾广泛分布于中国南方至爪哇的广大区域，如今仅散存于云南及东南亚的局部区域，目前是我国一级重点保护动物，并被国际自然保护联盟评定为“全球性濒危”等级。虽有关于人类取食和利用绿孔雀的零星历史记载，但目前尚不清楚绿孔雀种群衰退过程中的主要致危因素，尤其是历史气候变化和人类活动在其中的相对作用。

为回答上述问题，我们组装了首个绿孔雀基因组，并开展了种群基因组重测序。溯祖模拟分析揭示自中全新世（~6000 年前）至 100 年前绿孔雀有效种群数量的急剧下降，幅度达 200 倍；历史标本与当前样本的比对分析表明近 50 年内，幸存种群的遗传多样性水平仍在持续下降。进一步的生态位模型分析揭示，全新世气候变化对于绿孔雀的分布变迁没有显著影响，而针对历史人类活动的统计分析却提示了三个重要信号：①历史人类活动强度与绿孔雀的有效种群数量呈显著负相关，②与其当前的存活状态（绝迹 v.s. 幸

存）具有显著的关联性，③尤其表现为在绿孔雀已绝迹区的人类活动强度显著高于当前幸存区。这些结果暗示，自中全新世以来的人类干扰是绿孔雀走向濒危的重要驱动因素。研究同时揭示，当前在云南及中南半岛的绿孔雀地理种群间没有显著的遗传结构，但长期的分布收缩和种群数量下降，加之“一雄多雌”的婚配制度，使这些它们呈现异常高的近交水平，迫切需要加强栖地保护和生态廊道建设，以维持其应对未来环境变化的进化潜力。研究成果已以“Population genomic, climatic and anthropogenic evidence suggest the role of human forces in endangerment of green peafowl (*Pavo muticus*)”为题发表于 *Proceedings of the Royal Society B: Biological Sciences*。

（云南：董锋，杨晓君，吴飞，王洁，单鹏飞；

广州：刘阳，陈国玲；北京：陈德，雷富民；

台湾：洪志铭，郭浩志）

## 基于最优超保守元件分区策略的鸡形目分化时间估计

物种间的分化时间是理解生物进化很多方面的基础，如特征演化、多样化和生物地理分布等。随着序列技术的发展和分析方法的改进，越来越多的研究开始得到一致的分析结果。虽然基因组水平的数据集在系统发育估计方面显示出巨大的前景，但利用大量数据进行分化时间估计的最优策略还没有得到很好的探索。一个潜在的解决方案是选取一个合适的数据子集进行分化时间估计，这不仅可以大大减少计算负担，还能够避免数据异质性带来的结果偏差的问题。本研究中，我们从 130 个现存的鸡形目类群（包括所有属的代表）中获得了数千个超保守元件（ultraconserved elements, UCEs），并评估了多

种不同特征的数据子集对分化时间估计的影响。结果发现,以往研究中最常用的方案(最符合分子钟模型的数据子集)可能不适于超保守元件,因为有些超保守元件的信息位点很少。我们建议使用最符合物种树的数据子集对超保守元件进行分化时间估计。本研究提供了一棵可靠的鸡形目时间树,结果可以与更多的类群和化石记录相结合,进一步促进我们对鸡形目鸟类进化的理解。

相关研究详见:Chen, D., Hosner, P.A., Dittmann, D.L., O'Neill, J.P., Birks, S.M., Braun, E.L., Kimball, R.T., 2021. Divergence time estimation of Galliformes based on the best gene shopping scheme of ultraconserved elements. *BMC Ecology and Evolution* 21, 209.

(北京:陈德)

## 大天鹅春季迁徙兴奋与气候因素、越冬行为和活动区的关系

在河南省三门峡天鹅国家湿地公园,我们对越冬大天鹅(*Cygnus cygnus*)迁徙兴奋与气候因素、越冬行为和活动区的关系进行了研究。测定每月大天鹅新鲜粪便中的糖皮质激素(FGM)的浓度变化,以此衡量迁徙兴奋的状态,并进行各越冬阶段行为和活动区特征的分析,使用线性或非线性回归模型分析 FGM 与平均气温和光周期相关性。最佳拟合模型显示,FGM 浓度与平均气温平方值呈正相关( $R^2 = 0.88$ );随着昼长和平均气温的增加,FGM 的浓度也随之增加。利用主成分分析了大天鹅 7 种越冬行为的行为频率,将其归纳为三类行为主成分(PCs)。FGM 与行为 PC2(警戒、整羽和觅食)显著相关,PC3(打斗、鸣叫和运动)对活动区面积存在显著影响。研究表明,大天鹅的春季迁徙兴奋与温度和光周期有较大关系,体现在越冬

行为和活动区面积上有较大不同。

(中国林科院森环森保所全国鸟类环志中心:张国钢,杨亮亮)

## 滨海湿地盐沼植被和社会环境影响两种同域分布杓鹬季节性的警戒策略

我们于 2017—2019 年在辽河口国家级自然保护区翅碱蓬滩涂湿地开展大杓鹬和白腰杓鹬两种鸟类的警戒行为观察,重点关注植被遮挡效果和群体组成对警戒行为影响。

动物在有植被和无植被等不同环境中取食时通常需要调整警戒策略,因为植被既可起到视野障碍作用增加捕食风险,也可能起到隐蔽保护效果。另外,种群大小、个体竞争及各种环境条件和人为干扰也会影响动物的警戒行为。本研究我们选择辽河口国家级自然保护区翅碱蓬滩涂和潮间带分布的两种同域分布的大杓鹬和白腰杓鹬进行研究。使用混合线性模型分析发现,两种杓鹬在翅碱蓬滩涂生境觅食时被视野障碍的时间比例均高于滩涂,但是,只有大杓鹬增加了警戒时间,这说明视野障碍仅作用于该物种。未发现翅碱蓬植被可以起到隐蔽效果,因为两种杓鹬在春季均未降低警戒投入。群体大小对杓鹬警戒行为的影响具有明显的生境差异,因为两种杓鹬警戒时间比例仅在翅碱蓬滩涂生境中出现增加。我们认为两种杓鹬均可以根据社会环境和取食生境调整取食策略,在取食风险和食物丰富度之间权衡可能是多数杓鹬类警戒行为调整的重要原因。

本研究得到国家自然科学基金(No. 31911540468, 31672316)资助,研究成果发表在 *Avian Research* (2021,12:39)。

(辽宁:张菁,张杭,李东来;  
北京:刘宇,李建强,张正旺)

## 历史气候变化对于喜马拉雅山鸟类群落的影响研究

热带山脉通常是生物多样性的热点区域。目前对于其生物多样性起源的研究普遍忽略第四纪气候变化对于物种分布的影响。这主要是基于生物可以通过垂直梯度上的短距离迁移来缓冲气候变化影响的直观推断。但目前尚未有针对这一假设的系统检验。

我们通过重建在喜马拉雅山地分布的 288 种雀形目鸟类的历史分布动态, 检验末次间冰期 (~12 万年前, LIG) 和末次冰盛期 (~2 万年前, LGM) 的气候变化对山地群落演化的影响。结果显示, 这些鸟类可以通过海拔梯度上的垂直迁移来应对 LGM 的气候变化, 但却有 32.6-46.2% 的现生物种在 LIG 期间缺少适宜分布区。进一步的分析发现, 这一群落周转可能源于 LIG 期间气候变异度的显著增强导致的局域种群绝灭。这些研究结果表明剧烈的气候变化可能会突破山地垂直梯度的缓冲作用, 对于理解热点区域的生物多样性起源和预测未来气候变化的影响具有重要作用。研究结果已以 “Potential Himalayan community turnover through the Late Pleistocene” 为题在 *Climatic Change* 上发表。

(云南: 董锋、杨晓君,  
台湾: 洪志铭、李寿先)

## 黄渤海北部地区翅碱蓬盐沼湿地的快速围垦和退化

翅碱蓬滩涂湿地是我国黄渤海地区一种重要的滨海盐沼湿地类型, 在生物多样维持和迁徙水鸟的栖息地利用中发挥重要功能。但是, 我国翅碱蓬湿地出现了快速的退化或消失。本研究通过遥感影像解译分析了近 30 年 (1988—2018) 山东黄河口以北地区翅碱

蓬盐沼湿地的变化及影响土地覆盖变化的因素。结果发现该地区翅碱蓬盐沼湿地的面积下降了 63% (264~99 km<sup>2</sup>), 平均下降速率为 5.5 km<sup>2</sup>/年。在翅碱蓬集中分布的辽东湾和黄河入海口附近两个地区翅碱蓬盐沼湿地分别下降了 77% (112~26 km<sup>2</sup>) 和 52% (137~65 km<sup>2</sup>)。土地围垦是导致翅碱蓬滩涂湿地丧失的主要原因, 其次, 自然演替和互花米草入侵也有一定的影响。基于翅碱蓬盐沼湿地的重要生态功能, 我们建议应该加大对该湿地的保护, 降低土地围垦等对栖息地丧失的影响。

本研究得到国家自然科学基金 (No.31672316) 资助, 研究成果发表在 *Land* (2021. 12:39)。

(辽宁: 张菁, 张妍, 李东来; 英国  
Huw Lloyd, 北京: 张正旺,)

## 蓝冠噪鹛巢生境选择及适宜生境预测

蓝冠噪鹛 (*Garrulax courtoisi*) 是中国特有的极度濒危鸟类。近年来, 其种群数量一直稳定在 500 只以内, 在野外几乎灭绝。国际鸟盟 (BirdLife International) 已将蓝冠噪鹛列入全球濒危鸟类名录, 并将它的受胁等级定为极危 (Critically Endangered, CR)。同时, 蓝冠噪鹛也被列为国家一级重点保护野生动物。在这种情况下, 探索蓝冠噪鹛的巢生境现状、适宜生境分布和受胁因素对其保护至关重要。

研究于 2021 年 3-7 月在江西省婺源县和德兴市对蓝冠噪鹛的繁殖期分布区域展开调查。通过样圆法 (Circular Sample-plot Method) 调查并分析不同区域巢生境的差异显著性、不同类型 (工厂、居民区及受保护区域) 巢生境中影响其巢址选择的生态参数间差异。研究对该物种的受胁因素进行了分

析, 并利用物种分布模型对蓝冠噪鹛适宜生境分布进行了预测。结果显示:

(1) 蓝冠噪鹛巢生境乔木盖度、灌木种数、灌木高度、草本均高、草本最高高度 5 个生态参数差异显著, 巢距地面高度、总郁闭度、乔木胸径等生态参数间差异不显著。主成分分析结果显示, 各生态参数对巢址选择的影响程度差异整体上不显著, 但 3 种不同类型巢生境中, 受保护区域型生境内对巢址选择产生主要影响的生态参数为总郁闭度、灌木高度和草本最高高度, 其余 2 种类型巢生境中, 影响程度差异不显著。

(2) 蓝冠噪鹛存在巢二次利用情况 (2.78%), 一次繁殖和二次繁殖的出雏数最高均可达 4 只, 其中一次繁殖出雏数大多为 3 只 (50%)。

(3) 物种分布模型预测结果显示研究区的适宜生境面积为 24.76 km<sup>2</sup>。集中分布区主要位于婺源县中南部和德兴市西部。

(北京: 黄馨洁, 田姍, 刘正霄, 徐基良)

## 江苏盐城自然保护区越冬期灰鹤觅食生境适宜性分析

灰鹤是我国的 II 级重点保护野生动物, 它是目前全球数量最多、分布最广的鹤类。通过对江苏盐城湿地珍禽国家级自然保护区 (以下简称江苏盐城自然保护区) 越冬期灰鹤所利用的觅食生境进行研究, 从而为灰鹤越冬生态学的研究提供基础数据。

在 2018 年和 2019 年的越冬期运用定点观察法、GPS 定位、样方法、主成分分析法以及最大熵模型等方法, 对在江苏盐城自然保护区越冬的灰鹤在种群分布、越冬期觅食生境特征以及觅食生境适宜性等方面进行调查与分析。得到的主要的研究结果如下: ①越冬期的灰鹤主要集中分布在北缓冲区, 核

心区、南缓冲区及南一实验区次之, 南二实验区有较少分布, 保护区的其余区域无分布。灰鹤在越冬时主要以谷物为食, 越冬时的觅食生境选择更偏向于农田。②灰鹤越冬期觅食生境特征的 13 个生境因子概括为: 食物与水因子 (农田距离、明水面距离、植被高度、植被密度、植被盖度、植被直径、海拔以及水深)、干扰因子 (道路距离、距人为干扰距离以及居民区距离) 以及隐蔽因子 (芦苇沼泽距离以及剩余苇丛高度)。③最大熵模型分析得出: 灰鹤越冬期觅食最适宜生境面积为 17814.63 ha, 占江苏盐城自然保护区总面积的 8.55%; 较适宜区面积为 19463.8 ha, 占保护区总面积的 9.34%; 次适宜区面积为 17549.58 ha, 占保护区总面积的 8.42%。

(黑龙江: 田晔, 邹红菲)

## 区域和景观尺度栖息地特征影响内蒙古东部草原鸟类群落多样性

人为活动造成的天然栖息地丧失和破碎化是对世界范围内生物多样性的主要威胁。近几十年来, 内蒙古东部地区大量天然草地已经转变为支离破碎的农业用地, 对鸟类多样性产生了潜在的负面影响。本文量化了区域和景观尺度栖息地特征对内蒙古草原繁殖鸟类物种、功能和系统发育多样性的影响。首先通过方差膨胀因子分析 (VIF) 获得八个独立的栖息地变量, 然后使用规范对应分析 (CCA) 来确定不同尺度的栖息地因素如何解释鸟类群落组成的差异。最后, 拟合贝叶斯广义加性模型来分析栖息地特征与不同水平生物多样性关系, 并根据每个模型中土地覆盖丰富度的平滑效应来验证中度干扰假设。研究发现区域和景观尺度的栖息地特征可以部分解释鸟类群落组合的差异。四个鸟类多样性指标对栖息地特征的响应不同且与空间

尺度有关：其中物种丰富度和香农多样性表现出相似的响应模式，两者都与裸地面积负相关，而与植被盖度和不透水面积百分比呈正相关。系统发育多样性与植物丰富度呈正相关，而与森林面积百分比和不透水面积百分比呈负相关。功能多样性与栖息地特征之间没有显著的统计学关系。此外，这四个多样性指标没有在栖息地干扰的中等水平达到顶峰，因此不支持中度干扰假说。建议多指标、多尺度地对鸟类群落进行评估和保护决策，特别是当保护目标不仅是物种本身而且涉及到物种的进化历史和生态功能时。

(吉林：韩征，姜云垒，王海涛；  
法国：Frédéric Jiguet)

## 中华秋沙鸭在长白山区森林 - 河流生境中的指示作用

森林 - 河流交错区是关注较少的生物多样性热点区域。在森林采伐和河道改造的影响下，东北林区森林 - 河流生态环境亟需被保护，然而对森林 - 河流生境适宜性及物种丰富度的监测和评估常常耗时耗力，该区域是否存在有效的指示物种仍不清楚。

本文验证了濒危物种——中华秋沙鸭是否可作为长白山区山地 - 河流水陆交错区的指示物种，结果表明：中华秋沙鸭繁殖种群在沿岸森林覆盖度较高、边滩面积较大且河道较宽的河段出现概率较高；且倾向集中栖息于河岸森林茂密的弯曲河段。同时，中华秋沙鸭的出现概率及个体数量与交错区鸟类、鱼类和大型无脊椎底栖动物的物种丰富度及鱼类重量呈正相关。

本研究发现了中华秋沙鸭与典型山地森林 - 河流生境及生物多样性的显著相关性，同时由于其受到社会的广泛关注，因此可被作为伞护物种和旗舰物种，在长白山地区及

东北亚其它山地河岸带生境及物种多样性的保护和监测中发挥指示作用。

此外，本研究丰富了食鱼动物作为指示物种的证据，并建议其余食鱼物种的指示作用也值得验证，用以评估森林 - 河流生态系统中其它难以被监测的重要栖息地。

(吉林：续文字，王琳，弓冶，王海涛)

## 气候变化和土地利用对东南亚鸡形目鸟类保护的影响

气候变化和土地利用的改变及其相互作用会改变生物多样性，特别是在东南亚等特有物种广泛分布的生物多样性地区。为了提高生物多样性保护的有效性，评价气候变化、土地利用变化及其相互作用对生物多样性的影响是十分必要的。鸡形目物种是生物多样性不可缺少的组成成分。我们选择鸡形目物种来评价气候变化和土地利用对东南亚未来适宜栖息地的影响，并比较气候变化和土地利用影响之间的差异。我们集合了 7 个物种分布模型，来评价潜在的栖息地以及评价 60 种鸡形目物种在 2050 年和 2070 年的栖息地变化情况。我们的结果表明气候变化、土地利用改变及其相互作用对鸡形目潜在分布产生了负面的影响。不同濒危等级的物种受到气候变化和土地利用的影响不同，被世界自然保护联盟列为近危 (NT) 和濒危 (EN) 的物种更易受到气候变化和土地利用变化的影响。并且我们发现，当前保护区和未来适宜的栖息地之间出现了错配。为了有效的保护生物多样性，我们建议应该根据气候和土地利用变化的共同影响建立新的保护区或调整保护区的范围。

(北京：刘正霄，田姍，陆帅，朱自强，李建强，  
徐基良；美国：王勇)

## 沿海盐池对迁徙鸕鹚类的价值：使用稳定同位素方法对鸕鹚类的生境利用研究

迁徙鸕鹚类是世界上受胁情况最严重的类群之一。鸕鹚类水鸟在非繁殖季节通常利用潮间带滩涂，在一定程度上也能适应利用人工生境。本研究通过分析东亚—澳大利西亚迁飞区 (EAAF) 北迁鸕鹚类水鸟对盐池的利用以评估这种适应能力。

研究采用低潮期同步调查 24 种鸕鹚类在渤海湾北部滦南湿地的潮间带滩涂和盐池的利用情况，结合其中 12 种鸕鹚类的血浆、血细胞稳定同位素，使用贝叶斯混合模型 (BMMs) 对食性进行分析。将鸕鹚类按取食方式分成不同的取食集团，结果发现取食集团能很好地解释鸕鹚类对盐池的利用模式。水面取食物种 (water-surface foraging) (如 stilt 长脚鹚、avocet 反嘴鹚)，不管体型大小，几乎完全利用盐池生境，稳定同位素也佐证了它们的主要食物来源为盐池。中小型视觉 (如鸕类) 和触觉 (滨鹚) 取食物种，与水面取食物种都拥有针状的喙，也有相当比例的食物来自于盐池。然而大型的触觉取食鹚类，几乎不利用盐池作为取食地。

比较两种方法，发现稳定同位素贝叶斯混合模型的结果比数量调查反映的鸕鹚类对盐池依赖程度更强。盐池的食物富含生物必须的脂肪酸，盐池对海岸鸟类食物的贡献不应仅仅考虑绝对值，还应该考虑这种贡献的质量。因此，如果管理得当，例如通过控制水位以利于依赖盐池的特定群体进行取食，盐池可为数量不断下降的鸕鹚类提供保护。虽然我们的重点是在 EAAF，但这些发现与也对于其他迁徙路线和其他非潮汐性的人工湿地也有启发意义。

相关研究详见 Lei, W., Masero, J.A., Dingle, C., Liu, Y., Chai, Z., Zhu, B., Peng, H., Zhang, Z., Piersma, T., 2021. The value

of coastal salt pans for migratory shorebirds: conservation insights from a stable isotope approach based on feeding guild and body size. *Anim. Conserv.* 24, 1071–1083.

(北京：雷维蟠)

## 公众对朱鹮保护的态度及支付意愿：对管理的启示

全球范围内，由于人类活动，生物多样性面临持续下降。此外，研究表明，上个世纪脊椎动物物种灭绝率比背景灭绝率高 100 倍，表明第六次大规模灭绝可能正在进行中。鉴于人类活动是物种减少和灭绝的主要来源，受威胁物种的保护管理计划的制定有必要考虑社会、经济和文化等因素。朱鹮 (*Nipponia nippon*) 是全球濒危鸟类，经过 40 余年的保护努力，野生种群数量稳定增长，分布范围逐渐从山区扩散到平原，而平原区较为频繁和持续的人类活动使朱鹮野生种群及其栖息地所面临的潜在威胁增加，为保护管理工作带来一定挑战。我们通过调查问卷来了解当地居民对朱鹮保护计划的态度、支付意愿及其影响因素，以期从社会 and 经济学角度为保护管理提供建议。

研究表明，当地居民积极支持朱鹮保护项目，82.34% 的受访者表示其家庭愿意每年为朱鹮保护捐款。Turnbull 下限非参数估计得到每户每年的支付意愿为 126 元，朱鹮保护的潜在捐款价值约为每年 2000 万元。受访者的收入，对朱鹮的态度及互动经历显著影响了他们对朱鹮保护项目的接受度和支付意愿。朱鹮原始研究价值与 Meta 回归分析函数的预测结果的比较表明，效益转移值可以为管理决策提供依据。

本研究结果不仅可用于朱鹮保护管理政策和相关宣传计划的制定，也表明决策者在缺乏物种经济信息的情况下可使用效益转移

模型进行快速的价值评估,对其他濒危物种的保护管理也具有一定的借鉴意义。

该研究得到了中国环境科学院生物多样性调查与评估项目(2019HB2096001006)和国家自然科学基金项目(No.31772483)的资助。详细内容请见:Ren, Y.P., Ding, C.Q., Zhang, Y.Z., Qing, B.P., & Duan, W.B. (2022). Public attitudes and willingness to pay toward the conservation of Crested Ibis: Insights for management. *Journal for Nature Conservation*, 66, 126118. (<https://doi.org/10.1016/j.jnc.2021.126118>)

(北京:任玉平,丁长青)

### 朱鹮(*Nipponia nippon*)野生种群的巢址选择仍倾向于高大乔木

了解鸟类如何选择适宜的繁殖地对其栖息地保护至关重要,濒危物种尤为如此。随着朱鹮(*Nipponia nippon*)野生种群数量的不断增加,其分布范围已经由山区扩大到海拔较低的平原地区,并且多在保护区以外,给该物种的保护带来极大困难和挑战。

为了制定新的更有效的保护计划,亟需了解当前朱鹮的繁殖地需求。本研究于2015–2019年共对117个野生朱鹮营巢地进行样方特征调查,使用广义线性混合模型评估朱鹮野生种群的巢址选择。结果表明,在山区朱鹮的主要营巢树种是马尾松(*Pinus massoniana*) (64.6%),而平原地区的主要营巢树种分别为榆树(*Ulmus pumila*) (44.9%)和山杨(*Populus davidiana*) (40.6%),这与营巢树种可利用性随分布区的变化有关。

在山区和平原地区,朱鹮均偏向于选择较高且胸径较大的营巢树,平原地区尤为明显,高大的营巢树能够提供较高的适宜巢位,有利于起飞和下落。同时,野生朱鹮(尤其

是山区繁殖个体)偏向于选择靠近树干营巢,能够获取更大的巢支撑。模型的进一步分析表明,山区的朱鹮巢址选择与坡度以及距小路距离均呈正相关,与巢下郁闭度呈负相关,而在平原地区巢址选择与这些因子关系不大,说明朱鹮的巢址选择表现出空间差异。本研究表明,尽管朱鹮分布范围不断扩大,并且主要栖息地类型发生变化,但仍偏好高大乔木上营巢。我们建议,在平原地区应加强对榆树和山杨等高大乔木的保护。另外,在制定新的保护计划,尤其是在未来的再引入项目中,应针对不同的栖息地景观特征确定具体的保护措施。该研究得到国家自然科学基金项目(31772483和31900371)和中国环境科学研究院生物多样性调查与评估项目(2019HB2096001006)的资助。研究结果发表在*Bird Conservation International*上(<https://doi.org/10.1017/S0959270921000526>)。

(广西:黄勇杰;北京:丁长青)

### 互花米草入侵生境纯色山鹧鸪鸣唱行为变异

栖息地结构可能是影响鸟类鸣声进化的重要因素,野生鸟类鸣声通讯正日益受到人为驱动的栖息地变化的影响。入侵植物有时会显著改变栖息地特征,但对本土鸟类鸣声的影响尚很少受到关注。外来植物互花米草(*Spartina alterniflora*)入侵严重改变了中国东部沿海湿地的植被景观格局,经历长期共存后,一些本土小型雀类逐渐扩散迁入米草生境繁殖。本研究以黄海湿地广泛分布的纯色山鹧鸪(*Prinia inornata*)为研究对象,比较了本土植被与米草生境中的雄性领域鸣唱声特征及行为差异,并分析了两类生境中鸣唱栖位与风速变化对个体鸣唱行为的潜在影响。结果表明,相比较本土植被生境,米草生境

中：(1) 个体鸣唱时长显著较短；(2) 种群内鸣唱类型较少；(3) 个体间鸣声相似性较高；(4) 高密度且均质化的植被结构与较高的风速可能导致部分个体改变了传统的伫立鸣唱习惯。推测，这种鸣唱行为变异现象可能与奠基者效应、植被结构及小气候变化等有关。本研究表明本土动物在适应入侵植物生境过程中的行为进化问题仍需深入理解，未来需进一步探究米草生境中纯色山鹧鸪鸣唱行为变异的主要驱动因素及其适应机制。本研究已在 *Integrative Zoology* 上发表 (2022; 17: 93–104.)

(安徽：陈潘；江苏：陈泰宇，  
刘彬，张曼玉，鲁长虎)

## 不同天气条件下青头潜鸭越冬行为模式响应分析

在自然界中，众多的环境因素会影响动物的行为表达，天气因素是其中之一。天气对动物有直接影响和间接影响，既可以影响动物个体或群体间的能量流动、信息交换，还可以影响动物与环境间的物质循环、行为模式。深入研究天气条件与动物行为模式之间的响应关系，能进一步深入了解动物应对天气变化的行为策略。本文以河南民权湿地公园的青头潜鸭为例，分析比较了青头潜鸭对晴天、阴雨天和雾霭天这三种天气条件的越冬行为模式响应。

研究结果表明，不同天气条件下，民权湿地公园青头潜鸭越冬期行为在行为时间分配、行为节律、主要行为方面存在一定的响应，表现为越冬期行为节律的整体波动程度与天气恶劣程度呈负相关（晴天 > 雾霭天 > 阴雨天），青头潜鸭在阴雨天和雾霭天会分配更多的静息和觅食时间（阴雨天 > 雾霭天 > 晴天），并将其峰期延后至中午和下午，尤其是傍晚

时达到最高峰；同时减少耗能行为，以储备更多的能量来应对恶劣天气下的夜晚，即增加能量摄入（即食物）并减少能量消耗是青头潜鸭在越冬期应对恶劣天气的行为响应。

(黑龙江：李浙，吴庆明，徐卓，  
杜微；北京：张琦；山东：高晓冬)

## 大鸨东方亚种的迁徙性别差异

大鸨 (*Otis tarda*) 是最重的迁徙鸟类，且具有高度的雌雄体型二态性。虽然该物种的迁移行为被广泛研究，但东方亚种 (*Otis tarda dybowskii*)，特别是雄性的迁移模式仍知之甚少。本研究组于 2018 年至 2019 年在蒙古国东部的繁殖地捕获了 6 只大鸨东方亚种 (5 只雄性和 1 只雌性)，并通过 GPS-GSM 卫星定位对其追踪。

结果表明，大鸨两性之间的迁徙模式存在显著差异：1) 雄性春季开始迁徙的时间晚于雌性，但较雌性早到达繁殖地，秋季则不然；2) 雄性的迁徙时长是雌性的 1/3 (雄性：16.44 ± 14.68 天；雌性：47.52 ± 20.04 天)；3) 雄性的迁徙距离约为雌性的 1/2 (雄性：945.13 ± 79.00 km；雌性：1882.63 ± 61.80 km)。

此外，我们发现大鸨对其繁殖地、繁殖后期活动区和越冬地表现出高度的忠诚度。比较以往文献记录，本研究发现的大部分越冬地在 70 年前也曾被利用。保护空缺分析结果表明，仅 22.20% 的大鸨 GPS 位点位于保护区内，且越冬地和迁徙期间处于保护区内的位点低于 5.0%。因此，这一濒临灭绝的亚洲种群亟需更多的有效保护。

(北京：王颖君，王子建，宓春荣，  
郭玉民；蒙古：Gankhuyag Purev-Ochir，  
Amarkhuu Gungaa, Baasansuren Erdenechimeg，  
Oyunchimeg Terbish, Dashdorj Khurelbaatar)

## 不同人为干预梯度下白鹤越冬行为模式研究

白鹤 (*Grus leucogeranus*) 是全球极危物种, 为了缓解受威状态, 许多动物园、救护中心开展了迁地保护形式的饲养管理, 而在管理过程中, 行为管理是其中重要的一块。为了有效提升迁地保护地 (动物园、救护中心) 人工干预下白鹤群体行为管理的质量, 采用瞬时扫描取样法、焦点动物取样法、所有事件取样法等对鄱阳湖保护区野生白鹤群体 (无人活动干预组)、扎龙保护区野外救护的白鹤群体 (轻度人为活动干预组)、哈尔滨动物园的人工饲养白鹤群体 (重度人为活动干预组) 开展了不同人为干预梯度下白鹤越冬行为模式研究。

研究表明, 三个不同研究组白鹤的越冬期行为模式存有差异; 其中, 无人活动干预的野生白鹤群体的越冬期行为时间分配以觅食行为占绝对优势, 其次为游走、静栖、站立、理羽等行为; 轻度人为干预组的白鹤越冬期行为时间分配以觅食、站立两种行为为主, 其次是理羽、鸣叫、游走、静栖行为; 重度人为干预组的白鹤越冬期行为时间分配却以理羽行为占优势, 其次是站立、静栖、觅食、游走行为; 所有这些行为均具有明显的日行为节律。进一步分析表明, 不同人为干预梯度下, 白鹤越冬期行为时间分配规律符合集群效应假说、中度干扰理论, 重度干预会促使某些行为向伴人行为转变。

(黑龙江: 徐卓, 吴可新, 卓白宗,  
肖超, 黄显, 邓文攸, 吴庆明)

## 邻近同伴对越冬东方白鹳觅食活动水平的影响: 社会信息的益处

动物喜欢聚集在食物资源丰富且可获性

高的斑块进行觅食活动。在此过程中, 觅食者往往通过监控邻居行为和外界情况来获取关于食物资源的相关信息。信息中心假说 (Information Centre Hypothesis) 认为, 由于同种个体之间提供的社会信息, 集群活动提高了彼此的觅食活动水平。觅食水平的提高导致了用于反捕食时间的减少, 于此同时加剧了群体成员之间的相互竞争。

有研究表明, 觅食活动水平受到群体规模以外的其他因素的影响, 比如邻居的数量和觅食强度。

为了验证这些假设, 我们对越冬东方白鹳 (*Ciconia boyciana*) 的觅食活动水平 (觅食率、觅食努力和觅食成功率) 进行量化, 分析如何受到邻居数量和觅食强度的影响。本研究中, 我们收集了 2017—2019 年在安徽升金湖国家级自然保护区越冬的东方白鹳觅食行为数据, 控制其他变量 (群体编号、越冬年份和越冬阶段) 的影响。结果发现, 在有觅食邻居的情况下, 东方白鹳个体的觅食活动水平要显著高于没有觅食邻居的个体。

此外, 东方白鹳根据邻居行为来收集社会信息调整自己的觅食活动水平。焦点个体的觅食率和觅食努力与邻居的平均觅食率呈现正相关, 而觅食成功率不受邻居觅食率和觅食成功率的影响, 但与邻居的平均觅食努力呈正相关。

综上所述, 个体觅食活动水平主要受其周边邻居觅食活动强度的影响。这一结果与以往的研究结果, 群体规模是决定个体觅食活动水平的最重要因素不同。

相关研究详见: Cheng L., Zhou L., Bao Y., et al. Effect of conspecific neighbors on the foraging activity levels of the wintering Oriental Storks (*Ciconia boyciana*): Benefits of social information. *Ecology and Evolution*, 2020, 10: 10384-10394.

(安徽: 程磊, 周立志)

## 挠力河保护区不同退耕模式下鸟类群落多样性响应

黑龙江挠力河国家级自然保护区，地处三江平原腹地，在保护三江平原生物多样性和维持生态系统功能方面极具代表性。经过近半个世纪的垦荒，挠力河流域湿地生态特征发生了明显的改变。近年来国家开展退耕还湿工程，挠力河保护区响应国家政策，截至 2018 年，退耕总面积达 5004 ha。为了了解退耕的生态效果，本研究将研究地区分为退耕区域和未退耕区域，用样线法和样点法对挠力河保护区的鸟类群落进行了调查，从群落组成、群落多样性、群落相似性阐述了不同退耕方式、不同退耕时间两种情境下鸟类群落结构的响应，进而评价了植被群落演替下鸟类群落方面的退耕效果。研究结果表明：(1) 不同退耕方式下，鸟类群落多样性均有所增加，但在水鸟物种丰富度方面，影响不一致，自然退耕的效果强于人为干扰退耕的效果；而在陆地鸟类物种丰富度方面，人为干扰退耕的效果强于自然退耕的效果。(2) 不同退耕时间下，退耕时间的长短对鸟类物种丰富度影响不大，但在水鸟丰富度方面，退耕时间越长，水鸟丰富度越高。(3) 退耕后，群落不同演替阶段鸟类群落多样性有所不同，演替发展阶段的鸟类群落多样性高于演替初始阶段，水鸟物种丰富度也如此。进一步分析表明：无论人为干扰退耕还是自然退耕，都能促进鸟类群落多样性的恢复；不同退耕方式对水鸟与陆地鸟类物种丰富度的驱动影响不同，自然退耕方式对水鸟群落恢复有利，人为干扰退耕方式对陆地鸟类物种丰富度恢复有利。

(辽宁：陈露；黑龙江：吕泓学，徐卓，金洪阳，吴庆明)

## 鹊鸂发现非亲雄性杀雏案例

杀雏行为案例已经在越来越多的鸟种中得到记录，但由于这种行为发生的比例很低且难以被证实，因而通常在巢失败原因分析中的重要性被低估了。我们在海南观察到了 2 例人工巢箱中发生的鹊鸂 (*Copsychus saularis*) 非亲杀雏行为：一例是在育雏期雄鸟失踪，只有雌鸟存在情况下，一只其他雄鸟进入巢箱，不断用喙啄和甩着巢里全部 4 只 8 日龄雏鸟直到死亡；另一例是雄鸟和雌鸟都在，但在喂食间隙，一只雄鸟进入巢箱叼出仅有的 1 只 3 日龄雏鸟扔到巢箱外。雏鸟被杀害之后亲鸟仍叼着食物进来尝试喂食，见到雏鸟没有生命活动迹象之后显得非常暴动，由此可以判断这是鹊鸂的同种雄鸟非亲杀雏行为。结果发表在 2021 年的 *Ornithological Science* 上。

(海南：靳雅萌，冯昌章，梁伟)

## 同域 4 种大杜鹃宿主的巢址选择与反寄生策略比较研究

繁殖是鸟类生活史中最重要的组成部分，利用相似资源的同域繁殖的多种鸟类存在生活史特征的差异和生态位的分化，以此在有限的资源中减少竞争、实现共存；同时应对外界不同强度的选择压力表现出不同的适应性的繁殖对策。我们通过比较东方大苇莺 (*Acrocephalus concinens*)、钝翅苇莺 (*Acrocephalus concinens*)、震旦鸦雀 (*Paradoxornis heudei*) 和棕头鸦雀 (*Sinosuthora webbiana*) 4 种在湿地芦苇生境中共域繁殖的大杜鹃 (*Cuculus canorus*) 宿主的巢址选择、繁殖成效及与大杜鹃在卵阶段的协同进化，探究共域繁殖鸟类的共存机制和繁殖对策。

结果发现，东方大苇莺的繁殖巢占 4 种

鸟类的 70% 以上, 为绝对优势种群; 4 种鸟类的繁殖巢呈镶嵌式分布, 巢型相似; 但 4 种鸟类在巢址微生境中利用的芦苇高度 (Chi-square = 13.635,  $df = 3$ ,  $P = 0.003$ )、芦苇密度 (Chi-square = 8.045,  $df = 3$ ,  $P = 0.045$ ) 和筑巢高度 (Chi-square = 46.795,  $df = 3$ ,  $P < 0.01$ ) 存在显著性差异。

此外, 震旦鸦雀和棕头鸦雀两种本地留鸟的繁殖时间比两种苇莺提前, 存在繁殖物候的分化, 从而降低了种间竞争; 4 种鸟类对抗大杜鹃巢寄生进化出的卵识别能力存在显著性差异 (Fisher's exact: all  $P < 0.01$ ); 本地区超过 90% 的大杜鹃寄生卵来自东方大苇莺的繁殖巢, 两种卵型除亮度外 (all  $P < 0.05$ ), 在背景色和斑点的色调和色度上均极为相似 (all  $P > 0.05$ )。

进一步研究发现东方大苇莺采用真识别机制识别外来卵, 且拒卵行为均发生在雌性个体中, 卵阶段对抗大杜鹃寄生的繁殖策略存在性别冲突。

(河北: 褚来坤; 宁夏: 刘建平;  
海南: 杨灿朝、梁伟)

## 鸟巢中添加蛇蛻是一种有效的反捕食手段

蛇是鸟类常见的捕食者之一, 然而, 一些胆大的鸟类会主动向巢内添加蛇蛻。我们以海南热带岛屿的八哥 (*Acridotheres cristatellus*) 为研究对象, 探讨巢中叼入蛇蛻的作用及其可能的机制。

结果发现, 八哥在繁殖的不同阶段会向巢内添加蛇蛻 (长度范围: 2~18.3 cm), 筑巢期添加蛇蛻的比例高达 38.9%。另外, 蛇蛻组 (巢中有蛇蛻) 和非蛇蛻组 (巢中无蛇蛻) 在离巢雏鸟的数量和雏鸟体重上没有显著差异, 说明鸟巢中的蛇蛻并不能促进雏鸟生长, 即

不支持药物假说 (the drug hypothesis); 然而, 蛇蛻组的捕食率显著低于非蛇蛻组, 这说明八哥巢中的蛇蛻能够有效降低巢捕食率, 支持反捕食假说 (the anti-predation hypothesis)。

(海南: 刘金梅, 梁伟)

## 河南民权湿地公园青头潜鸭越冬行为模式及性别差异

动物的行为活动通常反映了其生活习性、生存状态以及种内种间关系等, 掌握珍稀濒危物种的行为活动规律对制定其保护管理措施有着重要的参考价值。以河南民权公园分布的极危物种青头潜鸭为例, 我们针对其越冬期的行为模式进行了研究, 并分析比较了行为模式的性别差异。研究结果发现: (1) 民权湿地公园, 青头潜鸭越冬期行为时间分配以静息、觅食和运动三类行为为主, 其次是修整和飞行两类行为; 运动行为与觅食、修整、社会等行为之间呈极显著正相关, 修整行为与社会行为之间呈极显著正相关, 静息行为与修整、运动、社会等行为之间呈极显著负相关, 飞行行为与觅食、静息、修整等行为之间呈极显著负相关; (2) 静息行为具有全时段高时间分配的特征, 不存在峰期和谷期; 觅食行为和飞行行为具有明显的错峰式节律; (3) 不同性别青头潜鸭越冬行为时间分配存有差异, 雌雄青头潜鸭在静息、修整、运动和飞行四类行为时间分配方面存在显著性差异, 雄性的静息、修整行为的时间分配极显著高于雌性, 而运动、飞行行为的时间分配极显著低于雌性; (4) 不同性别青头潜鸭越冬行为活动节律方面, 除飞行行为外, 其余行为均在行为峰期与谷期节律方面存有差异。进一步分析表明, 民权湿地公园青头潜鸭越冬行为模式符合行为投资与收益的能量学理论, 越冬行为模式在行为时间分配和行为节律方

面存在性别差异。

(北京：张琦；黑龙江：李浙，隋媛，杜微，徐卓，吴庆明；山东：高晓冬)

## 山雀异亲抚育实例

异亲抚育指的是个体向非后代提供的任何类型的照料。异亲抚育行为不仅仅是一种利他主义行为；它有益于接受照料者和实施照料者双方。异亲抚育在降低双亲育雏投入的同时提高了后代的成活率。

在此，我们报告了 3 例在 2019 年繁殖季节发现的 3 只成年大山雀 (*Parus major*) 在同一个人工巢箱中向雏鸟提供抚育的情况。全部 3 例均发生在大山雀亲本移除实验的实验巢箱中。

在这些持续 3 天的实验中，1 只亲鸟在第 2 天被暂时移除。录像发现自第 1 天起即存在第 3 个成鸟参与育雏。在其中 2 个巢箱中，第 3 只个体在第 3 天被移出的亲鸟回到巢箱后仍继续抚育雏鸟。在其中 1 个巢箱中，第 3 只个体在第 1 天与另 1 只亲鸟共同育雏，并在第 2 天继续育雏。

这是第一个关于大山雀存在异亲抚育的记录。这对于一个被充分研究的鸟类物种来说是一个有趣的发现，并为深入研究提供了可能性。

本研究已于 2022 年 2 月在线发表于 *The Wilson Journal of Ornithology* (133(3):000–000, 2021)。

(辽宁：蒋一婷，马瑞瑶，何亚齐，万冬梅)

## 邻居的空间分布与繁殖行为对山雀繁殖成功的影响

同种和异种鸟类的巢址空间分布和繁殖

行为可能对邻居鸟类繁殖产生影响，并且这种影响会因物种而异。该项研究在辽宁仙人洞国家级自然保护区开展，利用人工巢箱招引山雀繁殖，并对杂色山雀 (*Sittiparus varius*) 和大山雀 (*Parus cinereus*) 的繁殖期行为进行了监测。整个研究自 2016 至 2019 年，连续 3 年记录了两种山雀的巢箱选择及繁殖数据。

结果显示，在空间分布上，同种鸟繁殖巢的巢间距明显大于异种鸟的巢间距；从时间上看，邻里间繁殖是否高度同步并未显著影响本实验地两种鸟类包括孵化率和繁殖成功率在内的繁殖成效。但隔壁邻居的繁殖成效与本家的繁殖成效的相关性却出现了种间差异：大山雀的孵化率和繁殖成功率与种内或种间邻居均没有显著相关；杂色山雀的孵化率和繁殖成功率与种间邻居无显著相关，但其繁殖成功率却与种内邻居呈现显著负相关关系。

本研究呈现了生态位接近的两个物种会从繁殖空间上表现出种内分离的倾向以降低竞争，但不同物种的种内竞争对其繁殖成效的影响却不尽相同。雀形目鸟类巢址空间分布的研究结果，也为未来试验和保护计划中的人工巢箱使用提供了可靠参照。本研究已于 2022 年 2 月在线发表于 *Avian Research*。

(辽宁：蒋一婷，毕雨佳，马瑞瑶，张静，万冬梅)

## 沼泽山雀婚外配发生原因探究

婚外配是鸟类复杂繁殖策略中的重要组成部分，对鸟类个体的适合度及种群繁衍具有重要影响。在 2012—2019 年间，课题组对辽宁省仙人洞国家级自然保护区内沼泽山雀的婚外配行为开展了研究。共收集沼泽山雀繁殖巢 44 个，325 个子代，其中 20 巢中 49

个子代为婚外子代，有婚外父权巢比例高达 45.45%，婚外子代率达 15.08%。找到婚外雄性 9 只，其中 4 只为中心巢的邻居巢雄鸟，另外 5 只雄鸟的繁殖巢距离中心巢较远。

对于雌鸟婚外配行为的原因一直以来都备受争议，许多研究试图从基因杂合度或配偶间遗传相似性的角度来解释雌鸟发生婚外配行为的原因。然而，本研究通过比较却发现，有婚外父权巢雄鸟与无婚外父权巢雄鸟的基因杂合度、有婚外父权巢雌鸟的社会配偶和婚外配偶的基因杂合度、婚内子代和婚外子代的基因杂合度间均无显著性差异；针对有婚外父权的巢，我们又进一步分析了雌雄鸟间的遗传相似性，发现雌鸟与其社会配偶间和雌鸟与婚外配偶间的遗传相似性也无显著性差异。

总的来说，研究证实，沼泽山雀种群存在较高比例的婚外父权，其婚外配行为的发生原因不是为了追求基因杂合度及其带来的子代适合度利益，也不是为了避免近交或远交带来的遗传衰退。

本研究得到国家自然科学基金 (No. 31872231) 资助，研究成果发表在 *Avian Research* (2021, 12: 69)。

(辽宁：王娟，李可可，万冬梅)

### 大杜鹃雏鸟叫声促使棕头牛鹂的宿主红翅黑鹂提供更多的亲代抚育

本研究是 2019—2020 年在美国伊利诺伊大学香槟分校访学期间与 Mark E Hauber 教授合作在校园周边开展的雏鸟鸣声回放实验，旨在探讨大杜鹃雏鸟叫声作为一种潜在的超常刺激信号，在美洲地区一种未被寄生过的宿主鸟类中的育雏效果。

巢寄生鸟类通过“欺骗”和“操纵”宿主的行为获取更多自己的适合度利益。其中，

以雏鸟叫声为最典型，通常被形容成“超常刺激信号”来诱导宿主鸟类提供更多的亲代抚育。同时，也有研究认为，在不同的宿主巢中寄生鸟类的乞食叫声也存在可塑性，以更好“侵入”寄主的亲子交流系统。大杜鹃和美洲的牛鹂属于两种不同的巢寄生体系，具有不同的雏鸟乞食策略：大杜鹃雏鸟通常把宿主雏鸟（或卵）推出巢外，仅靠自己一只鸟的叫声索取足够的食物；而牛鹂可以与宿主雏鸟共同被抚育，可通过宿主雏鸟的叫声获取更多的食物。尽管两种寄生体系寄生鸟类的雏鸟乞食策略不同，但关于两种寄生鸟类乞食叫声的效果还没有比较研究。本研究选择北美地区褐头牛鹂的常见宿主，红翅黑鹂为研究对象，通过回放大杜鹃、褐头牛鹂、红翅黑鹂雏鸟叫声和空白对照，比较寄主鸟类的育雏努力。结果发现，大杜鹃雏鸟叫声可以比褐头牛鹂更好触发宿主提供更多的育雏频次和食物量；回放杜鹃和红翅黑鹂雏鸟叫声具有相似的育雏效果，并显著高于空白对照。这个研究表明大杜鹃雏鸟叫声可作为一种有效的声音信号成功“入侵”一种北美大陆新的宿主。未来需要从声音结构或鸣叫频率等角度分析大杜鹃雏鸟在新寄主和现在利用宿主中的作用差异。

本研究得到国家自然科学基金 (No. 31911540468) 部分资助，研究成果发表在 *Behavioral Ecology and Sociobiology* (2021,75:11)。

(辽宁：李东来)

### 杂色山雀亲代抚育与婚外父权的丧失没有关系

本研究是课题组在辽宁省仙人洞国家级自然保护区对杂色山雀的婚外配行为为长期研究的重要成果，重点是从亲代抚育角度探讨

婚外配发生和存在的机理性问题。

我们知道具有很高婚外配比例的社会性鸟类, 雄性面临很高的代价抚育没有亲缘关系的后代, 理论模型预计丧失父权的雄性应该降低亲代投入。然而, 研究数据并不完全支持这个推论。本研究我们选择中国分布的杂色山雀进行实验, 探讨亲代抚育行为与婚外配的关系。结果发现 39.5% 的杂色山雀具有婚外配, 婚外配子代比例为 16.4%。但我们没有发现明显的证据表明雄性亲鸟降低育雏频次和努力。同时, 婚外配也没有明显的影响亲鸟的繁殖成功率和子代的身体状况。我们推测广泛缺乏准确的婚外交配线索或必要的环境选择压力可能是促使雄性亲鸟无法调整育雏策略的重要原因。本研究进一步说明社会性鸟类广泛存在婚外配现象也可能是由于雄性鸟类缺乏亲代识别, 并未对发生婚外配的雌鸟带来适合度代价。

本研究得到国家自然科学基金 (No. 31071927, 31872231) 资助, 研究成果发表在 *Pakistan Journal of Zoology* (2021. 53: 2105-2116)

(辽宁: 李东来, 韩梅, 金麟雨,  
张雷, 殷江霞, 万冬梅)

## 觅食地空间距离会影响白头鹤和家鸭肠道细菌的群落组成

动物肠道微生物群落组成的影响因素是目前的研究热点, 多数关注于动物食性和垂直遗传等方面, 对于物种间的间接接触方式导致肠道菌群传播的研究较少, 以及种间距离对肠道细菌群落结构影响的研究更加贫乏。2019 年 1 月于安徽升金湖国家级自然保护区采集白头鹤粪便样品 20 份 (HC)、距离白头鹤觅食地 1 公里以内家鸭粪便样品 20 份 (D-N) 和距离白头鹤觅食地超过 4 公里家鸭粪便样

品 20 份 (D-F)。通过粪便样品 DNA 提取、物种鉴定、16S rRNA 高通量测序和生物信息学分析, 比较和分析白头鹤和不同远近距离家鸭肠道细菌 (包括潜在致病菌) 的群落组成。结果显示, 白头鹤和近距离家鸭具有更相似的肠道细菌群落结构, 且家鸭群体存在更多的潜在致病菌 OTU (Operational Taxonomic Unit)。进一步发现, 这种明显的跨种传播和感染, 可能源于近距离下物种的间接接触 (如粪 - 口传播和共用水源等)。这些研究结果表明, 种间距离在肠道细菌跨种传播和潜在致病感染中起着关键作用。明确了肠道细菌群落的变化是由于近 1 公里的同域分布动物之间的跨物种传播而导致。为确定保护区的安全放养距离和建立自由放养区提供了理论依据。

相关研究详见: Wang, W., Zhou, L., Fu, R. et al. Effects of foraging site distances on the intestinal bacterial community compositions of the sympatric wintering Hooded Crane (*Grus monacha*) and Domestic Duck (*Anas platyrhynchos domesticus*). *Avian Research*, 2021, 12(1):20.

(安徽: 王伟, 周立志)

## 白头鹤 (*Grus monacha*) 食物组成的改变会影响其肠道细菌多样性

影响动物肠道微生物的因素有很多, 其中食物是一个重要的影响因素。本研究分析了升金湖越冬白头鹤在 2018 年 11 月、2019 年 1 月和 3 月的食物组成、肠道细菌组成及食物组成对其肠道细菌多样性的影响。结果显示, 升金湖越冬白头鹤以蓼子草、水稻和苔草属植物为主要食物, 2018 年 11 月以蓼子草和苔草属植物为主要食物, 2019 年 1 月以水稻和蓼子草为主要食物, 3 月以蓼子草和苔草属植物为主要食物。在门水平上的肠道细

菌较为稳定,白头鹤的主要食物均与其肠道细菌具有较高的相关性。此外,白头鹤肠道细菌  $\alpha$ -多样性在越冬的最后一个阶段显著高于前两个阶段,可能是由于白头鹤可获得的主要食物种类发生了变化。肠道细菌 NMDS 分析显示,升金湖白头鹤肠道细菌在越冬期的第一个阶段和最后一个阶段的差异性更小,说明进食相似的食物会导致肠道细菌组成也更相似。

相关研究详见: Zhang N, Zhou L, Yang Z, et al. Effects of Food Changes on Intestinal Bacterial Diversity of Wintering Hooded Cranes (*Grus monacha*). *Animals*, 2021, 11(2):433.

(安徽: 章娜中, 周立志)

### 栖息地大小和保护等级可能影响了白头鹤肠道微生物群落

迁徙水鸟在不同的栖息地越冬,其肠道微生物受所在栖息地外部环境的影响。栖息地大小和保护等级的不同为迁徙水鸟提供了不同的外部环境选择压力,这种环境选择压力可能反应在其的肠道微生物上。目前在栖息地环境对水鸟肠道微生物的影响方面的研究还比较薄弱,特别是栖息地大小和保护等级对肠道微生物的影响。通过在同一时间段采集长江中下游三个不同湖泊(栖息地)的白头鹤粪便,探究了栖息地大小和保护等级对迁徙水鸟肠道微生物的影响。结果显示,小湖泊升金湖白头鹤肠道细菌与真菌 Alpha 多样性显著高于大湖泊鄱阳湖,保护等级较高的升金湖白头鹤肠道细菌多样性显著高于保护等级较低的菜子湖。进一步分析发现,升金湖与鄱阳湖相比,升金湖白头鹤有更多的肠道潜在病原菌属;升金湖与菜子湖相比,升金湖白头鹤肠道中的肠道指示菌很多都与纤维素代谢有关,菜子湖白头鹤肠道指示菌

很多都是肠道潜在病原菌。这些研究结果表明栖息地大小和保护等级的不同可能影响迁徙水鸟肠道微生物的组成。研究不同栖息地环境下濒危水鸟肠道微生物对理解濒危水鸟在不同栖息地环境下面临的环境选择压力可能具有重要的意义。

相关研究详见: Gu J, Zhou L. Intestinal Microbes of Hooded Cranes (*Grus monacha*) Wintering in Three Lakes of the Middle and Lower Yangtze River Floodplain. *Animals*, 2021, 11(5):1390.

(安徽: 顾晶晶, 周立志)

### 迁徙停歇地白头鹤肠道细菌群落结构具有显著的季节差异

肠道细菌群落是生物体重要的组成部分。影响肠道细菌群落组成和多样性的因素多种多样,包括食性、环境和季节等。在季节性迁徙过程中,候鸟会利用多种栖息地和食物资源,可能会影响其肠道细菌群落结构。

白头鹤 (*Grus monacha*) 是一种季节性长途迁徙水鸟,且在飞行途中会利用不同的栖息地。林甸位于中国松嫩平原,因其具有丰富的食物资源,包括玉米、水稻和大豆,使其成为白头鹤重要的迁徙停歇地之一。研究表明,每年约有 4000 只白头鹤(约占全球总数的 34%)在此停歇。升金湖是长江中下游的一个浅水通江湖泊,也是白头鹤的重要越冬地之一。白头鹤在此越冬时主要的食物来源是苦草、马来眼子菜和大米等。此外,食物的丰富度和可获得性也会影响白头鹤的觅食策略,从而影响其肠道的生理生态。

本研究主要关注白头鹤在迁徙季节其肠道细菌群落的多样性和差异性。采集迁徙停歇地林甸(春、秋季)和越冬地升金湖冬季白头鹤的粪便样本,使用高通量测序(Illumina

Mi-seq) 分析粪便样本中的细菌群落。其优势门主要为厚壁菌门 (Firmicutes)、变形菌门 (Proteobacteria)、软壁菌门 (Tenericutes)、蓝藻菌门 (Cyanobacteria) 和放线菌门 (Actinobacteria)。林甸春、秋季白头鹤肠道细菌的物种多样性显著低于升金湖冬季。且在这三个季节白头鹤的肠道细菌群落组成差异显著 (ANOSIM,  $P = 0.001$ ), 表明季节波动可能调节候鸟肠道细菌的群落组成。本研究为了解迁徙白头鹤肠道细菌群落结构的季节动态提供了基础资料。

相关研究详见: Zhang F., Xiang X., Dong Y., et al. Significant differences in the gut bacterial communities of Hooded Crane (*Grus monacha*) in different seasons at a stopover site on the flyway. *Animals*, 2020, 10(4):701.

(安徽: 张凤玲, 周立志)

### 丹顶鹤野化放归前两种模式下其肠道微生物群落的比较研究

动物肠道中有丰富多样的微生物, 在宿主的生理健康方面发挥重要作用。许多内外

部因素影响肠道细菌群落, 包括宿主基因型、肠道不同部位、不同发育阶段、性别、饮食、地理、污染物等。然而, 目前对野化放归前不同饲养模式对珍稀鸟类肠道细菌群落影响的研究甚少。

本研究采用 16SrRNA 高通量测序技术, 对黑龙江扎龙国家级自然保护区内野化放归前两种模式下丹顶鹤的肠道细菌群落组成和多样性进行了研究。

结果表明, 变形菌门 (74.39%) 和厚壁菌门 (25.29%) 是扎龙自然保护区丹顶鹤的主要肠道细菌群落。散养和圈养丹顶鹤的肠道细菌群落组成存在显著差异 ( $p = 0.001$ )。雌雄散养丹顶鹤肠道细菌群落组成不存在显著差异 ( $p = 0.613$ )。PICRUST2 分析表明, 扎龙保护区丹顶鹤肠道微生物相关基因功能预测主要包括氨基酸代谢、碳水化合物代谢、辅助因子和维生素代谢等。

结果表明, 不同的饲养模式对丹顶鹤肠道微生物群落组成有显著影响, 但性别对丹顶鹤肠道微生物群落组成无显著影响。这些结果为鹤类肠道菌群的研究提供了新的思路, 为今后的研究奠定了基础。

(黑龙江: 王焕, 伍一宁, 邹红菲, 王贺)



## 全国鸟类环志中心唐家河环志站成立

4月1日,2021年青川唐家河紫荆花节启动仪式在唐家河国家级自然保护区举行。启动仪式上,全国鸟类环志中心负责人宣布,唐家河国家级自然保护区开展的鸟类环志工作纳入全国鸟类环志管理体系,加挂“全国鸟类环志中心唐家河环志站”牌。

“唐家河国家级自然保护区地处岷山摩天岭南麓,是西南地区重要的鸟类栖息地和迁飞通道,开展鸟类环志活动对于监测候鸟种群动态、研究迁徙规律和保障迁徙安全等具有重要的意义。”该负责人介绍,唐家河环志站目前是全国鸟类环志中心在四川唯一挂牌环志站的单位。

(四川:陈诗颖,苟小华)

## 东北林业大学帽儿山鸟类环志站 2021 年环志简报

2021年东北林业大学帽儿山鸟类环志站共计开展环志工作133天,环志鸟类6,862只。春季环志于3月10日开始至5月24日结束,共开展环志工作76天。环志鸟类10目23科68种3,056只。春迁期鸟类环志量在4月16日达到高峰,有181只。主要环志鸟类包括:红胁蓝尾鸂(*Tarsiger cyanurus*)1180只、黄喉鹀(*Emberiza elegans*)426只、灰头鹀(*Emberiza spodocephala*)255只、田鹀(*Emberiza rustica*)230只、北朱雀(*Carpodacus*

*roseus*)138只。秋季环志于9月15日至11月10日开展,共计57天。环志鸟类6目23科67种3,806只,日均66.8只。10月5日达到最高环志量204只。主要环志鸟类包括:红胁蓝尾鸂734只、黄喉鹀508只、北朱雀402只、白腰朱顶雀(*Acanthis flammea*)327只、黄腰柳莺(*Phylloscopus proregulus*)302只、黄眉柳莺(*Phylloscopus inornatus*)288只、远东山雀(*Parus major*)261只、黄雀(*Spinus spinus*)119只。春季重捕鸟类481只,其中归家82只,回收到外地环志鸟2只。秋季重捕鸟类58只,归家40只,未回收到外地环志的鸟类。受疫情影响,导致本年度环志总量有所下降。利用帽儿山鸟类环志保护站环志数据,可以帮助科研工作者开展鸟类学各领域的研究工作,并为研究鸟类迁徙行为提供丰富的基础数据。通过研究每年环志鸟类的数量变化,监测迁徙鸟类的种群动态变化,研究环境变化对鸟类的影响,有助于制定合理的鸟类资源保护管理对策。

(黑龙江:司雨惠,戎可)

## 国家林草局候鸟动态监测保护国家创新联盟成立大会暨第一届联盟成员代表大会在京召开

6月18日,以中国林科院森环森保所为牵头单位,中国科学院昆明动物研究所、东北林业大学、南京师范大学、北京野生动物救护中心等单位共同发起成立的候鸟动态监

测保护国家创新联盟成立大会暨第一届联盟成员代表大会在北京召开。国家林草局科技司一级巡视员厉建祝, 动植物司副司长周志华、鸟类处处长肖红、监测处处长温战强, 自然保护区管理司生物多样性处处长罗颖, 中国林科院副院长肖文发, 森环森保所所长江泽平等领导出席会议。森环森保所副所长王小艺主持会议。

厉建祝巡视员宣读了候鸟创新联盟成立的批复文件, 并肯定了候鸟创新联盟的重要性、特殊性、科学性、权威性, 同时提出联盟的工作要求, 进一步明确工作重点、工作机制, 发挥联盟功能作用, 希望将联盟建设成联合开发、资源共享, 优势互补、风险共担、利益共同共享于一体的技术创新合作组织; 周志华副司长和肖文发副院长分别强调了候鸟动态监测保护国家创新联盟成立的重要性和必要性; 江泽平所长在会上致欢迎词。

厉建祝等领导向联盟理事长陆军和与会理事单位、成员单位授牌。第一届联盟成员代表大会上, 候鸟创新联盟理事会成员单位代表表决了候鸟动态监测保护国家创新联盟第一届理事单位名单、理事会会员名单、联盟成员单位、秘书处人员名单、章程及五年发展规划等, 并聘请来自北京师范大学、

复旦大学、北京林业大学、东北师范大学和东北林业大学的鸟类学权威专家成立专家咨询委员会。

候鸟创新联盟经国家林草局批准成立,

候鸟没有国籍、迁徙不分国界, 因此, 突破传统的保护理念, 沿着迁徙路线, 在重要的迁徙节点, 同步开展保护行动, 有效掌握候鸟的迁徙动态, 探索保障迁徙安全的有效途径, 既是新时期加强野生动物保护管理能力需要, 同时也是提升迁徙研究水平的有效途径, 更是候鸟动态监测保护国家创新联盟将要探索和示范的新模式。联盟围绕国家生态文明建设战略部署、候鸟资源保护管理以及科学研究的需要, 遵循“行业自律、协同创新、平等竞合、共同发展”的原则, 致力于推动候鸟监测技术创新, 提升我国候鸟保护水平致力于规范候鸟动态监测活动, 协同创新提升迁徙研究水平, 优势技术创新资源整合, 开展科技协同创新, 着力解决重大战略需求与共性关键技术, 互助合作共享资源信息成果, 保障候鸟迁徙安全。

候鸟联盟目前有 28 家成员单位, 包含了科研监测、保护管理、宣传展示和科技开发等多个领域, 覆盖了从东北到西南广阔的迁飞区域, 涉及东亚 - 澳大利西亚, 中亚和西太平洋三条迁徙路线。具备了引领候鸟研究方向, 规范监测技术标准, 研发更新追踪设备和示范应用新技术的能力。本联盟将遵循国家生态文明发展战略, 紧盯野生动物保护管理需求, 关注国内外迁徙研究趋势, 充分发挥联盟优势, 努力成为我国候鸟保护与迁徙研究的重要支撑力量。

(北京: 陈丽霞、陆军)



## 我国新版《国家重点保护野生动物名录》公布

2021年2月6日,国家林业和草原局、农业农村部联合公布了新调整的《国家重点保护野生动物名录》(以下简称《名录》)。调整后的新版《名录》,共列入野生动物980种和8类,其中国家一级保护野生动物234种和1类、国家二级保护野生动物746种和7类。上述物种中,686种为陆生野生动物,294种和8类为水生野生动物。

与1989年的《名录》相比,2021年的新版《名录》主要有以下变化:一是在原《名录》所有物种均予以保留的基础上,将黑琴鸡、白枕鹤、黑脸琵鹭、长江江豚等65种原国家二级保护野生动物升为国家一级;二是熊猴、北山羊、蟒蛇3种野生动物因种群稳定、分布较广,由国家一级保护野生动物调整为国家二级;三是新增517种(类)野生动物。其中,勺嘴鹬、黄胸鹀、东方白鹳、大斑灵猫等43种列为国家一级保护野生动物,狼、大滨鹬等474种(类)列为国家二级保护野生动物。

我分会陆军、金崑、张正旺、杨晓君、张雁云、孙悦华、丁长青等多位专家参加了国家林草局组织的专家论证,为新版《国

家重点保护野生动物名录》的颁布提供了咨询意见。

(北京:张正旺)

## 中国首批国家公园正式设立

2021年10月12日,在《生物多样性公约》第十五次缔约方大会上,我国正式宣布设立三江源、大熊猫、东北虎豹、海南热带雨林、武夷山等首批5个国家公园,涉及青海、西藏、四川、陕西、甘肃、吉林、黑龙江、海南、福建、江西等10个省区,保护面积达23万平方公里,涵盖近30%的陆域国家重点保护野生动植物种类。

其中,三江源国家公园地处青藏高原腹地,保护面积19.07万平方公里,实现了长江、黄河、澜沧江源头整体保护。大熊猫国家公园跨四川、陕西和甘肃三省,保护面积2.2万平方公里,是野生大熊猫集中分布区和主要繁衍栖息地,保护了全国70%以上的野生大熊猫。东北虎豹国家公园跨吉林、黑龙江两省,与俄罗斯、朝鲜毗邻,保护面积1.41万平方公里,分布着我国境内规模最大、唯一具有繁殖家族的野生东北虎、东北豹种群。海南热带雨林国家公园位于海南岛中部,保护面积4269平方公里,保存了我国最完整、最多样的大陆性岛屿型热带雨林。这里是全球最濒危的灵长类动物——海南长臂猿唯一分布地。海南热带雨林国家公园位于海南岛中部,保护面积4269平方公里,保存了我国最完整、最多样的大陆性岛屿型热带雨林。这里是全球最濒危的灵长类动物——海南长臂猿唯一分布地。

(自新华网)

## 我分会两位鸟类学者获得国家基金委优秀人才项目资助

2021年我分会两位会员获得国家基金委优秀人才项目的资助。其中中科院动物研究所的詹祥江研究员获得杰出青年基金的资助,北京大学华方圆研究员获得优秀青年基金的资助。

詹祥江简介:现任中国科学院动物研究所研究员、副所长(主持工作),种群和进化遗传学组组长,中英生物复杂性研究联合实验室主任。2003年和2006年分别于北京师范大学和中国科学院动物研究所获得硕士和博士学位。中国科学院优秀毕业生、优秀博士学位论文获得者,中国科学院优秀导师,国家自然科学奖获得者。2008起在英国 Cardiff 大学进行博士后研究。2014年回国后主要从事动物种群和进化遗传学研究。主持和参加多项国内外科研项目,包括国家自然科学基金委国家杰出青年科学基金和重点项目、国家重点研发计划、中国科学院战略先导、英国皇家学会等项目。迄今为止已经在 *Nature*、*Nature Genetics*、*Nature Communications*、*Current Biology*、*Genome Biology*、*Molecular Biology and Evolution*、*Science* 等科技期刊上发表论文 57 篇,其中多项研究成果被 *Nature*、*Science*、*Faculty 1000*、人民日报、光明日报、BBC 等报道或推荐。

华方圆简介:现任北京大学城市与环境学院生态研究中心研究员、课题组长、博士生导师。2003年本科就读于北京师范大学,2013年博士毕业于佛罗里达大学,2013—2016年在普林斯顿大学生态与进化生物学系从事博士后研究,2017—2019年在剑桥大学保护研究中心以英国皇家学会牛顿国际学者身份从事研究工作。2019年入职北京大学。研究的核心方向为全球变化下

生物多样性所受的影响及其保护机遇。在国际著名期刊 *Nature Communications*、*Global Change Biology*、*Proceedings of Royal Society B: Biological Sciences* 等发表论文多篇。

(北京:张正旺)

## 中国动物学会动物行为学分会第四届学术年会(2021)暨全国动物行为学第八次研讨会在上海圆满召开

中国动物学会动物行为学分会(以下简称“行为学分会”)第四届学术年会暨全国动物行为学第八次研讨会于2021年10月28-31日在上海浦东召开。会议由中国动物学会动物行为学分会主办,中国水产科学研究院东海水产研究所、上海海洋大学联合承办。会议的主题为“行为表象背后的故事”。

来自全国21个省份(自治区、直辖市)62所高校及科研机构的210名(其中参会在职人员79名,学生131名)动物行为学及相关学科的学者,通过线下(参会人员137名)和线上(参会人员73名)形式分享了本次学术盛宴。

中国科学院动物研究所张健旭研究员、中国海洋大学王芳教授、中国科学院脑科学与智能技术卓越创新中心杜久林研究员分别作了《我们对哺乳动物信息素的研究》、《三疣梭子蟹行为生态学初步研究》、《破解脊椎动物全脑神经联接之谜》的大会报告;同时大会还邀请了4位优秀青年学者作了报告。此外,还有68个会议口头报告和42份墙报。研究对象涉及从节肢动物到鸟类、哺乳动物的各个类群;研究内容涉及动物行为的功能和机制,以及水生动物行为及其应用等相关领域。

闭幕式由分会常务委员兼副秘书长、南京大学李忠秋教授主持。分会主任委员张健

旭研究员作了重要讲话。常务副主任委员贾志云编审对本次会议进行了总结。参加本次会议的分会副主任委员还有李进华教授（线下）、梁伟教授（线下）、殷东敏教授（线下）、齐晓光教授（线上）、邵发道教授（线上）等。

（摘自中国动物学会网站）

## “万羽南归 千里护航”2021 白鹤迁徙系列护飞活动

2021年10月25日至12月18日，由中国林业科学研究院森林生态环境与自然保护研究所（全国鸟类环志中心）和国际鹤类基金会（美国）北京代表处组织的“万羽南归千里护航”2021白鹤迁徙系列护飞活动圆满结束。本次护飞系列活动时间跨度大，参与人数多达5000人次，从线上到线下，包括来自国家林草局、相关省林草局、地方政府、保护地、科研院所、社区、学校、志愿者、国际机构，以及网友，均参与其中。活动旨在促进白鹤越冬地、停歇地和繁殖地之间的交流与合作，并通过开展环境教育，提高迁徙路线上公众的家乡自豪感与保护意识。主要活动如下：

① 2021年10月25日，护飞活动在吉林省镇赉县正式启动。启动会上，组织了有关白鹤迁徙网络保护、东北半干旱区域退化盐碱湿地恢复与适应性管理等主旨报告，白鹤保护的跨国合作和多方参与机制的嘉宾对话，白鹤东部种群重要迁徙停歇地与越冬地保护经验分享专题报告，和如何开展鹤类保护环境教育自由讨论。最后与会代表集体讨论并共同发布了《白鹤保护倡议书》。

② 考察吉林向海国家级自然保护区，在向海学校给孩子们带来了一场轻松有趣的国

际自然课堂，通过专家讲解、手工体验、游戏互动等多种形式，让生活在湿地候鸟周边的孩子们更直观的认识他们周围的自然环境和鸟类；

③ 携手江西南矶湿地国家级自然保护区共同开展公益亲子观鸟活动，通过分享鸟类信息、讲述保护故事、练习使用望远镜等多种形式，让参与者了解关心湿地以及生活在这里的鸟类；

④ 2021年12月8日，见证了江西鄱阳湖国家级自然保护区与俄罗斯克塔雷克国家公园战略合作备忘录线上签订仪式。备忘录就白鹤的科研监测、栖息地管理、保护成果应用、环境教育等方面达成共识，进一步推进了白鹤越冬地与繁殖地的合作与交流。

⑤ 2021年12月12日，在第二届鄱阳湖观鸟周期间，主办方携手北京林业大学共同主办了“东亚-澳大利西亚迁飞区候鸟及栖息地保护国际论坛”。

⑥ 在鄱阳湖畔的吴城中心小学，举办了“鄱阳湖白鹤学堂”的揭幕仪式，并观摩了一场生动别致的环境教育课堂。

⑦ 联合北京根与芽，开展了1小时的线上直播，通过介绍鄱阳湖的生态、候鸟，播放白鹤等候鸟的越冬集群壮观场景，设置有奖问答环节，带领更多的网友走近候鸟的越冬地，了解他们的艰辛迁徙，分享有趣的保护故事，吸引了4000多名网友观看。

⑧ 2021年12月18日，“万羽南归千里护航”2021白鹤迁徙护飞系列活动闭幕式，在鄱阳湖国家级自然保护区举办。线下代表与俄罗斯线上代表，来了一场跨越万里的“生命”对话，分享了白鹤研究、环境教育、保护与管理工作经验、成果与理念。

（全国鸟类环志中心，江红星；国际鹤类基金会（美国）北京代表处，侯博）

## 北京市鸟类资源数据库的建立及应用 ——基于 Python

北京市鸟类资源丰富,根据北京市各鸟类监测站的数据,北京市共记录到鸟类 503 种。基于 Python,以这 503 种鸟类记录,及其居留型、所属区系等信息所构建的源数据表格,建立了北京市鸟类资源数据库。

以 PyCharm2020.2.3 为开发环境利用 Tkinter、Pandas、Matplotlib、Numpy 等模块完成了可视化窗口的构建,并能对数据进行初步分析。并以在北京市为期 14 天的鸟类调查数据为实验数据,对此系统进行进一步的测试与使用。

经数据库系统分析,调查期间共记录到鸟类 112 种,17 目,42 科,占北京市鸟种类总数的 22.27%。在调查到的鸟类中,雀形目鸟类最多,共 48 种 (42.86%)。调查结果中共有国家 I 级保护鸟类 5 种 (4.46%);国家 II 级保护鸟类 12 种 (10.71%)。调查区域共有夏候鸟 48 种 (42.86%);留鸟 33 种 (29.46%);旅鸟 21 种 (18.75%);冬候鸟 9 种 (8.04%),迷鸟 1 种 (0.89%)。区系分析方面,调查结果中有古北界鸟类 5 种 (4.46%);广布种 106 种 (94.64%);东洋界鸟类 1 种 (0.89%)。

通过进一步利用数据库系统对不同调查地点的鸟类组成相似度、Shannon-Weiner 多样性指数、Pielou 均匀性指数以及 Simpson 优势度指数进行分析,发现汉石桥自然保护区与东郊湿地公园的鸟类相似性最高,相似度指数为 0.66;野鸭湖湿地公园鸟种数量最多,共 51 种;汉石桥自然保护区鸟类多样性指数最高,多样性指数为 4.28;喇叭沟原始森林公园鸟类群落结构最为均匀,均匀度指数为 1.22;汉石桥自然保护区的优势度指数最高为 0.93。

经调查数据检验,基于 Python 语言所建立的北京市鸟类资源数据库且计算分析准确,

具有很高的可用性。

(黑龙江:曾康军,杨舒涵,王汝森,  
刘宁,郭瑞萍,丰大林,邓文攸,  
吴庆明,罗志文,王贺)

## 海南海口发现白鹡鸰集大群夜栖

2018 年 12 月—2019 年 12 月,借助红外热成像搜索,在海南海口发现白鹡鸰 (*Motacilla alba*) 的集群夜栖地共 4 个,其中 3 个夜栖地位于海口城市中心路口,集群夜栖的白鹡鸰数量分别为 1 728 只,1 676 只和 1 341 只;1 个位于海口美兰机场航站楼,夜栖数量为 1 256 只。集群夜栖从 2018 年 11 月下旬,一直到 2019 年 5 月下旬离开,持续约 6 个月。2019 年 11 月下旬再次开始集群在上一年的位置夜栖,其夜栖地相对稳定。夜栖树和夜栖地的特征参数测量结果表明,白鹡鸰所选择的夜栖树相对较高 ( $3.89 \pm 1.86$  m),冠幅较宽;夜栖地位于闹市区的交通路口或机场,交通设施干扰强度大,噪音量较高 ( $80.64 \pm 8.18$  db),汽车流量 ( $36.28 \pm 15.28$  / 2 min) 或电动车流量 ( $28.93 \pm 26.26$  / 2 min) 较大。这提示白鹡鸰利用城市的交通设施和灯光照明作为夜栖的反捕食策略。调查结果发表在 2021 年的 *Ornithological Science* 上。

(海南:蒋星颐,张昌杰,周博,梁伟)

## 我国首部《鸟类追踪器使用规范》发布、实施

由黑龙江省林业和草原局野生动植物保护处、黑龙江省濒危野生动物救护繁育中心、黑龙江中央站黑嘴松鸡国家级自然保护区服务中心、北京林业大学生态与自然保护学院、湖南环球信士科技有限公司等单位联合编制

的黑龙江省地方标准——《鸟类追踪器使用规范》(DB23/T 2871-2021) 于2021年5月14日发布, 2021年6月13日开始实施。

鸟类追踪器佩戴是指给鸟类佩戴电子追踪设备, 然后将鸟放飞, 通过信号传输或再次捕获后下载相关定位等信息, 从而获得鸟类生物学或生态学信息的方法。是目前研究鸟类迁徙最为有效的方法。

保护候鸟最紧迫的任务是明确鸟类在繁殖地、迁徙停歇地、越冬地的生态需求。了解候鸟的迁徙时间、路线、迁徙途经地等信息, 不但对保护候鸟资源有重要的价值, 同时也可为防止鸟机相撞提供科学依据、为阻断人鸟共患的流行病传播开展主动预警。传统研究候鸟迁徙的方法如环志法虽然简便易行, 但其结果依赖于长周期的监测且回收, 效果差、效率低, 无法在短期内取得明显结果, 需长期连续研究。而卫星追踪技术具有追踪范围广, 时间跨度长, 可以准确地得到被追踪对象的迁徙时间、迁徙停留地点以及迁徙路径等生物学资料, 是采用常规方法无法获得的。因此, 自20世纪80年代末利用卫星定位技术开展对大型野生动物迁徙进行追踪研究以来, 极大地促进了候鸟迁徙研究的发展, 在众多物种保护中得到广泛和有针对性的应用, 并取得了良好的效果。同时, 利用卫星遥感技术手段对环境进行分析的技术日渐成熟, 将卫星追踪鸟类迁徙和卫星遥感技术结合进行候鸟栖息地分析并应用到保护研究方面也已取得很好的成果。

我国近代对鸟类迁徙的研究始于20世纪60年代, 且仅在个别地方做过少量研究。全国性的鸟类迁徙研究开始于80年代初期, 但目前仍处于一个相对落后的状态。最近几年暴发的禽流感等动物疫病成为国内外关注的重大公共安全事件, 迁徙中某些候鸟携带病原微生物引发人们的关注。我国是众多候鸟的繁殖地、迁徙停歇地, 为确保鸟类安全、

获得更多鸟类学信息, 规范佩戴追踪器研究候鸟迁徙成为鸟类学者关注的重点。目前追踪器信号传输方式有卫星传输、手机信号传输、无线接收机接收、下载接收等。根据鸟类的体型大小及所需信息的要求, 佩戴相应的追踪器。

目前以背负式追踪器最为常见, 还有腿环式、颈环式、翅环式、尾夹式等。

通过对鹤类、鸕类、猛禽、雁鸭类以及大鸨的研究, 发现了研究对象的迁徙路线, 建立了迁徙鸟类越冬地和繁殖地之间的关联, 更新了物种和栖息地保护所需的基本生活史信息。

追踪器的小型化是一种趋势, 但限于目前的技术能力和成本投入, 追踪器小型化还有一定限度。由于追踪器价格、数据使用费用比较高, 目前还只能在重点关注的珍稀濒危鸟类研究上使用。追踪器佩戴不规范不仅会导致跟踪失败, 还会对鸟类安全构成威胁, 鸟类追踪器的规范化使用显得愈加重要。

本标准在追踪器佩戴方法、注意事项、记录内容上进行了规范, 弥补了国内外有关鸟类追踪器佩戴技术规范的空缺。按照本标准操作, 能够确保鸟类安全, 并可以实现相关信息获取最大化。

(黑龙江: 李显达)

## 中国野生动物保护协会鹤类联合保护委员会顺利完成全国越冬鹤类调查

为了及时掌握我国鹤类分布和数量动态, 为保护管理部门出台鹤类资源保护政策和措施提供科学依据, 中国野生动物保护协会鹤类联合保护委员会于2021年1月5-15日顺利组织开展了“2020-2021年全国冬季鹤类资源同步调查”。此次调查对我国境内在冬季有鹤类野生种群分布的地点以及可能有鹤分

布的位点都进行了调查,全国近70家单位及900余名志愿者参与了此次调查活动。

(全国鸟类环志中心:王毅花,钱文)

## 湖南毛里湖国家湿地公园鸟类调查

2021年4月至2022年1月,全国鸟类环志中心对湖南毛里湖国家湿地公园进行了春季、秋季和冬季鸟类调查,夏季调查由于受疫情影响未能如期开展。该调查活动是法国开发署资助的“湖南津市毛里湖国家湿地公园生物多样性示范项目”的一部分,通过调查摸清该湿地公园的鸟类资源本底情况,为生物多样性保护奠定基础。

公园内林鸟的调查采用样线法,水鸟的调查采用分区定点直接计数法。三次调查共记录鸟类15目38科124种。综合公园以往鸟类名录,该湿地公园共有鸟类18目49科198种,其中35种是公园鸟类新纪录。属于国家重点保护鸟类的有35种,其中国家一级保护鸟类4种,分别是青头潜鸭(*Aythya baeri*)、中华秋沙鸭(*Mergus squamatus*)、黑鹳(*Ciconia nigra*)和黄胸鹀(*Emberiza aureola*);国家二级保护鸟类31种,包括小天鹅(*Cygnus columbianus*)、鸳鸯(*Aix galericulata*)和斑头秋沙鸭(*Mergellus albellus*)等。

(全国鸟类环志中心,武陶陶,钱法文)

## 向海保护区青头潜鸭监测初报

青头潜鸭是我国I级重点保护野生动物,被世界自然保护联盟(IUCN)列为极危物种。近些年由于其种群急剧下降,在国际上引起了重要关注。通过对向海保护区青头潜鸭的

长期监测,分析2005-2020年间青头潜鸭在向海保护区的分布、种群大小以及繁殖状况,以对向海保护区青头潜鸭的保护提供科学依据。

监测结果表明:(1)监测期间,青头潜鸭的出现频率和最大种群数量整体上呈增加趋势,共观察到青头潜鸭种群50次,其中最大群体数量为26只;(2)一般每年3月中下旬迁到向海保护区,4月份开始成对活动,最晚出现于10月中上旬,偏好安静且水生植物比较茂盛的明水沼泽,常与白眼潜鸭、红头潜鸭、凤头潜鸭、白骨顶同域活动;(3)同发滚水坝西侧、遼凤金鱼塘、青年坝(含碱地泡、付老文泡)、芦苇闸门附近(位于一场水库西侧)、东闸门附近(位于大肚泡)、黑山坝小林场屯(含福泰泡)、仙鹤岛是青头潜鸭的主要栖息区域。

(黑龙江:李连山,林宝庆,刘蕾,徐卓,杜微,李浙,吴庆明)

## 2021年5月新疆阿尔金山保护区黑颈鹤调查

2021年5月11日至25日,北京林业大学鹤类研究课题组联合新疆阿尔金山国家级自然保护区管理局在该保护区及其周边地区,包括依协克帕提湿地、玉素甫检查站、阿其克库勒湖东部及吐拉牧场西部等地,开展了黑颈鹤数量及分布调查,同时对其中3个巢址分别架设红外相机各2台。本次调查共记录到黑颈鹤113只,其中含繁殖对10组。仅在保护区东部依协克帕提及其周边湿地已发现繁殖对9组,远多于其他地区,表明该区域是保护区内黑颈鹤最重要的繁殖栖息地。同时在巢址周边架设红外相机,可用于探究黑颈鹤与其伴生物种的种间关系。



图 1- 黑颈鹤巢址

(新疆：许东华，徐俊泉，地里木拉提·帕尔哈提；北京：陈嘉珈，黄中鸿，蒲真，李雪竹，郭玉民)



图 1- 黑颈鹤的巢和卵

(西宁：张毓，高雅月，马存新；北京：蒲真，陈嘉珈，黄中鸿，郭玉民)

## 2021 年度祁连山国家公园（青海片区）及周边地区黑颈鹤春季调查简报

2021 年 5 月 31 日至 6 月 17 日，北京林业大学鹤类研究课题组与祁连山国家公园青海省管理局，对祁连山国家公园（青海片区）内及其周边湿地的黑颈鹤数量和繁殖状况进行了调查。主要涉及门源县、祁连县、天峻县、乌兰县、刚察县以及大柴旦行政区。

本次调查共记录到黑颈鹤 195 只（含 5 只幼鹤），其中确认已坐巢的繁殖对 31 组，非繁殖对 30 组，游荡个体 20 只，亚成体 7 群（48 只）。其中青海片区内记录到的成鹤 87 只，包括繁殖对 23 组，非繁殖对 15 组，游荡个体 11 只。

综上所述，祁连山国家公园（青海片区）是黑颈鹤良好的繁殖地和度夏地，每年为黑颈鹤种群源源不断地提供新生力量。充分掌握该地的黑颈鹤数量及繁殖状况为管理局更好的了解和保护黑颈鹤这一湿地旗舰物种提供了有效支撑。

## 罗布泊鸟类调查进展

长期以来，罗布泊一直是个沙漠禁区。2021 年 5-10 月，我们有机会多次深入到罗布泊野骆驼自然保护区境内，调查鸟类资源状况。这一次借助了红外相机监测技术，还有国内外人造卫星跟踪数据，结合实地调查，初步整理出鸟类名录 14 目 31 科约 89 种。期间，我们调查了钾盐矿区的盐池，发现有一些水禽和小鸟意外葬身其中。

(新疆：马鸣，钟悦陶)

## 新疆支线机场重视鸟防工作

新疆有支线机场近 30 个（不含空军），是国内支线机场最多的地区。为了预防鸟机碰撞，机场集团分别在 4 月和 8 月召开了交流会。分线上线下两种形式，邀请到北京的张洁和陈唯实，还有中科院马鸣等，介绍鸟类迁徙和雷达监测等方面的知识。这一年，马鸣还参与了当地待建机场的环评工作（6 月），还应邀前往哈密机场开展鸟类专题讲座和调研（9 月）。机场鸟害防范，越来越受到

重视。



图1 培训期间，参观新疆机场集团的鸟类标本陈列室  
(新疆：马鸣，田野，何晶，吴克凡)

## 2021 年系列观鸟节和观鸟赛举办

2021 年，朱雀会在江西资溪、江苏盐城条子泥、云南昆明、广西金秀大瑶山、广西弄岗、江西九江鄱阳湖等地组织了一系列观鸟节/赛活动，并技术支持神农架国家公园等机构举办观鸟赛。全国 20 余个省份的 3000 多人次观鸟爱好者参与，发现了一批省级鸟类分布新记录（如湖北省新记录黑喉歌鸲、峨眉鹡鸰、甘肃柳莺等）。通过这种公民科学方式开展的快速鸟类调查和物种多样性影像收集活动，为观鸟赛主办地提供了一份完整的鸟类清单和丰富的影像资料，为长远保护提供基础信息，同时拉动生态保护的社会化参与，打造地方生态保护品牌，有效推动地方生态保护主流化进程。

(朱雀会，雷进宇)

## 纪念全国“爱鸟周”40 周年暨北京市 2021 年“爱鸟周”活动启动仪式举行

2021 年 4 月 13 日，以“爱鸟护鸟，万物和谐”为主题的纪念全国“爱鸟周”40 周年暨北京市 2021 年“爱鸟周”活动启动仪式在

北京植物园举行。全国绿化委员会办公室专职副主任胡章翠、中国野生动物保护协会会长陈凤学、北京市园林绿化局副局长戴明超、著名表演艺术家六小龄童、著名节目主持人敬一丹等领导、嘉宾出席活动。

多年来，我国持续加大鸟类保护力度，鸟类资源得到不断恢复和发展，野生动物保护工作取得了显著成效，有力地支持了生态文明建设。朱鹮由发现之初的 7 只增长到目前的 5000 多只，白鹤由 210 只增长到目前的 4500 只左右，黑脸琵鹭由 1000 只增长到目前的 4000 余只等，都是突出的例子。截至 2020 年，我国环志鸟类总数达 845 种 392 万只，彩色标记鸟类达 278 种近 12 万只，利用卫星跟踪技术掌握了中华秋沙鸭、白鹤、大鸨等 60 余种鸟类的迁徙规律。

启动仪式上，中国野生动物保护协会向著名表演艺术家六小龄童先生、著名节目主持人敬一丹女士颁发了中国野生动物保护协会公益形象大使荣誉证书。敬一丹女士发表了热情洋溢的感言。六小龄童先生在启动仪式上宣读了爱鸟护鸟倡议书，呼吁全社会都从我做起，积极宣传鸟类保护理念，为保护鸟类做贡献。北京市园林绿化局野生动植与湿地保护处处长张志明公布了《北京陆生野生动物名录——鸟类》。与会领导为 2021 年中国野生动物保护协会春季候鸟保护“护飞行动”的 6 支志愿者队伍代表授旗。

本次活动由国家林业和草原局、中国野生动物保护协会联合主办，北京市园林绿化局、北京市公园管理中心协办，北京植物园、北京野生动物保护协会承办。来自国家林业和草原局、北京市园林绿化局、公安部等单位、国际鹤类基金会等自然保护组织以及新闻媒体、野生动物保护志愿者、社会各界群众千余人参加了本次活动。

(摘自中国野生动物保护协会网站)

## 《国家重点保护野生动物 (I 级) (三)》 特种邮票 12 月 3 日发行

中国邮政于 2021 年 12 月 3 日发行《国家重点保护野生动物 (I 级) (三)》特种邮票 1 套 8 枚, 其中包括斑尾榛鸡、黄胸鹀和绿孔雀等三种鸟类。该套邮票画面采用科学插画方式表现, 动物体态结构严谨, 笔法运用精微细腻, 色彩画面清澈亮丽。“斑尾榛鸡”是中国特有的松鸡科鸟类, 仅分布于中国甘肃、青海、四川等地。“黄胸鹀”又名禾花雀, 由于大规模猎捕数量急剧减少被列入极度濒危物种, 为新增国家一级保护动物。“绿孔雀”栖息于海拔 2000 米以下的热带、亚热带常绿阔叶林和混交林, 我国境内仅分布于云南省, 数量仅有几百只。

(摘自中国集邮报)

## Avian Research 的国际影响力提升

在中国科协卓越期刊计划和北京林业大学的大力支持下, 我分会主办的鸟类学杂志 *Avian Research* 的国际影响力明显提升。2020 年 IF 为 1.774, 在世界 28 个鸟类学刊物中, 排名第七位, 进入鸟类学 SCIE 收录刊物 Q1 区。*Avian Research* 属于开放获取的英文期刊, 不收取版面费, 欢迎大家踊跃投稿。

## 《英国鸟类学会会刊》虚拟专刊祝贺中国鸟类学蓬勃发展

中国地域辽阔, 覆盖古北和东洋两界, 第三纪晚期以来一系列地质 - 古地理事件, 对动物区系的演变具有深刻的影响, 也使得中国鸟类资源极为丰富, 为鸟类学研究提供了良好的条件。1927 年, 寿振黄先生在《科

学》(中国科学社出版发行, 1915 年 1 月创刊于上海) 上发表了我国第一篇鸟类学论文“福建鸟类一束”(A small collection of birds from Fujian), 为中国的现代鸟类学研究开辟了先河。之后, 众多的学者如任国荣、郑作新、傅桐生等先生陆续发表现代鸟类学文章为中国现代鸟类学研究做了坚实的铺垫。1980 年中国动物学会鸟类学分会成立以来, 中国鸟类学研究队伍不断壮大, 论文水平不断提高, 许多成果也在国际相关领域的高水平刊物上发表。

英国鸟类学会主办的《英国鸟类学会会刊》(*IBIS International Journal of Avian Science*, 简称 *IBIS*) 创刊于 1859 年, 至今已经有 162 年的历史, 是国际上历史悠久, 最有影响力的鸟类学期刊之一。*IBIS* 刊登包括鸟类保护、生理、生态、遗传以及地理分布等鸟类学领域最新的研究成果以及评论。

为预祝即将举行的第十六届中国鸟类学会顺利召开, 在马志军、刘阳等几位中国编委的推动和努力下, *IBIS* 近期以“虚拟专刊”(Virtual Issues) 的形式集中推出了近五年来发表在本刊上面的 12 篇中国学者优秀论文。详情请见“鸟类学分会”微信公众号。这些论文包括了一系列令人兴奋的研究主题, 包含行为学、生态学、遗传学和多类群的鸟类迁徙研究, 同时也包括了这个广阔地理区域内鸟类物种保护的应用研究, 展示了中国鸟类学研究的发展与进步, 期待将来有更多中国学者的论文会发表在《英国鸟类学会会刊》。

(学会秘书处)

## 第 27 届国际鸟类学大会改为线上举办

IOCongress2022 组委会主席来信, 向各位通报执行委员会的决定: 因为 COVID-19 流行病的不可预测性, 将主要会议转换为完

全虚拟的形式，但为那些想要旅行的人提供一些会前或会后的研讨机会。

科学计划委员会目前正在制定新的大会日程。摘要提交截止日期延长至 2022 年 3 月 25 日。我们希望所有已经提交或将要提交摘要的人注册并支付费用。本次大会将允许各种形式的报告、讨论和电子海报。目标是尽可能多地收录论文摘要和会议报告。

已注册并付费参加大会的代表将被退还

线下会议和线上参会费用之间的差额。如果有人希望将这些注册差额捐赠给发展中国家的学生或鸟类学家进行注册，我们将不胜感激。

本届大会的组委会非常期待您参加 IOCongress2022 大会，并将尽最大努力确保网络平台顺利分享您的研究成果并建立工作关系。

(北京：孙悦华)



## 世界鸟类分类与分布名录（第 2 版）出版

《世界鸟类分类与分布名录》（第 1 版）出版距今已近 20 年。在此期间，世界鸟类的系统演化研究快速发展，分类体系变动频繁，让人应接不暇。近两年，国际上的主要世界鸟类名录在分类体系上日趋一致，为本书第 2 版的编写提供了契机。

本书以简洁实用的方式，列出了每个物种的中文名、拉丁名、英文名和主要分布区。在目和科级分类阶元上，本书的分类系统参考 Winkler 等（2015）编著的 *Bird Families of the World*；在种的修订方面，综合参考 IOC World Bird List、The Howard and Moore Complete Checklist of the Birds of the World（第 4 版）和 The eBird/Clements Checklist of Birds of the World 等主流国际鸟类名录。共收录世界鸟类 36 目 142 科 10,634 种，比第一版收录的 9755 种增加了 879 种，新增目和科 70 余个。其中在我国分布的鸟类增加至 1470 种，特有种 101 种。

中文名是本书修订的重要内容。在拟定新增分类阶元的中文名时，依照本书第一版前言及《中国鸟类分类与分布名录》（第 3 版）所列原则，一般不轻易改动，以保持名称的连续性和稳定性。同时本着简明易懂、科学准确的原则对中文名进行了适度修订。

本书可供从事鸟类学教学、科研，以及从事农业、林业、环境保护、野生动物管理等领域的专业人员使用，也可大专院校动

物学、生态学、保护生物学等相关专业的师生提供参考。是国内科学研究者、专业工作者、观鸟者和新闻媒体等了解世界鸟类的有益参考书和工具书。



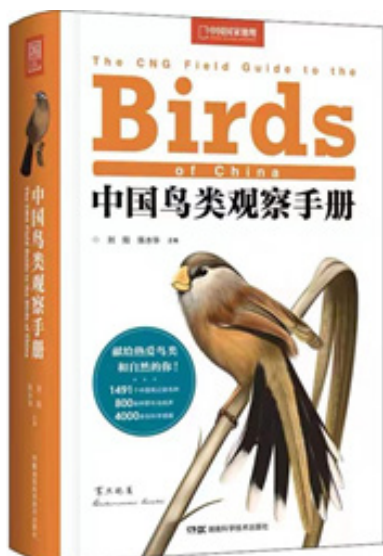
（北京：张雁云）

## 《中国鸟类观察手册》出版

20 世纪 90 年代，中国内地开始出现本土观鸟爱好者；之后，观鸟活动在中国迅速发展，各地的观鸟组织陆续成立，进一步推动了观鸟活动发展和观鸟爱好者的增加。

观鸟者常用的图鉴是英国生物保护学家约翰·马敬能在 2000 年出版的《中国鸟类野外手册》。随着时间的推移，鸟类的分类和分布都发生了较大的变化。随着中国国内观鸟爱好者水平的发展进步，观鸟需求的不断扩大，出一本“原创”的基于绘画的本土鸟类

图鉴，呼声一直很高。《中国国家地理》图书与中山大学生态学院刘阳教授和浙江省博物馆馆长陈水华一拍即合，决定再出一本种类齐全又方便携带的“观鸟手册”。编辑团队由 10 多位国内资深的观鸟者和鸟类学者组成，还有 10 余位科学绘画师加盟。大家齐心协力，于 2021 年 1 月由湖南科学技术出版社出版。本书系统地梳理了中国有记录的 1489 种鸟类，含有精准分布图 1000 余张，鸣声 800 余种，科学插画 4000 余张，获得了非常好的市场反响。



(浙江：陈水华；广东：刘阳)

## 《广西鸟类图鉴》出版

由蒋爱伍副教授编著、马建章院士作序的《广西鸟类图鉴》于 2021 年 6 出版发行。该书收录了广西有分布的 23 目 92 科 744 种鸟类，近 2000 幅生态照片，详细介绍每种鸟类的中文名和国际通用的学名和英文名，并根据广西的实际情况，描述该种鸟类鉴别特征、栖息地、行为和种群数量、分布以及可能出现的月份。该书是我国华南省份首部种类收集最全的鸟类鉴别指南，具有如下特色：(1) 本书是迄今为止对广西鸟类资源总结最

为全面的著作，其鸟类种数较 2011 时增加 62 种；(2) 本书以检索表的形式描述鸟类识别特征，方便读者在野外快速鉴定鸟种，对提高鸟类鉴定水平较为实用；(3) 华南地区绝大多数鸟类在广西都有分布，北方地区的候鸟也多在广西越冬，因此虽然本书面向广西，但也可作为我国大部分地区的鸟类识别指南。



(广西：蒋爱伍)

## 《中国鸟类观察年报 2020》出版

中国观鸟组织联合行动平台（朱雀会）编写了《中国鸟类观察年报 2020》。该报告对中国观鸟记录中心 (<http://www.birdreport.cn>) 近 15000 名公民科学家于 2014-2020 年间提交的，涵盖 1321 种在中国有分布的鸟类及全国 2032 个县级行政单位，累计超过百万条的数据进行了初步分析，识别了中国鸟类分布多样性较高区域和受胁鸟类保护优先区域；判定了中国各地最常见鸟种（共计 81 种）；分析了珍稀濒危特有鸟种在各省级行政单位分布情况；尝试提出基于公众数据的（年度）鸟类多样性评价指数，并对 12 个省、市、自治区开展了试验性的评价工作。报告还简要

分析了中国鸟类保护面临的挑战,并提出了如何基于中国观鸟记录中心,开展各种形式公民科学活动的建议。

(云南:雷进宇)

的状况,包括地区描述、保护现状、对水鸟的重要性等,最后提出了中国沿海水鸟与栖息地保护的研究结论与建议。全书 165 页,图文并茂,是从事水鸟研究、保护和管理工作的一个重要参考书。

## 《中国沿海水鸟重要栖息地》出版

由于秀波、石建斌、雷进宇、夏少霞主编的《中国沿海水鸟重要栖息地》2021 年 6 月在科学出版社出版。该书首先介绍了中国沿海湿地水鸟重要栖息地的评估方法,包括水鸟调查数据的获取、整理以及水鸟重要栖息地的识别标准;其次确定了 132 块中国沿海水鸟重要栖息地,简要介绍了每块栖息地



(北京:张正旺)



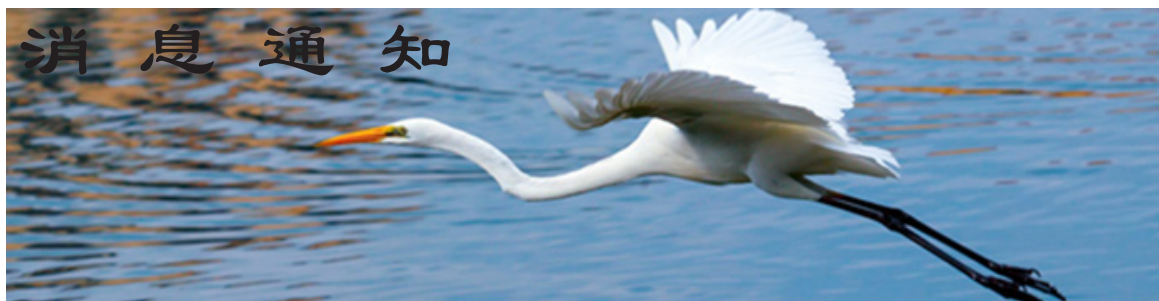
### 温馨提示

2022 年起 Avian Research 将由科爱出版

自 2022 年起,Avian Research 将转由北京科爱森蓝文化传播有限公司(简称“科爱”)继续采取开放获取(Open Access)模式出版。现网站 [www.avianres.com](http://www.avianres.com) 所有已发表的文章将继续保留。期刊投稿入口现已关闭,新的网站和投审稿系统正在紧急建设中。在此期间,请广大作者联系期刊编辑部 [pjcheng@bjfu.edu.cn](mailto:pjcheng@bjfu.edu.cn) 进行投稿和稿件状态查询,系统中现存稿件的审稿程序不受影响。

科爱由中国科技出版传媒集团有限公司(科学出版社)和爱思唯尔共同投资,目前出版 120 多种英文学术期刊,将为 Avian Research 提供 EditorialManager 投审稿系统和爱思唯尔的 ScienceDirect 文章发布平台。

# 消息通知



## 第十六届中国鸟类学大会暨会员代表大会”通知（第一轮）

为促进我国鸟类学的学术交流与人才培养，助力国家生态文明建设与粤港澳大湾区绿色发展，经中国动物学会鸟类学分会常务理事会议讨论决定，第十六届中国鸟类学大会暨会员代表大会将于 2021 年 11 月 11-15 日在广东省召开。

本届大会由中国动物学会鸟类学分会主办，广东省动物学会和广东省科学院动物研究所承办，协办单位为广东长隆动植物保护基金会、中国科学院动物研究所、北京师范大学珠海校区、珠海市观鸟协会、Avian Research 杂志等。

### 一、会议主题：

跨入中国鸟类学卓越时代

### 二、会议日期：

2021 年 11 月 11 日至 15 日。

会前将举办“第十七届中国青年鸟类学家研讨会暨全国研究生翠鸟论坛”（11 月 9 日至 11 日，北京师范大学珠海校区，具体安排另行通知）。

### 三、会议地点：

广东省珠海市横琴岛。

### 四、大会日程安排：

2021 年 11 月 11 日（周四）报到，12 日至 14 日学术交流。会议期间召开会员代表大会，进行理事会换届选举。15 日（周一）代表离会。

会议详细日程及安排请关注中国动物学

会学术会议网站 (<http://czs.bitcast.org.cn>) 的通知。

### 五、参会费用：

参会代表的住宿费用自理。注册费缴纳方式请见中国动物学会学术会议网站，会议注册费分为早期注册和现场注册，以费用缴纳日期为准。

	早期注册	现场注册
	2021.9.3之前	2021.11.11
会员代表	¥1400	¥1600
非会员代表	¥1600	¥1800
学生代表	¥900	¥1100

### 六、会议报告及论文摘要要求

本届大会设立大会报告、专题报告会、圆桌讨论会、口头报告会和墙报（设墙报奖）等学术交流形式。大会报告由大会学术委员会邀请。专题报告会和圆桌讨论会的每个单元时间为 120 分钟和 60 分钟，会议主持人采用大会学术委员会邀请和与会代表自由申请两种方式。每个单元由两位主持人共同主持，两位主持人应来自不同单位。有意申请报告会主持人的代表，需向大会学术委员会提交不超过 1000 字的摘要，阐述报告会的主题、学术意义和重要性等信息。申请专题报告会还需提供至少 2 名邀请报告人的姓名和报告题目。专题报告会和圆桌讨论会自由申请，申请截止日期为 2021 年 6 月 30 日。

本届大会的学术报告以中文为主。提交的论文摘要应为中文，并欢迎同时提供英文摘要。用于报告展示的 PPT 可为中文或英文，如为英文，需要同时提供简要的中文概括。大会墙报可为中文或英文，如为中文，欢迎

同时提供英文摘要。如为英文，必须提供中文摘要。

论文摘要需通过学术会议网站上提交，截止日期为 2021 年 8 月 30 日。摘要包括题目（中英文）、作者、单位（含地址及邮编）、摘要正文、关键词。提交论文摘要时，需注明申请口头报告还是墙报。摘要正文字数不超过 500 字。摘要请务必按照《动物学杂志》的摘要格式要求进行编排。

#### 七、住宿安排

会议住宿安排请后续关注中国动物学会学术会议网站（<http://czs.bitcast.org.cn>）的通知。

#### 八、大会组织机构负责人及联系邮箱：

大会主席：雷富民 [leifm@ioz.ac.cn](mailto:leifm@ioz.ac.cn)

秘书长：胡慧建 [13922339577@139.com](mailto:13922339577@139.com)

副秘书长：刘曦庆 [gdsdongwuxuehui@163.com](mailto:gdsdongwuxuehui@163.com)

学术委员会主任：马志军 [zhijunm@fudan.edu.cn](mailto:zhijunm@fudan.edu.cn)

学术委员会副主任：

邹发生 [zoufs@gdei.gd.cn](mailto:zoufs@gdei.gd.cn)

李东明 [ldm1980@126.com](mailto:ldm1980@126.com)

组委会主任：张雁云 [zhangyy@bnu.edu.cn](mailto:zhangyy@bnu.edu.cn)

组委会副主任：

胡慧建 [13922339577@139.com](mailto:13922339577@139.com)

刘阳 [liuy353@mail.sysu.edu.cn](mailto:liuy353@mail.sysu.edu.cn)

欢迎全国大专院校、科研单位、自然博物馆、动物园、自然保护区以及野生动物管理部门等单位的鸟类学及相关领域的科技工作者报名参加中国鸟类学的学术盛会！

欢迎鸟类学科研、教学、科普及鸟类保护的仪器、设备和材料的生产与销售单位、出版社在本届中国鸟类学大会上展示产品。具体参展事宜请联系刘阳（[liuy353@mail.sysu.edu.cn](mailto:liuy353@mail.sysu.edu.cn)）。

[sysu.edu.cn](mailto:sysu.edu.cn))。

中国动物学会鸟类学分会

2021 年 3 月 02 日

## 关于延期举办第十六届中国鸟类学大会暨会员代表大会的通知

各位代表：

鉴于当前疫情形势和防疫工作的严峻性，经第十六届中国鸟类学大会组委会和会议承办方讨论决定：原定于 2021 年 11 月 11 日~15 日在广东省珠海市召开的第十六届中国鸟类学大会暨会员代表大会，将延期到 2022 年 4 月 7~10 日在广东省珠海市召开。已经缴纳注册费的代表，大家可以保留至明年会议正式召开时使用；如需退费，请发邮件至 [zgdxwxh@ioz.ac.cn](mailto:zgdxwxh@ioz.ac.cn) 邮箱，联系办理注册费全额退费，退费注意事项如下：

(1) 通过银行汇款或转账，需提供当时汇款账号、开户银行信息精确到支行；

(2) 通过一张银行卡代其他参会者缴注册费的，请同时提供被代缴人姓名+金额；

(3) 通过扫码支付缴费，需提供缴费人本人银行卡号、开户银行信息精确到支行。

代表已预定的酒店将全部自动取消，明年鸟类学大会期间酒店的预定日期、房型将另行通知。

已发布的大会报告、专题报告、墙报及圆桌讨论会的内容安排保持不变。组委会在明年会前将向各位报告人进行确认。

对于会议延期给大家带来的不便，我们深表歉意。

中国动物学会鸟类学分会

第十六届中国鸟类学大会组委会

2021 年 10 月 26 日

## 中国动物学会鸟类分分会微信公众号开通

2021 年 5 月 6 日,“鸟类学分会”公众号正式开通。

该公众号(gh\_5227d025e5d7)主要介绍学会会员的研究成果,发布分会相关的信息,负责维护的有叶元兴、刘阳、朱磊和张雁云。欢迎各位会员予以关注。

(学会秘书处)

## 沉痛悼念并深切缅怀赛道建先生、关贯勋先生和常家传先生

我分会原理事、山东师范大学教授赛道建先生于 2021 年 5 月 6 日不幸去世,享年 73 岁。赛先生长期致力于动物学教学与科研工作,曾编著出版《山东鸟类志》。赛道建先生修身立德、为人师表,退休后致力于山东省

多个保护区鸟类监测研究。

我分会资深会员、中山大学知名教授关贯勋先生于 2021 年 7 月 7 日不幸去世,享年 91 岁。关先生曾参与出版《中国动物志 鸟纲第七卷》,长期致力于鸟类研究与调查,关先生深耕学术、学识渊博,是一位深受学界敬重的前辈。

我分会资深会员、东北林业大学教授常家传先生于 2021 年 7 月 9 日不幸去世,享年 88 岁。常先生长期致力于鸟类学的教学和科研工作,曾出版《鸟类学》《东北鸟类图鉴》等著作,在我国鸟类学研究领域开展过很多具有重要影响力的工作。退休之后,他在帽儿山开展了多年的鸟类环志工作,积累了大量迁徙鸟类的数据。

赛道建先生、关贯勋先生和常家传先生的逝世是我们鸟类学分会的重大损失,鸟类学分会全体成员对三位杰出学者的逝世表示沉重哀悼。

(学会秘书处)

## English Abstract



### Notes of Meetings

#### **The first Asian Ornithological Congress was successfully held in China**

#### **Chinese Young Ornithologists Seminar and the 17th Kingfisher Forum was successfully held online**

#### **The 2nd AsianEvo Conference held virtually, 16-19 August 2021**

Prof. Yanhua Qu from the Institute of Zoology, Chinese Academy of Science and Prof. Lu Dong from Beijing Normal University acted as conveners of the session “A genomic perspective on Asian avian biodiversity”. Dr. Feng Dong, Prof. Daiping Wang and Prof. Yang Liu gave oral presentations.

(Beijing: Lu Dong, Yanhua Qu)

#### **Xiangjiang Zhan's laboratory reveals the formation of bird migration routes and key genes for long-distance migration**

On March 3, 2021, Xiangjiang Zhan's laboratory of the Institute of Zoology, Chinese Academy of Sciences published a research paper on bird migration with a cover story in the international top journal *Nature* “Climate-driven flyway changes and memory-based long-distance migration” (doi: 10.1038/s41586-021-03265-0).

In this study, the team built an arctic peregrine falcon migration system by integrating years of satellite tracking data and population genomic information, revealing the main causes of its migration routes and the key genes for long-distance migration.

(Beijing: Yanyun Zhang)

### Research Reports

#### **Seasonal variation in community composition and distributional ranges of birds along a subtropical elevation gradient in China**

Seasonal variation in community composition and species distributional ranges along elevational gradients remain poorly known but are essential to inform conservation. In this study, we aim to understand how species richness, community composition, and elevational ranges of montane birds change between the breeding and the non-breeding season. We compared bird species

richness and community composition in nine 300-m elevational bands in the breeding (April - May) and non-breeding (December - January) seasons of Gaoligong Mountains, Yunnan. We also calculated seasonal elevational shifts of 97 species with sufficient data recorded in both seasons and assessed how species' traits influenced these shifts. Species richness declined in high and low elevations between the breeding and non-breeding season. The temporal beta diversity shift from the breeding to the non-breeding season was mainly caused by species losses rather than species gains in high- and low- elevation communities. Communities in middle elevations showed a contrasting pattern, with seasonal composition change resulting mainly from species gains. We also found that species' seasonal distribution shifts were mainly associated with breeding elevation and diet. Notably, high- and middle-elevation breeders and insectivores significantly shifted their elevational ranges downslope in the non-breeding season. In addition, species that participate in mixed-species flocks and that rely on forests also showed significant downslope shifts in the non-breeding season. These results show complex patterns of the interconnectedness of bird communities along the elevational gradient. Keeping forests at middle elevations intact appears especially important as they are used in winter by species that breed at both high and middle elevations. Furthermore, our results suggested conservation actions maintaining connectedness in low and middle elevations are urgently needed to conserve regional biodiversity and highlight the importance of seasonality in montane ecosystem research.

(Guangdong: Xinyuan Pan, Dan Liang, Yang Liu; Yunnan: Xu Luo)

### **Signatures of the prolonged negative genetic consequences of a population bottleneck in a rapidly re-expanding wader, the black-faced spoonbill *Platalea minor***

The long-term persistence of a population which has suffered a bottleneck partly depends on how historical demographic dynamics impacted its genetic diversity and the accumulation of deleterious mutations. Here we provide genomic evidence for the genetic effect of a recent population bottleneck in the endangered black-faced spoonbill (*Platalea minor*) after its rapid population recovery. Our data hint that the bird's effective population size,  $N_e$ , had been relatively stable (7,500-9,000) since 22,000 years ago; however, a recent brief yet severe bottleneck ( $N_e = 20$ ) was estimated to occur around the 1940s wiped out more than 99% of its historical  $N_e$  in roughly three generations. Despite a >15-fold population recovery since 1988, we found that black-faced spoonbill population has higher levels of inbreeding (7.4 times more runs of homozygosity) than in its sister species, the royal spoonbill (*P. regia*), which is not thought to have undergone a marked population contraction. Although the two spoonbills have similar levels of genome-wide genetic diversity, individual black-faced spoonbills carry 2.8% more nonsynonymous substitutions and 3.9% more putatively deleterious mutations (Grantham's score >50) than that of royal spoonbills. Our results imply that black-faced spoonbills have elevated levels of putatively harmful variation that could potentially impact its fitness and persistence. Here we demonstrated

the importance of using genomic indices to monitor levels of genetic erosion, inbreeding and mutation load in species with conservation concerns. To mitigate the prolonged negative genetic effect of population bottleneck, we recommend that all possible measures should be employed to maintain population growth of a threaten species.

(Taiwan: Shou-hsien Li; Guangdong: Yang Liu)

### **Studies on the population divergence of Snow Partridge**

Dr. Hongyan Yao and graduate student Yanan Zhang from Beijing Forestry University, collaborate with Associate Professor Nan Wang from Beijing Forestry University and Dr. Pengcheng Wang from Nanjing Normal University, carried out the research on the population divergence of plateau pheasants, The results, entitled "Inter-glacial isolation caused divergence of cold-adapted species: the case of the snow partridge", were published online in Current Zoology, a journal sponsored by the Chinese Society of Zoology.

Exploring the impact of historical climate change on population differentiation will help us understand the impact of climate change on biodiversity. Quaternary glacial climate gyration led to a variety of evolutionary histories of species with different life history characteristics in different regions of the world. The warm-adapted species may be distributed in glacial refuges from each other during the glacial periods, and the glacial isolation leads to divergence among populations; the cold-adapted species may expand during the interglacial period, contract during the interglacial period, and be isolated in interglacial refuges. Because it is difficult to perform field work at high altitude, most studies focus on the species that adapt to the warm environment at low and medium altitude, however few studies focus on the species that adapt to the cold environment at high altitude. Therefore, the researchers studied the population divergence history of the snow partridge (*Lerwa lerwa*) distributed in extremely high altitude environment. Snow partridge distributed between 4000 and 5500 meters above sea level. Based on nuclear gene and mitochondrial genes, the researchers found snow partridge has two genetic evolution units, which differentiated from each other about 0.40~0.44 million years ago, in the interglacial period after the Zhongliangan glaciation. The niche model shows that snow partridge was widely distributed in the low-altitude areas of the Himalayas and Hengduan Mountains during the glacial period, whereas it contracted to the high elevations, southern of Himalayas, and Hengduan mountains during inter-glacial periods. The historical dynamic model of population effective size also showed that snow patridge expanded in glacial period and decreased in interglacial period. This study provides case support for revealing the impact of climate change on species with different life history characteristics, and helps to deepen the understanding of bird biodiversity in the Qinghai Tibet Plateau and Hengduan Mountain area.

The study was supported by the second national terrestrial wildlife survey project of the State Forestry Administration.

(Jiangsu: Pengcheng Wang; Beijing: Nan Wang)

## **How does circadian rhythm shape host-parasite associations? A comparative study on infection patterns in diurnal and nocturnal raptors**

Infection patterns of parasites, including their prevalence, diversity and host specificity, can be impacted by many biological and environmental factors, but no study has focused on the circadian rhythms of vertebrate hosts, which may affect susceptibilities and encounter rates between hosts and vectors and further shape host-parasite associations.

In this study, we focused on avian haemosporidians, a classical model in studies of host-parasite associations, and investigated their infection patterns in rescued raptors brought to the Beijing Raptor Rescue Center during 2007-2020. The dataset comprised 1336 bird individuals from 35 species, among them, 897 belonged to diurnal raptors and 439 belonged to nocturnal raptors. Haemosporidian infections were detected in 329 individuals, with a total prevalence of 24.63%, among the diurnal raptors, we obtained 51 haemosporidian lineages from 17.95% of individuals (161 total), from the nocturnal raptors, we obtained 51 haemosporidian lineages from 38.27% of the individuals (168 total). We then assessed the association between prevalence and host biotic traits, among the host biotic traits tested in our study, activity pattern is an important explanatory variable, Haemosporidian prevalence was significantly higher in the nocturnal raptors than in the diurnal raptors, and the prevalence of *Haemoproteus* and *Leucocytozoon* in the nocturnal raptors was significantly higher than that in the diurnal raptors. Furthermore, we analysed the phylogenetic relationship and host-parasite network-level differences of haemosporidian parasites in diurnal and nocturnal raptors, and demonstrated that the lineages infecting the diurnal and nocturnal raptors were not clearly separated, but the nocturnal lifestyle led to a more specialized host-parasite network structure. These variations in host-parasite associations may be driven by different susceptibilities of the hosts and the diversity or abundance of vectors during the day and night. Our study provides new insight into host-parasite associations shaped by circadian rhythm and calls for more studies on the underlying mechanisms of parasite infection.

(Xianli Che from the Institute of Zoology, Guangdong Academy of Sciences)

## **Long-term trends in the phylogenetic and functional diversity of Anatidae in South China coastal wetlands**

Anatidae are widespread and well known birds, including ducks and geese wintering on the South China coastal wetlands. They are important components of wetland biodiversity and provide important ecological functions. Historically, migratory ducks were an important protein source for people living in South China. Often, more than one million ducks and geese were killed during a single hunting season. Despite their importance and dramatic declines, no study quantifying the phylogenetic and functional historical trends of Anatidae in South China has been published.

Based on several complete censuses of anatid birds wintering in South China coastal wetlands during the 1950–2010s, we performed phylogenetic and functional analyses for

historical anatid assemblage dynamics at the local scale. We observed asynchronous species, phylogenetic and functional diversity trends since the 1950s. Species diversity declined but without significant trends. For phylogenetic perspectives, the standardized effect size of the mean pairwise distance (ses.MPD) declined significantly (Fig. 1). For the body mass as a functional trait, functional richness (FRic) and functional dispersion (FDis) declined significantly (Fig. 2). We conclude that both basic phylogenetic diversity and body mass of anatid communities declined significantly over this time period. This was largely due to a decline in population size of genus *Anser* with larger body. This may make it more challenging for the anatid community to recover to its historical composition in the future.

Based on our results, we call for timely attention to the areas with serious loss of biodiversity. Biodiversity monitoring for such areas should be strengthened. Only by using the data of biodiversity dynamics can we identify and expand the key species and areas for biodiversity protection, and then take appropriate protection measures. Our results also provide excellent environmental consultations for the protection of biodiversity of the Guangdong-Hong Kong-Macao Greater Bay Area. This city group in the Pearl River Estuary is under development for an international first-class bay area for living, working and travelling.

The above findings from Prof. Zou's group were published in *Ecological Applications*, entitled "Long-term trends in the phylogenetic and functional diversity of Anatidae in South China coastal wetlands". Link to the article: <https://doi.org/10.1002/eap.2344>

(Xianli Che from the Institute of Zoology, Guangdong Academy of Sciences)

### **Egg rejection changes with seasonal variation in risk of cuckoo parasitism in Daurian redstarts, *Phoenicurus aureus***

Interspecific brood parasites lay eggs in the nests of other species and rely entirely on these unrelated foster parents to care for their offspring, which pose heavy costs on host parents. Therefore, intense selection favours the evolution of host defences against brood parasites, such as habitat selection, nest defence (or attack of adult cuckoos), egg rejection and nestling rejection. Among these, egg rejection is the most common and effective anti-parasite defence. However, due to high potential cost from both brood parasites and mistaken rejection, when making decisions, hosts should balance the risk of accepting or rejecting the parasitic egg. The optimal acceptance threshold hypothesis predicts that hosts should adjust their acceptance thresholds towards parasites according to the environmental context, such as risk of brood parasitism. For example, studies of reed warblers *Acrocephalus scirpaceus* and rufous-tailed scrub robins *Cercotrichas galactotes* found that hosts reduced their egg rejection probability later during the breeding season when risks of cuckoo parasitism were lower. However, to our knowledge, it remains unknown whether hosts will exhibit more intense egg-rejection defence in face of seasonally increased risk of parasitism.

The Daurian redstart *Cercotrichas galactotes* is a common host of the common cuckoo *Cuculus*

*canorus* (hereafter cuckoo) in northeast China. The redstarts show an egg colour polymorphism, with some females laying blue and others pink eggs, whereby the latter are more distinct from the blue cuckoo eggs (Figure 1a,b). In our study site, female redstarts start laying from mid-April onwards and typically produce at least two clutches within one breeding season. While cuckoos arrive at the breeding grounds around mid-May, when most hosts have nestlings or are in the late incubation stage of their first clutch (Figure 2). Thus, in this population of Daurian redstarts, the risk of cuckoo parasitism varies within each breeding season from zero in the first clutch to a high risk in subsequent clutches. According to the optimal acceptance threshold hypothesis, we predicted that redstarts were more likely to reject the foreign egg in the second than in the first egg-laying period. To test the idea, we conducted artificial brood parasitism using a manufactured model egg that mimics a real cuckoo egg. We introduced a model cuckoo egg into the focal nest, during either the late-laying phase of the host, i.e., when the nest contained three eggs, or during early incubation, i.e., within three days after clutch completion (Figure 1c,d). After artificially parasitizing a nest or after finding a naturally parasitized nest, we checked it daily for six days to decide the fate of the parasitic egg (accepted/rejected).

As a result, we found redstart females showed a significant higher egg-rejection rate during the second egg-laying period (i.e. after cuckoo arrival) than during the first period (i.e. before cuckoo arrival (Figure 3), suggesting that redstarts egg-rejection rate increased with increasing risk of cuckoo parasitism, which was in line with our prediction. Our study for the first time demonstrated that hosts will exhibit more intense egg-rejection defence in response to seasonally increased risk of parasitism, meanwhile, our results suggested that Daurian redstarts' egg-rejection behaviour is seasonally plastic.

(Beijing: Jinggang Zhang, Wenhong Deng)

### Conservation genomics of the green peafowl

The green peafowl is known as the "King of birds". With beautiful bodyline and gorgeous plumage, it is a frequent feature in Chinese literary and artistic works and also a symbol of ancient royal power in Myanmar and other countries. It is of great significance to the cultural inheritance of East Asia and Southeast Asia. Green peafowl was once widely distributed from southern China to Java, but now only exist in Yunnan and some parts of Southeast Asia. At present, it is listed as a protected animal in China and is ranked as "globally endangered" by the International Union for Conservation of Nature. Although there are scattered historical records about human hunting and exploitation of green peafowls, the main risk factors in the decline of green peafowl population, especially the relative role of historical climate change and human activities, remains unclear at present. To answer the above questions, we assembled the first green peafowl genome and carried out population genome resequencing. The effective population of green peafowls decreased by 200 folds from the middle Holocene (~6000 years ago) to 100 years ago. Comparative analysis of historical and modern samples showed that the level of genetic diversity

in the surviving populations continued to decline over the past 50 years. Further analysis revealed generally similar distributional models through Holocene climate change and suggested its nonsignificant impact on the distribution of the green peafowl. Statistical analysis in view of the history of human activity is prompted three important signals: (1) historical human activity intensity was significantly negatively correlated with effective population sizes and (2) with the current status (extirpation or persistence) of the green peafowl, and (3) the intensity of human activities in the historically extinct areas was significantly higher than that in the surviving area. These results suggest that human disturbance since the Middle Holocene is an important driving factor for the endangered green peafowl. The study also revealed that the current green peafowls in Yunnan and Indochina present no significant genetic structure, but long-term demographic and distributional declines, combined with the polygynous males mating system, make them subject to abnormally high levels of inbreeding, urging the need to strengthen the construction of habitat protection and ecological corridor, in order to maintain its evolutionary potential for future environmental change. These results have been published as "Population genomic, climatic and anthropogenic evidence suggest the role of human forces in endangerment of green peafowl (*Pavo muticus*)" on Proceedings of the Royal Society B: Biological Sciences.

(Yunnan: Dong Feng, Yang Xiao-Jun, Wu Fei, Wang Jie, Shan Peng-Fei,  
Guangzhou: Liu Yang, Chen Guo-Ling, Beijing: Chen De, Lei Fu-Min,  
Taiwan: Hung Chih-Ming, Kuo Hao-Chih)

### **Divergence time estimation of Galliformes based on the best gene shopping scheme of ultraconserved elements**

Divergence time estimation is fundamental to understanding many aspects of the evolution of organisms, such as character evolution, diversification, and biogeography. With the development of sequence technology, improved analytical methods, and knowledge of fossils for calibration, it is possible to obtain robust molecular dating results. However, while phylogenomic datasets show great promise in phylogenetic estimation, the best ways to leverage the large amounts of data for divergence time estimation has not been well explored. A potential solution is to focus on a subset of data for divergence time estimation, which can significantly reduce the computational burdens and avoid problems with data heterogeneity that may bias results. In this study, we obtained thousands of ultraconserved elements (UCEs) from 130 extant galliform taxa, including representatives of all genera, to determine the divergence times throughout galliform history. We tested the effects of different "gene shopping" schemes on divergence time estimation using a carefully, and previously validated, set of fossils. Our results found commonly used clock-like schemes may not be suitable for UCE dating (or other data types) where some loci have little information. We suggest use of partitioning (e.g., PartitionFinder) and selection of tree-like partitions may be good strategies to select a subset of data for divergence time estimation from UCEs. Our galliform time tree is largely consistent with other molecular clock studies of

mitochondrial and nuclear loci. With our increased taxon sampling, a well-resolved topology, carefully vetted fossil calibrations, and suitable molecular dating methods, we obtained a high quality galliform time tree. This tree can be combined with more fossil records to further facilitate our understanding of the evolution of Galliformes and can be used as a resource for comparative and biogeographic studies in this group.

For more detail, please read the paper: Chen, D., Hosner, P.A., Dittmann, D.L., O'Neill, J.P., Birks, S.M., Braun, E.L., Kimball, R.T., 2021. Divergence time estimation of Galliformes based on the best gene shopping scheme of ultraconserved elements. *BMC Ecology and Evolution* 21, 209.

(Beijing: Chen De)

### **Relationship between spring migratory restlessness of whooper swans (*Cygnus cygnus*) and climate factors, wintering behavior and home range**

The relationship between spring migratory restlessness and climate factors, wintering behavior and home range were studied in wintering whooper swans (*Cygnus cygnus*) in the Sanmenxia Swan National Wetland Park in western Henan Province. The fecal glucocorticoid metabolite (FGM) concentration was established to measure the state of migratory restlessness, and analyzed behaviors of each wintering activity phases and home range feature, FGM was related to mean air temperature or photo period (day length) using simple linear or non-linear regression models. The best fitted model revealed that FGM and the squared mean air temperature are positively correlated ( $R^2 = 0.88$ ), an increase of FGM concentration was associated with an increase in the squared mean air temperature and day length. Behavioral frequencies of seven behaviors were condensed into three behavioral principal components (PCs) using principal components analysis. Results revealed a significant correlation between FGM and behavioral PC2 (vigilance, preening, and foraging), and the behavioral PC3 (fighting and calling, locomotion) had a marginal significant effect on home range size. Results showed that the spring migratory of whooper swans had strong relationship with temperature and photoperiod, which was reflected in the difference of wintering behavior and home range size.

(Guogang Zhang, Liangliang Yang, National Bird Banding Center of China, Ecology and Nature Conservation Institute, Chinese Academy of Forestry)

### **Saltmarsh vegetation and social environment influence flexible seasonal vigilance strategies for two sympatric migratory curlew species in adjacent coastal habitats**

Animals need to adjust their vigilance strategies when foraging between physically contrasting vegetated and non-vegetated habitats. Vegetated habitats may pose a greater risk for some if vegetation characteristics function as a visual obstruction but benefit others if they serve as protective shelter. Variation in group size, presence of similar species, along with variation in environmental conditions and anthropogenic disturbance can also influence vigilance investment.

In this study, we quantified the vigilance behaviour of two large-bodied, sympatric migratory curlew species—Far Eastern Curlew (*Numenius madagascariensis*) and Eurasian Curlew (*N. arquata*)—in vegetated *Suaeda salsa* saltmarsh and non-vegetated mudflat habitat in Liaohekou National Nature Reserve, China. We used linear mixed models to examine the effects of habitat type, season, tide time, flock size (conspecific and heterospecific), and human disturbance on curlew vigilance investment. Both species spent a higher percentage of time under visual obstruction in *S. salsa* habitat compared to mudflat habitat but in response, only Far Eastern Curlew increased their percentage of vigilance time, indicating that visual obstruction in this habitat is only a concern for this species. There was no evidence that *S. salsa* vegetation served as a form of cryptic background colouration since neither species decreased their vigilance effect in *S. salsa* habitat in spring compared to the autumn migration season. The effect of curlew social environment (i.e. flock size) was habitat dependent since percentage of vigilance time by curlews in saltmarsh increased with both the number of individual curlews and number of other birds present, but not in mudflat habitat. We conclude that both migratory curlew species exhibit a flexible vigilance adjustment strategy to cope with the different environmental and social conditions of adjacent and sharply contrasting coastal habitats, and that the trade-off between the risks of foraging and the abundance of prey may be a relatively common phenomenon in these and other shorebird populations.

This study was published in *Avian Research* (2021. 12:39).

(Jing Zhang, Hang Zhang, Yu Liu, Huw Lloyd, Jianqiang Li, Zhengwang Zhang, Donglai Li)

### Effects of historical climate change on avian communities in the Himalayas

Tropical mountains are usually biodiversity hotspots. The effects of Quaternary climate change on species' elevational distribution have been generally ignored. This is mainly based on the intuitive inference that organisms can buffer the effects of climate change by performing short distances along elevational gradients. But there is no systematic test on this hypothesis. We reconstructed the historical distribution dynamics of 288 passerine species in the Himalayas to examine the effects of climate change on mountain community evolution during the last interglacial period (~ 120,000 years ago, LIG) and the last glacial maximum period (~20,000 years ago, LGM). The results showed that these birds could survive climate change during LGM by migration along the elevation gradient, but 32.6-46.2% of the extant species lacked suitable distributions during LIG. Further analysis suggested that this community turnover might be due to the local population extinction caused by the significant enhancement of climate variability during LIG. These results suggest that dramatic climate change may break through the buffer effect of mountain elevational gradient, which is important for understanding the origin of biodiversity in hotspots and predicting the impact of future climate change. These results have been published as "Potential Himalayan community turnover through the Late Pleistocene" on the *Climatic Change* (<https://>

doi.org/10.1007/s10584-021-02976-7)

(Yunnan: Dong Feng, Yang Xiaojun, Taiwan: Hung Chih-Ming, Li Shou-Hsien)

## **Rapid reclamation and degradation of *Suaeda salsa* saltmarsh along coastal China's northern Yellow Sea**

*Suaeda salsa* saltmarshes are an important coastal wetland habitat of China's northern Yellow Sea, which plays a critical role in sequestering carbon (blue carbon), protecting shorelines, maintaining biodiversity, and has substantial economic value (e.g., ecotourism). However, the area of *S. salsa* has been rapidly declining due to several different threats from reclamation and invasive species that impact its natural succession. Here, we map the changes in the distribution of the *S. salsa* saltmarshes along the northern Yellow Sea of China (NYSC) at 5-year intervals by applying the supervised maximum likelihood method to analyze Landsat images from 1988 to 2018 and investigate the potential impact of three important factors on habitat change by analyzing the temporal changes in *S. salsa* saltmarshes with other land covers. *S. salsa* saltmarsh areas have decreased by 63% (264 km<sup>2</sup> ha to 99 km<sup>2</sup>), and the average loss of *S. salsa* saltmarshes was 5.5 km<sup>2</sup>/year along the NYSC over the past three decades. There have been many dramatic declines in the two main distribution areas of *S. salsa* saltmarshes with a 77% loss of habitat area in Liaodong Bay (from 112 km<sup>2</sup> to 26 km<sup>2</sup>) and a 52% loss in the Yellow River Delta wetland-Guangli-Zhima estuarine wetland (from 137 km<sup>2</sup> to 65 km<sup>2</sup>). Land reclamation is the most important impact factor in the loss of *S. salsa* saltmarshes, while there have been limited effects of natural succession and smooth cordgrass (*Spartina alterniflora*) invasion. In light of the important ecological services and economic value of the *S. salsa* habitat, emergency conservation actions (e.g., habitat restoration, strictly supervision) are needed to limit the rapid habitat loss, which should include the immediate cessation of extensive land reclamation along the NYSC.

This study was published on *Land* (2021. 12:39).

(Jing Zhang, Yan Zhang, Huw Lloyd, Zhengwang Zhang, Donglai Li)

## **Nest habitat selection characteristics and suitable habitat prediction of Blue-crowned laughingthrush**

Blue-crowned laughingthrush (*Garrulax courtoisi*) is a critically endangered bird endemic to China. In recent years, its population has been stable within 500 individuals and it is nearly extinct in the wild. BirthLife International has listed it on the global list of Endangered birds, and has rated it as Critically Endangered (CR). At the same time, the blue-crowned laughingthrush is also listed as a national key protected wildlife. Therefore, it is essential to explore the nest habitat status, suitable habitat distribution and threat factors for its protection.

In this study, the distribution area of the breeding period of the blue-crowned laughingthrush was investigated in Wuyuan County and Dexing City of Jiangxi Province from March to July 2021. We investigated and analyzed the significance of difference of nest sites in different regions and

the discrepancy of ecological parameters affecting nest site selection in different nest types (factories, residential areas, and protected areas) by using Circular Sample-plot Method. The threat factors of this species were analyzed and the potential habitat distribution of species was predicted using a species distribution model. The results are shown below:

(1) The five ecological parameters including tree cover, shrub species, shrub height, average herbaceous height and maximum herbaceous height differed significantly in the nesting habitat of the blue-crowned laughingthrush. The differences between the ecological parameters of nest height from the ground, total depression and DBH of the tree were not significant.

(2) The Blue-crowned laughingthrush has a secondary nest use (2.78%), with a maximum of 4 chicks from both primary and secondary breeding, with the majority of chicks from primary breeding being 3 (50%).

(3) The species distribution model showed that the suitable habitat area were 24.76 km<sup>2</sup>. The centralized distribution area was mainly located in the central and southern parts of Wuyuan County and the west part of Dexing City.

(Beijing: Xinjie Huang, Shan Tian, Zhengxiao Liu, Jiliang Xu)

### **Foraging habitat suitability assessment of common crane during wintering period in Yancheng Nature Reserve of Jiangsu Province**

Common cranes (*Grus grus*) is a class II protected wildlife in China. It is the largest and most widely distributed crane in the world. This paper studies the foraging habitat of common cranes in Yancheng Wetland National Nature Reserve of Jiangsu Province (hereinafter referred to as Jiangsu Yancheng Nature Reserve), so as to provide a theoretical basis for the follow-up research on common cranes.

In the wintering period in 2018 and 2019, the paper studies and analyzes the population distribution, the characteristics of foraging habitat and the suitability of foraging habitat of common cranes in Yancheng Nature Reserve of Jiangsu Province by using fixed point observation, GPS positioning, sample method, principal component analysis and Maxent model. The main results are as follows: (1) The wintering period common cranes mainly distributed in the North buffer zone, followed by the core zone, the South buffer zone and the first experimental zone in the south, the Second Experimental Zone in the south, and the rest of the reserve. The common cranes mainly feeds on grain during wintering period, and its foraging habitat is more inclined to farmland habitat during wintering period. (2) According to the research, the 13 habitat factors of wintering period foraging habitat of Common cranes can be summarized as follows: Food and water factors (Farmland distance, Water surface distance, Vegetation height, Vegetation density, Vegetation coverage, Diameter of vegetation, Altitude and Depth of water); Interference factor (Road distance, Interference distance and Residential area distance); Concealment factor (Reed distance and Height of reed). (3) The MaxEnt model analysis shows that: The most suitable foraging habitat area for Common cranes in winter period is 17814.63 ha, accounting for 8.55%

of the total area of Yancheng Nature Reserve in Jiangsu Province. The suitable area is 19463.8 ha, accounting for 9.34% of the total area of the reserve. The second suitable area is 17549.58 ha, accounting for 8.42% of the total area of the reserve. The area of unsuitable area is 153478.89 ha, accounting for 73.68% of the total area of the reserve.

(Heilongjiang: Ye Tian, Hongfei Zou)

### **Local habitat and landscape attributes shape the diversity facets of bird communities in Inner Mongolian grasslands**

The loss and fragmentation of natural habitats because of anthropogenic activities are major threats to biodiversity world-wide. In recent decades, vast mosaics of natural and semi-natural habitats have been transformed into fragmented agricultural landscapes in Inner Mongolia, China, with potential negative effects on avian diversity. We quantified the effect of local and landscape habitat attributes on the taxonomic, functional and phylogenetic diversity of bird communities in Inner Mongolian grasslands. We considered eight independent habitat variables obtained by variance inflation factor analysis. We used canonical correspondence analysis to determine how these habitat factors of multiple scales explained variance in species composition. We then fitted Bayesian generalized additive models to analyse the habitat-biodiversity relationships and included a smooth effect of land cover richness to test the intermediate disturbance hypothesis in each model. Our results provided evidence that differences in bird assemblages can be explained, in part, by differences in local and landscape-scale habitat features. The responses of the four diversity indices to these predictors were diverse and scale-dependent. We found species richness and Shannon diversity exhibited similar response, with both being negatively related to bare land percentage while being positively related to plant canopy and impervious surface percentage. Phylogenetic diversity was positively associated with plant richness while negatively associated with forest percentage and impervious surface percentage. We found no statistical evidence for a relationship between functional diversity and any of the variables examined here. Additionally, for the four measures of bird diversity, we did not find any evidence that they peaked at intermediate levels of habitat disturbance. We propose that assessments of regional grassland bird communities should be conducted at multiple scales and that a range of biodiversity metrics are required to better evaluate and inform conservation decision making, especially when the target is preserving not only species but also their evolutionary history and ecological functions.

(Zheng Han, Yunlei Jiang, Haitao Wang, Jilin; Frédéric Jiguet, France)

### **The indicator roles of endangered scaly sided merganser (*Mergus squamatus*) in submontane rivers of Changbai Mountains, China**

Submontane sections of riparian forest habitats are potential focal points of biodiversity but are often the least conserved units of riparian habitats. This is especially concerning in the Northeast Forest Region of China, which has undergone drastic deforestation and river alteration. Effective

evaluation and supervision of the suitability of riparian forest habitat and species richness are labor- and time-consuming and could be compensated by using indicator species. In this work, we verified whether the endangered Scaly-sided merganser (SSME) can be used as a qualified indicator of the habitat characteristics and biodiversity of submontane river valleys in the Changbai Mountains area of China. Environmental variables and the richness of riparian species were compared between the river sections settled and unsettled by the SSME. Breeding SSME occurred in river sections with wider channels, larger gravel bars, greater coverage of riverine forests and showed a more concentric inhabitation pattern in wider, deeper, more sinuous and forested riparian habitats. In addition, the probability of occurrence and abundance of the SSME was positively correlated with the species richness of birds, fish and macro-invertebrates as well as the total mass of sampled fish. The correlation of the SSME with the richness of riparian animals and featured riparian habitats and its high public attention profile make it a good candidate for an umbrella and flagship species, which could be an especially valuable surrogate for the protection and monitoring of the habitats and species in the Changbai Mountains area and, probably, other habitats in Northeast Asia. This study adds to the evidence supporting the effectiveness of piscivorous species in indicator roles, suggesting that the indicator roles of mergansers and other fish-eating species deserve verification to complementarily assess important habitats that are difficult to monitor by other means in riparian ecosystems.

(Jinlin: Wenyu Xu, Lin Wang, Ye Gong, Haitao Wang)

### **The impacts of climate and land-use changes on Galliformes in Southeast Asia: implication in conservation**

Climate change and alterations to land use, as well as their interactions, change biodiversity, especially in biodiverse areas such as Southeast Asia (SEA) where aggregations of endemic species are widespread. To increase the effectiveness of biodiversity protection, it is crucial to understand the effect of climate change, land-use changes and their interactions on biodiversity. Galliformes species is an indispensable component of biodiversity. We used Galliformes species to assess impacts of climate and land-use changes on future suitable habitats in SEA, and compared the differences between the effects of climate change and land-use changes. We developed an ensemble of seven species distribution models (SDMs) to assess the potential habitats and their dynamics of 60 current Galliformes species in SEA in the 2050s and 2070s. Our results stated that the climate change, the land use changes and their interactions had a negative effect on the future distribution of these Galliformes. The species with various endangered status would experience different effects by climate change and land use changes, and the species listed as Near Threatened and Endangered by the International Union for Conservation of Nature (IUCN) were more vulnerable to climate and land-use changes. In particular, a mismatch existed between the current protection areas (PAs) and future suitable habitats. In order to ensure biodiversity effectively, our findings suggest that we should establish new PAs or adjust the actual range of PAs

based on the joint impact of climate and changes in land use.

(Beijing: Zhengxiao Liu, Shan Tian, Shuai Lu, Ziqiang Zhu,  
Jianqiang Li, Jiliang Xu; US: Yong Wang)

### **The value of coastal saltpans for migratory shorebirds: conservation insights from a stable isotope approach based on feeding guild and body size**

Migratory shorebirds are among the most threatened groups of birds. They rely on natural intertidal habitats outside the breeding season, but, to some extent have adjusted to using man-made habitats. Here, we assessed the importance of coastal saltpans – a type of anthropogenic wetland – for feeding in migratory shorebirds during their northward migration along the East Asian-Australasian Flyway (EAAF). We combined low tide counts on intertidal flats and nearby saltpans at the Luannan coastal wetland complex (Bohai Bay, China) with Bayesian mixing model analyses (BMMs) based on stable isotopes to evaluate the relative importance of coastal saltpans versus natural intertidal habitats as foraging grounds for migrating species. We grouped shorebird species ( $n = 24$ ) according to feeding guild and body size, and found that both predictors explained the broad-scale patterns of foraging use of saltpans by shorebirds at low tide. The guild of water-surface foraging species (e.g. stilts and avocets), independently of body size, mostly fed in saltpans, and the small-medium visual (e.g. plovers) and tactile-surface (e.g. sandpipers) foraging species consumed a significant portion of their diet in this habitat. In contrast, most large tactile-surface foraging species barely foraged in saltpans at low tide. BMMs showed that shorebirds had a greater reliance on saltpans than did traditional counts of foraging birds in each habitat at low tide. Saltpan food is rich in essential fatty acids, so the contribution of saltpans to the diet of shorebirds should not be considered only in absolute values, but also in the quality of this contribution. Saltpans may therefore help conserve declining shorebirds if properly managed – for example by controlling water levels – to serve the specific feeding guilds that rely on them. While our focus is in the EAAF, the findings are relevant for other flyways and other non-tidal anthropogenic wetlands.

More detail, please read Lei, W., Masero, J.A., Dingle, C., Liu, Y., Chai, Z., Zhu, B., Peng, H., Zhang, Z., Piersma, T., 2021. The value of coastal saltpans for migratory shorebirds: conservation insights from a stable isotope approach based on feeding guild and body size. *Anim. Conserv.* 24, 1071–1083.

(Beijing: Weipan Lei)

### **Public attitudes and willingness to pay toward the conservation of Crested Ibis: Insights for management**

Humans are fundamentally, and to a significant extent irreversibly, changing the diversity of life on Earth, and most of these changes represent a loss of biodiversity. Some scientists estimated that the average rate of vertebrate species loss over the last century is up to 100 times higher than

background extinction rate, indicating that a sixth mass extinction is already under way. Given the fact that human activity is the primary source of species decline and extinction, social, economic and political factors must be carefully considered. The wild population of the endangered Crested Ibis (*Nipponia nippon*) is currently only distributed in Yangxian County, Shaanxi province of China, and as the gradual dispersal of its population from the mountains to the plains, the possibility of human-wildlife interaction has increased, which poses certain challenges for conservation and management. Here, we used a questionnaire to investigate public attitudes and willingness to pay (WTP) toward Crested Ibis conservation, and to evaluate relevant influencing factors, with a view to providing recommendations for its management.

The results showed that local residents strongly support the conservation of ibis and factors like education level, income, residential area, perception for ibis and prior experiences significantly affected their support for conservation. Results also indicated that the annual WTP was US\$18.28 per household, and the potential value of donations is about US\$2.45 million per year for Crested Ibis conservation. Regression analysis indicated that income, perception for ibis, prior experience, support for conservation and environmental attitudes had a significant effect on WTP. The comparison between the original research value of the ibis and the predicted value from the Meta-regression analysis function indicated that the benefit transfer values are able to inform policy decisions. Our results can be applied not only to the design of tailored outreach programs and management policies for the Crested Ibis, but also to facilitate conservation and management of other endangered species by encouraging decision makers to use benefit transfer models for the rapid valuation in the absence of species economic information.

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(Yuping Ren and Changqing Ding, Beijing)

### **Tall trees drive the nest-site selection of wild Crested Ibis *Nipponia nippon***

Understanding how birds select breeding sites plays an important role in habitat protection, especially for the conservation of endangered species. With the increase in population size of the endangered Crested Ibis (*Nipponia nippon*), its distribution range has expanded from the mountain areas to plains located outside protected areas, representing a new challenge for species conservation. Identifying the current nesting-habitat requirements is thus needed and can provide valuable information for the planning of new nature reserves. In this research, we surveyed a total of 117 nests across the whole distribution range from 2015 to 2019. We used generalized linear mixed-effects models to assess nesting preferences of the Crested Ibis in the wild. Results showed that in mountain areas, Masson pines *Pinus massoniana* were preferred (64.6%), whereas Elms *Ulmus pumila* (44.9%) and Aspens *Populus davidiana* (40.6%) were used more frequently lower

down, probably because of their higher availability. The ibises in both mountain areas and plains selected tall nesting trees with larger diameter at breast height and preferred nesting rather high above ground, especially in plains where taller nesting trees provided higher suitable nesting positions. The ibises also preferred nesting close to tree trunk, especially in mountain areas, probably for more safety from collapsing. Furthermore, in mountain areas, slope and distance to path had positive effects on nesting occurrence, and understory coverage was avoided by nesting ibises, while these variables had little impact in plains. Our results indicate that, despite their range expansion, Crested Ibises rely on very specific habitat characteristics for nesting. We suggest relatively tall trees like Elms and Aspens should be preserved in plains. In addition, we highlight how selection patterns of Crested Ibises may vary, and that such variation should be addressed in conservation planning, especially in future reintroduction.

(Guangxi Academy of Sciences: Yongjie Huang;  
Beijing Forestry University: Changqing Ding)

### **Song variation of *Prinia inornata* in the modified habitat by invasive *Spartina alterniflora***

Habitat structure has been considered as an important factor affecting the acoustic evolution of birds, and bird songs are increasingly affected by artificial environmental variation. Invasive plants sometimes can dramatically alter native habitats, but the song variation of native songbirds migrating into invaded habitats has received little attention. The invasion of smooth cordgrass *Spartina alterniflora* in the coastal wetlands of eastern China has drastically altered the vegetation structure and some small passerines have begun to use invaded habitats to breed after a long coexistence. In this study, we compared the song type prevalence and the song characteristics of male plain prinia *Prinia inornata* to identify differences in vocal behavior between native and invaded habitats. We also tested for differences in vocal behavior in relation to singing perch and wind speed variation between different habitats. The results indicated that males of plain prinia in invaded habitats sang shorter songs than those in native habitats and had a lower song diversity. The homogeneous vegetation structure and higher wind speed in invaded habitats likely leads to males changing the traditional perched singing style. We speculate that song variation may be related to the founder effect, the alteration of vegetation structure and microclimate in invaded habitats. This finding highlights the need for better understanding the behavioral evolution of native animals in the process of adapting to the invaded habitat. In the future, experimental manipulation is needed to ascertain how invasive plant drove these vocal behavior changes of native songbirds and the adaptive mechanisms of birds. This study was published on *Integrative Zoology* (2022; 17: 93-104. doi: 10.1111/1749-4877.12573).

(Pan Chen, Anhui; Taiyu Chen, Bin Liu, Manyu Zhang, Changhu Lu, Jiangsu)

## Response analysis of behavior pattern of *Aythya baeri* in wintering under different weather conditions

In nature, many environmental factors can affect the behavior of animals, and the weather factor is one of them. Weather has direct and indirect effects on animals. It can not only affect the energy flow and information exchange between individuals or groups of animals, but also affect the material circulation and behavior patterns between animals and the environment. Further study on the response relationship between weather conditions and animal behavior patterns can further understand the behavioral strategies of animals coping with weather changes. In this paper, the responses of the common *Aythya baeri* to three weather conditions, namely sunny day, cloudy day and misty day, were analyzed and compared, taking the *Aythya baeri* in Minquan Wetland Park, Henan Province as an example. The results showed that under different weather conditions, the behaviors of *Aythya baeri* in Minquan Wetland Park had certain responses in terms of behavioral time allocation, behavioral rhythm and main behaviors, which showed that the overall fluctuation degree of behavioral rhythm was negatively correlated with the severity of weather (sunny days > misty days > rainy days). The *Aythya baeri* allocated more resting and foraging time in cloudy and rainy days (cloudy and rainy days > misty days > sunny days), and delayed their peak to noon and afternoon, especially in the evening. At the same time, reducing energy consumption behavior to reserve more energy to cope with the night under bad weather, that is, increasing energy intake (food) and reducing energy consumption are the behavioral response of the common *Aythya baeri* to cope with bad weather during the wintering period.

(Heilongjiang: Zhe Li, Qingming Wu, Zhuo Xu,

Wei Du; Beijing: Qi Zhang; Shandong: Xiaodong Gao)

## Sex-dependent migration of eastern great bustard

The great bustard (*Otis tarda*) holds the distinction of heaviest birds to undergo migration as well as the greatest degree of sexual size dimorphism among living birds. Though the migration of the species has been widely discussed in the literature, researchers know little about the migration patterns of the subspecies in Asia (*Otis tarda dybowskii*), especially the males. In 2018 and 2019, we captured six *O. t. dybowskii* (five males and one female) at their breeding sites in eastern Mongolia, and tagged them with GPS-GSM satellite transmitters. We found notable differences between the sexes: 1) males started migration later but arrived early than females in the spring, but not in autumn; 2) males had 1/3 of the migration duration of the female ( $16.44 \pm 14.68$  days vs.  $47.52 \pm 20.04$  days); 3) males migrated about 1/2 the distance of the female ( $945.13 \pm 79.00$  km vs.  $1882.63 \pm 61.80$  km). Additionally, we found bustards exhibited high fidelity to their breeding, post-breeding and wintering sites. Indeed, most of the wintering sites found by GPS tracking in this study were also utilized 70 years earlier, according to previous work. For conservation, we found only 22.20% of GPS location fixes of bustards were within protected areas and less than 5.0% for wintering sites and during migration. Our findings suggest more conservation effort is needed

for the Asian populations of this threatened species.

(Yingjun Wang, Zijian Wang Chunrong Mi, Yumin Guo, Beijing;  
Gankhuyag Purev-Ochir, Amarkhuu Gungaa, Baasansuren Erdenechimeg,  
Oyunchimeg Terbish, Dashdorj Khurelbaatar, Mongolia)

### **Study on overwintering behavior patterns of White crane under different human intervention gradients**

White crane (*Grus leucogeranus*) is a critically endangered species in the world. In order to alleviate the threat, many zoos and rescue centers have carried out ex-situ breeding management, in which behavioral management is an important part. In order to effectively improve the quality of group behavior management of white cranes in ex-situ protected areas (zoos, rescue centers) with artificial intervention, Adopting instantaneous scan sampling, focal animal sampling method, sampling method and so on all events in Poyang Lake reserve wild crane group (without human intervention group), ZhaLong nature reserve field rescue crane group (mild human activity intervention group), Harbin zoo in captivity crane group (severe human activity intervention group) was carried out by different gradient crane wintering behavior under human intervention Pattern study. The results showed that the overwintering behavior patterns of white cranes were different among the three groups. Among them, foraging was the dominant behavior in wintering period, followed by wandering, resting, standing and grooming. In the mild human intervention group, foraging and standing were the main behaviors, followed by feathering, singing, wandering and resting. In the severe human intervention group, feathering behavior was the dominant behavior, followed by standing, resting, foraging and wandering behavior. All these behaviors have obvious daily behavior rhythm. Further analysis showed that the behavior time distribution of white cranes during the overwintering period was consistent with the cluster effect hypothesis and the moderate interference theory under different human intervention gradients, and the severe intervention could promote the change of some behaviors to companion behaviors.

(Heilongjiang: Zhuo Xu, Kexin Wu, Baizong Zhuo, Chao Xiao,  
Xian Huang, Wenyong Deng, Qingming Wu)

### **Effect of conspecific neighbors on the foraging activity levels of the wintering Oriental Storks (*Ciconia boyciana*): Benefits of social information**

Animals prefer to aggregate in patches with high abundance and availability of food resources. Group foragers typically receive information about food resources by monitoring external events and the behavior of neighbors. The Information Centre Hypothesis proposes that aggregations increase foraging activity levels as a result of social information provided by conspecifics. Increasing the foraging rate has as a result decreasing time devoted to anti-predator vigilance and may intensify competition among group members. Studies have shown that foraging activities are influenced by factors other than flock size, such as the number and foraging intensity of

neighbors. To test these hypotheses, we examined the effect of number and foraging intensity of neighbors on the foraging activity levels (foraging rate, foraging effort, and foraging success rate) of the wintering Oriental Storks (*Ciconia boyciana*). In this study, we collected focal sampling data on the foraging behavior of storks at Shengjin Lake during winter from 2017 to 2019, controlling the effects of other variables (group identity, wintering years, and wintering periods). We found that foraging activity levels were higher in the presence of foraging neighbors than in their absence. Moreover, individuals adjusted their foraging activity levels according to social information gathered from the behavior of neighboring conspecifics. Focal individuals' foraging rate and foraging effort were positively correlated with the average foraging rate of neighbors. Their foraging success rate was not influenced by the average foraging rate and foraging success rate of neighbors; however, it was positively correlated with the average foraging effort of neighbors. In conclusion, foraging activity levels of individuals are primarily driven by the intensity of the foraging activity of neighbors. This result differs from the results of previous studies that suggested that flock size was the most important factor determining individual foraging activity levels.

(Lei Cheng and Lizhi Zhou, Hefei)

### **Responses of Avian Community Diversity to Different Patterns of Returning Farmland to Wetland in Naolihe Nature Reserve, Heilongjiang Province**

Heilongjiang Naolihe National Nature Reserve is located in the hinterland of the San jiang Plain. It is very representative in protecting the biodiversity of the San jiang Plain and maintaining the function of the ecosystem. After nearly half a century of reclamation, the ecological characteristics of the wetlands in the Nao li River Basin have undergone significant changes. In recent years, the state has carried out the project of returning farmland to wet land, and Naoli River Reserve responds to the national policy. As of 2018, the total area of converted farmland in the Nao li River Reserve has reached 5004ha. This study divides the study area into areas with conversion of farmland and areas without conversion of farmland. The line transect method and sample point method were used to compare the bird community in the Naolihe Nature Reserve. The bird community in the study area of the management station was investigated, and the response of the bird community structure under the two scenarios of different conversion methods and different conversion times was explained in terms of community composition, community diversity and similarity, and then the vegetation community succession was evaluated. The results of the study show that: (1) Driven by different methods of returning farmland to wetland, the diversity of bird communities has increased. However, in terms of the abundance of water bird species, the driving influences are inconsistent. The effect of natural returning farmland to wetland is stronger than the effect of human interference. In terms of the abundance of Land birds species, the effect of artificial disturbance of returning farmland to wetland is stronger than that of natural returning farmland to wetland. (2) Driven by different time of returning farmland to wetland, the length of

returning farmland has little effect on bird species richness, but in terms of water bird richness, the longer the returning farmland time, the higher the water bird richness. (3) After returning farmland to wetland, the diversity of bird communities in different successional stages of the community is different. The diversity of bird communities in the development stage of succession is higher than that in the initial stage of succession, and the abundance of water bird species is also the same. Further analysis showed that, regardless of human disturbance, returning farmland to wetland or natural returning farmland to wetland, can promote the restoration of bird community diversity. Different ways of returning farmland have different driving effects on the richness of waterfowl and land bird species. The natural way of returning farmland to wetland is beneficial to the restoration of waterfowl community, and the way of artificial disturbance of returning farmland to wetland is beneficial to the restoration of Land birds species richness.

(Liaoning: Lu Chen, Heilongjiang: Hongxue Lu, Zhuojin Xu, Yang Hong, Qingming Wu)

### **Non-kin infanticide by male Oriental Magpie Robins**

Although a number of infanticide cases have been recorded among birds, since the incidence of this behavior is, overall, low and difficult to confirm, the importance of infanticide in the cause analysis of breeding failure is likely to be underestimated. We observed two cases of non-kin infanticide in Oriental Magpie Robins *Copsychus saularis* in nest boxes. The first incident occurred during the absence of the nesting male during the brooding period and in the sole presence of the female; another male entered the nest box and continuously attacked and pecked all four eight-day-old nestlings in the nest until they died. A second incident occurred in the presence of both parents, but during the feeding interval; a male perpetrator entered the nest box and pecked and pushed the single three-day-old nestling out of the box. The parents continued to carry food to the nest and tried to feed their nestling even after the latter had been killed. The parents were observed behaving anxiously once they detected no sign of activity from their nestling (see Jin et al. 2021 *Ornithological Science*).

(Hainan: Yameng Jin, Changzhang Feng, Wei Liang)

### **Nest-site choice and anti-parasitism strategy among four sympatric hosts of Common cuckoo (*Cuculus canorus*) breeding within a reed habitat**

Reproduction is one of the most fascinating parts in the life history of birds. Difference of life history characteristics and niches differentiation are often exhibited among the birds that use similar resources breeding within the same area, so as to reduce competition and achieve coexistence in limited resources. And adaptive reproductive strategies will be developed under environmental pressure of different intensities. In this study, nest-site choice, reproductive efficiency and coevolution in the egg stage were compared among four sympatric hosts of Common cuckoo (*Cuculus canorus*), namely Oriental reed warbler (*Acrocephalus orientalis*), Blunt-winged Warbler (*Acrocephalus concinens*), Reed Parrotbill (*Paradoxornis heudei*) and Vinous-

throated Parrotbill (*Sinosuthora webbiana*), which breeding within a wetland-reed habitat, to explore the coexistence mechanism and reproductive strategies. Our results showed that the nests of Oriental reed warbler was the most dominant species which accounting for more than 70% of the four sympatric species. Breeding nests of the four species were distributed in a mosaic pattern within the same habitat, with similar nest shapes/structures and nest-sites in the reeds. However, there were significant differences in height of reeds where nests were placed (chi-square = 13.635, df = 3,  $P = 0.003$ ), density of reeds around the nests (chi-square = 8.045, df = 3,  $P = 0.045$ ) and nest height above the water surface (chi-square = 46.795, df = 3,  $P < 0.01$ ). In addition, both the local resident birds of Vinous-throated Parrotbill and Reed Parrotbill bred earlier than that of the two warblers which leading to differentiation of reproductive phenology, so as to reduce the interspecific competition. Egg recognition experiments revealed that the ability of egg recognition against the nest parasitism of cuckoo among the four species differed significantly (Fisher's exact: all  $P < 0.01$ ). The common cuckoo shows a clear selective bias in its parasitism of the four sympatric hosts, mainly parasitizing the nests of Oriental Reed Warblers, in which we found more than 90% of the eggs laid by cuckoos. And in addition to significantly brighter (all  $P < 0.05$ ), the cuckoo eggs has evolved a high degree of mimicry for the eggs of this host in terms of the hue and chromaticity for egg coloration of background and markings (all  $P > 0.05$ ). Further research showed that Oriental reed warbler used the true recognition mechanism to discriminate foreign eggs. And only female warblers performed egg rejection, suggesting that sexual conflicts occurred in reproductive strategy of egg stage against the parasitism of cuckoo.

(Heibei: Laikun Ma; Ningxia: Jianping Liu; Hainan: Canchao Yang, Wei Liang)

### **Adding snake slough to nests is an effective anti-predation method**

Snakes are common predators of bird nests, but still, some avian species use snake slough as nest materials. Taking crested mynas (*Acridotheres cristatellus*) in the tropical Hainan island as the research objects, we investigated the role of snake slough as materials. Our results showed that crested mynas added snake slough (2–18.3 cm in length) to their nests during the breeding period, up to 38.9% of snake slough nests were added during the nest-building period. Furthermore, there were no significant differences in the number of nestlings hatched for each nest and nestlings growing between the snake slough and the non-snake slough group, snake slough in nest could not promote the growth of nestlings, which did not support the drug hypothesis; however, the predation rate of the snake slough group was lower than the non-snake slough group. Our study provided strong experimental evidence for the antipredation hypothesis that snake slough in birds' nests acts as a nest predator deterrent.

(Hainan: Jinmei Liu and Wei Liang)

## Overwintering behavior pattern and sex difference of *Aythya baeri* in Henan Minquan Wetland Park

The behavior of animals usually reflects their living habits, living conditions and relationships within and between species, etc. Grasping the behavior of rare and endangered species has important reference value for formulating conservation and management measures. Taking the *Aythya baeri*, a critically endangered species distributed in Henan Minquan Park, as an example, we studied the behavior patterns of *Aythya baeri* during their overwintering period, and analyzed and compared the gender differences in behavior patterns. The results showed that: (1) in the Minquan Wetland Park the overwintering behavior time allocation of *Aythya baeri* was mainly composed of resting, foraging and sport, followed by maintain and flying. There existed significantly positive correlation between sports behavior and foraging behavior maintaining behavior and social behavior and also significantly positive correlation between maintaining behavior and social behavior. While there was significantly negative correlation between resting behavior and maintaining behavior, sports behavior, social behavior, and significant negative correlation between flight behavior and foraging behavior resting behavior maintaining behavior. (2) The resting behavior had the characteristics of full-time high time allocation and there were no peak and valley periods. The foraging behavior and flight behavior had obvious alternating peak rhythm. (3) It existed obvious differences about time allocation of overwintering behaviors between different genders. There were significant differences in the time allocation of rest maintaining sport and flight between male and female. The time allocation of rest and maintaining of male was significantly higher than that of female, while the time allocation of sport and flight was significantly lower than that of female. (4) In wintering behavioral activities rhythm of *Aythya baeri* with different genders except for flight behavior the other behaviors were different in behavioral peak and valley rhythm. Further analysis showed that the overwintering behavior model of *Aythya baeri* in Minquan Wetland Park conforms to the behavioral investment and return principle from energy theory and there were gender differences in the behavior time allocation and behavior rhythm.

(Beijing: Qi Zang; Heilongjiang: Zhe Li, Yuan Sui,  
Qingming Wu, Wei Du, Zhuo Xu; Shandong: Xiaodong Gao)

## Instances of alloparental care in Great Tits (*Parus major*)

Alloparenting refers to any type of parental care provided by an individual to non-descendant offspring. Alloparenting is not merely an altruistic behavior; it confers benefits to both, care receivers and caregivers. Alloparenting increases overall survival rates of nestling in exchange for a relatively low investment. Here, we report 3 cases where 3 adult Great Tits simultaneously provided food to chicks in the same nest boxes during the breeding season of 2019. All 3 cases were found in nest boxes where parent removal experiments were carried out. In our 3-d experiments, 1 of the parenting adults was temporarily removed from the nest box early on the

second day and was back on its nest box at the end of that same day. In 2 of the nest boxes, the 3-adult brood-feeding started upon removing 1 of the brooding parents and continued on day 3, after the removed adult was returned. In 1 case, an alloparent was recorded feeding chicks alongside a parent since day 1 and continued feeding chicks on day 2. Our reports are the first documented examples of Great Tits involving a third adult in brooding. It presents an interesting finding for a well-studied bird species and may provide possibilities for in-depth research. This study was published on *The Wilson Journal of Ornithology* (133(3):000–000, 2021. DOI: 10.1676/19-00139)

(Yiting Jiang, Ruiyao Ma, Yaqi He, Dongmei Wan, Liaoning)

### **The spatial distribution and breeding behavior of neighbors affect the reproductive success of tits**

The spatial distribution and breeding behavior of neighboring birds (conspecific and heterospecific) may influence reproduction and the effects differ across species. In this study, we investigated intra- and inter-specific spatial distribution of breeding via artificial nestboxes and examined whether overlap with neighbors affected reproductive success of the focal breeding pair. Regarding spatial distribution, varied tits (*Sittiparus varius*) and cinereous tits (*Parus cinereus*) showed similar pattern: distances of nestboxes containing conspecific tits were greater than those with heterospecific ones. In terms of breeding behavior, reproductive success was not significantly related to the distance from their neighbor's nest. The reproductive success of varied tits were significantly related to that of their neighbors, while in cinereous tits, no strong link was found to any recorded reproductive behavior of the neighbors. Our results show that intra- and inter-specific competition affects the nest distribution of two hole-nesting species. The effect on reproductive outcome has interspecific divergence. The results highlight there are differences in reproductive outcome among related species and offer suggestions on the use of artificial nestboxes in experiment and conservation programs.

This study was published on *Avian Research* (<https://doi.org/10.1016/j.avrs.2022.100010>).

(Yiting Jiang, Yjia Bi, Ruiyao Ma, Jing Zhang, Dongmei Wan, Liaoning)

### **High level of extra-pair paternity in the socially monogamous Marsh Tits (*Poecile palustris*)**

Extra-pair copulation behavior has been widely studied among socially monogamous birds. Many species revealed high rates of extra-pair paternity. But few of the studies have been carried out in the Asian population. From 2012 to 2019, we explored the extra-pair paternity of marsh tits (*Poecile palustris*) in Xianrendong National Nature Reserve, Liaoning Province, China. During the study, adult marsh tits were captured with mist nets and parental birds, with nest-box traps. Blood samples were taken from the brachial vein. Parentage analyses were carried out using nine highly variable microsatellite loci through cervus 3.0 software and maximum likelihood

approach. The results showed that 49 offspring (15.08%) from 20 nests (45.45%) were the results of extra-pair fertilization out of a total of 325 offspring in 44 nests. The average extra-pair offspring ratio was 33.54%, of a set varying from 11.11% to 71.43%. Nine extra-pair fathers had been successfully identified, four of whom were the close neighbors of the focus nest while the nests of the remaining five were relatively far. No significant difference was found in the genetic similarity between the social and extra-pair mates of the female, nor in the heterozygosity among the maternal half-siblings. In general, our study proved that the extra-pair paternity in marsh tits and its extra-pair mating is independent of the genetic compatibility hypothesis and the genetic decline from inbreeding or distant breeding. This complements the understudied bird's extra-pair paternity in Asian area and contributes to the comprehensive insight of birds' extra-pair paternity behaviors. This study was published on *Avian Research* (2021, 12: 69)

(Wang Juan, Li Keke and Wan Dongmei, Liaoning)

### **Parasitic begging calls of nestmate-evictor common cuckoos stimulate more parental provisions by red-winged blackbirds relative to calls of nest-sharing brown-headed cowbirds**

Parasites often manipulate host behaviors to achieve their own selfish fitness goals. However, the efficiency with which parasitic begging calls solicit foster parental care has not yet been compared across different avian host-brood parasite systems. For example, the begging calls of nestmate-evictor parasites are predicted to solicit sufficient levels of foster parental provisioning for the sole parasitic chick in the nest whereas the calls of nest-sharing parasites combined with the begging by host nestmates to solicit provisions for the whole brood. We studied a host of the obligate brood parasitic brown-headed cowbird (*Molothrus ater*), the red-winged blackbird (*Agelaius phoeniceus*), to test the effects on parental feeding patterns of begging call playbacks of nestmate-evictor common cuckoos (*Cuculus canorus*) or nestmate-sharing cowbirds. As predicted, cuckoo calls elicited more parental feeding trips and the amount of food delivered than cowbird calls. Food provisioning to nestlings while hearing cuckoo begging calls was similar to that while hearing redwing calls, and both were higher relative to a control silence treatment, which suggested that the begging call acoustics of the cuckoo served as an efficient stimulus for parental care in this cuckoo-naïve host. The study also confirms that cowbird calls are not supernormal stimuli for parental provisions in this host species, as redwing begging calls themselves are similarly effective stimulants for conspecific parental provisioning behaviors. Future research should examine the acoustical bases and biases present in the cuckoo's begging calls to efficiently solicit parental provisioning in both naïve and coevolved hosts.

This study was published on *Behavioral Ecology and Sociobiology* (2021, 75:11).

(Donglai Li, Mark E Hauber)

### **Loss of extra-pair paternity is not associated with decreased paternal investment in mixed-parentage broods or unrelated nestlings in the Varied Tit *Parus varius***

Males of socially monogamous bird species may be faced with providing costly care for unrelated offspring when nests have extra-pair young (EPY). Theoretical models predict that cuckolded males should lower their parental investment as the likelihood of paternity decreases. However, empirical data are not always in support of this prediction. Here, we explore parental behaviors within the context of extra-pair paternity (EPP) in a population of the varied tit *Parus varius* in China. The results showed that 39.5% of nests were cuckolded and 16.4% of chicks were sired by extra-pair males. We found no evidence that male and female varied tits reduced their feeding rates or relative feeding effort to EPP broods, or that they decreased provisioning for EPY in mixed broods. There was also no direct effect of EPP on the reproductive success of breeding adults and the body condition nestlings near fledging. The lack of reliable cues of EP copulations (EPC)s by social mates available for the males, and/or the absence of strictly environmental pressure on males that would favor discrimination may account for a lack of an adjustment in feeding effort. The absence of discrimination between own and EPP chicks in parental care suggests that females pay no fitness cost because of EPCs, which may explain the high frequency of EPY in nests.

This study was published on *Pakistan Journal of Zoology* (2021. 53: 2105-2116.)

(Donglai Li, Mei Han, Huw Lloyd, Linyu Jin, Lei Zhang, Jiangxia Yin, Dongmei Wan)

### **Effects of foraging site distances on the intestinal bacterial community compositions of the sympatric wintering Hooded Crane (*Grus monacha*) and Domestic Duck (*Anas platyrhynchos domesticus*)**

The composition of intestinal microflora in animals is affected by cross-species transmission. In a nature reserve, the foraging sites of waterbirds are relatively fixed, but frequently close to residential areas and can also be visited by domestic fowls. It is easy to result in the trans-species-flock dispersal of gut microbes between the wild birds and domestic fowls. The effects of the variable foraging site distances on the gut microbe structures of the waterbirds and the sympatric domestic fowls are currently unclear, and further research is required to evaluate the impacts of geographic location on cross-infection.

Illumina high-throughput sequencing and bioinformatics analysis software were utilized to compare and analyze the composition of gut microbes from the fecal samples of Hooded Cranes (HC; *Grus monacha*) and two groups of Domestic Ducks (*Anas platyrhynchos domesticus*) that foraged at 1 km (ducks in near areas, D-N), and 4 km (ducks in far areas, D-F) away from the habitats of the Hooded Cranes at Shengjin Lake, China.

The results showed that there were significant differences in the alpha-diversity of the gut bacteria in the HC, D-N, and D-F samples under the interspecific distance factor. The dominant bacterial phyla, Cyanobacteria and Proteobacteria, showed correlations with distance for each

host. The D-N group had more diverse intestinal flora than the D-F, as they were physically closer to the HC and had more indirect contact and cross-transmission of their gut microbes. More potentially pathogenic bacterial sequences, and Operational Taxonomic Units (OTUs) were found in the D-N than in HC and D-F.

Hooded Cranes and the Domestic Duck populations at variable distances from the cranes showed significant differences in their intestinal bacteria and potentially pathogenic bacteria. The closer the foraging sites were, the easier the intestinal flora spread across species. The results provide a basis for determining the safe distance between wild birds and domestic fowls in a nature reserve.

(Wei Wang and Lizhi Zhou, Hefei)

### **Effects of food changes on intestinal bacterial diversity of wintering hooded cranes (*Grus monacha*)**

As food is recognised as an important factor affecting the intestinal microbiota, seasonal changes in diet can influence the community composition. The hooded crane (*Grus monacha*) is an endangered migratory waterbird species, with some of the population wintering in the shallow lakes in the middle and lower Yangtze River floodplain. Their food resources have changed seasonally, with a reduction resulting from wetland degradation. To cope with seasonal changes in food availability, hooded cranes must constantly adjust their foraging strategies to survive. We studied the effect of changes in diet on the intestinal bacterial diversity of hooded cranes at Shengjin Lake, using faecal microanalysis and high-throughput sequencing. The results show that the main foods of hooded cranes were *Polygonum criopolitanum*, *Oryza sativa*, and *Carex* spp., which were significantly related to the composition of the intestinal bacterial community. In addition, foods available from the similar habitats were more similar, and the corresponding hooded crane intestinal bacteria were also more similar. The relative abundance of *Lactobacillus acidipiscis* in January and March was significantly higher than in November. Our research shows that the intestinal bacteria of hooded cranes actively adapt to diet changes to overcome the negative impact of the reduction in food resources, which is vital to the survival of hooded cranes.

(Nazhong Zhang and Lizhi Zhou, Hefei)

### **Intestinal Microbes of Hooded Cranes (*Grus monacha*) Wintering in Three Lakes of the Middle and Lower Yangtze River Floodplain**

Intestinal microbes participate in life activities of the host, and are affected by external environmental factors. Different habitat sizes and protection status provide different external environmental selection pressures for the same wintering waterbirds, which may be reflected in their intestinal microbes. Hooded Cranes are vulnerable migratory waterbirds with similar numbers wintering at three different lakes in the middle and lower Yangtze River floodplain, Poyang, Caizi, and Shengjin Lakes. Here, we analyzed the characteristics of intestinal bacterial and

fungal communities of Hooded Cranes wintering at the three lakes to clarify the effect of habitat size and protection status on intestinal microbes, using high-throughput sequencing technology. Our results showed that community composition and diversity of intestinal microbes were significantly different among lakes with different habitat size and protection status. The Hooded Cranes at Shengjin Lake (small) had higher intestinal microbial alpha-diversity (for both bacteria and fungi) than those at Poyang Lake (large), which might be induced by social behavior of more waterbirds per unit area. The Hooded Cranes at Caizi Lake (relatively poorly protected habitat) had more diverse and abundant intestinal potential pathogens than Shengjin Lake (well-protected habitat). Our results indicated that the environmental pressure of a habitat might affect intestinal microorganisms and more attention might be needed for the vulnerable waterbirds at the habitat of poor protection status.

(Jingjing Gu and Lizhi Zhou, Hefei)

### **Significant differences in the gut bacterial communities of Hooded Crane (*Grus monacha*) in different seasons at a stopover site on the flyway**

Intestinal bacterial communities form an integral component of the organism. Many factors influence gut bacterial community composition and diversity, including diet, environment and seasonality. During seasonal migration, birds use many habitats and food resources, which may influence their intestinal bacterial community structure. Hooded crane (*Grus monacha*) is a migrant waterbird that traverses long distances and occupies varied habitats. In this study, we investigated the diversity and differences in intestinal bacterial communities of hooded cranes over the migratory seasons. Fecal samples from hooded cranes were collected at a stopover site in two seasons (spring and fall) in Lindian, China, and at a wintering ground in Shengjin Lake, China. We analyzed bacterial communities from the fecal samples using high throughput sequencing (Illumina Mi-seq). Firmicutes, Proteobacteria, Tenericutes, Cyanobacteria, and Actinobacteria were the dominant phyla across all samples. The intestinal bacterial alpha-diversity of hooded cranes in winter was significantly higher than in fall and spring. The bacterial community composition significantly differed across the three seasons (ANOSIM,  $P = 0.001$ ), suggesting that seasonal fluctuations may regulate the gut bacterial community composition of migratory birds. This study provides baseline information on the seasonal dynamics of intestinal bacterial community structure in migratory hooded cranes.

(Fengling Zhang and Lizhi Zhou, Hefei)

### **Comparison of intestinal microbial communities of red-crowned cranes (*Grus japonensis*) in two modes before wild release**

The intestinal tract of animals is rich in a variety of microorganisms, which play an important role in the physiological health of the host. Many internal and external factors affect the gut bacterial community, including host genotype, different parts of the gut, different stages of development,

gender, diet, geography, pollutants, and so on. However, there are few studies on the effects of different rearing patterns before reintroduction on the intestinal bacterial communities of rare birds. We studied the intestinal bacterial community composition and diversity of red-crowned cranes in Zhalong National Nature Reserve, Heilongjiang Province in two feeding patterns before reintroduction through 16S rRNA high-throughput sequencing technology. The results showed that Proteobacteria (74.39%) and Firmicutes (25.29%) are the main microbial communities of Red-crowned Cranes in Zhalong Nature Reserve. The intestinal bacterial community composition of free-range and captive red-crowned cranes was significantly different ( $p = 0.001$ ). There was no significant difference in intestinal bacterial community composition between female and male free-range red-crowned cranes ( $p = 0.613$ ). PICRUST2 analysis showed that the prediction of intestinal microbiome-related gene functions of Red-crowned Cranes in Zhalong Reserve mainly included Amino acid metabolism, Carbohydrate metabolism, Metabolism of cofactors and vitamins, etc. The results showed that different feeding patterns significantly affected the intestinal microbial community composition of red-crowned cranes, but gender did not significantly affect the intestinal microbial community composition of red-crowned cranes. These results provide new insights into the study of the gut microbiome of cranes and lay the foundation for future research.

(Heilongjiang: Huan Wang, Yining Wu, Hongfei Zou, He Wang)

## Bird Banding Report

### **Tangjiahe Huanzhi station of national Bird Huanzhi Center was established**

The launching ceremony of the 2021 Tangjiahe Bauhinia Festival was held in Tangjiahe National Nature Reserve in Qingchuan, east China's Sichuan Province, April 1, 2019. At the launch ceremony, the head of the National Bird Ring center announced that the bird ring work carried out by Tangjiahe National Nature Reserve was incorporated into the national bird ring management system, and the "National Bird ring Center Tangjiahe Ring station" card was added". Tangjiahe National Nature Reserve is located at the southern foot of Mianshan Motianling mountain, which is an important bird habitat and migration channel in southwest China. It is of great significance for monitoring migratory bird population dynamics, studying migration rules and guaranteeing migration safety to carry out bird tracking activities. The person in charge of the introduction, Tangjiahe Huanzhi station is currently the national bird Huanzhi center in Sichuan only listed Huanzhi station units.

(Sichuan: Shiyang Chen, Xiaohua Gou)

### **Bulletin of Bird Banding in Maoershan Station of Northeast Forestry University in 2021**

In 2021, 133 days of bird banding activities were carried out in the Maoershan station of

Northeast Forestry University and captured a total of 6862 birds. 76 days of bird banding activities were carried out in spring started from March 10 to May 24. And captured a total of 3056 birds that belonged to 68 species of 10 orders and 23 families. The peak number of bird banding in spring migration was 181 on April 16. The main banded species were Orange-flanked Bush-robin (*Tarsiger cyanurus*) (1180), Yellow-throated Bunting (*Emberiza elegans*) (426), Black-faced Bunting (*E. spodocephala*) (255), Rustic Bunting (*E. rustica*) (230) and Pallas's Rosefinch (*Carpodacus roseus*) (138). 57 days of bird banding activities were carried out autumn started from September 15 to November 10. And captured a total of 3806 birds that belonged to 67 species of 6 orders and 23 families, with an average daily average of 66.8. The highest number of bird banding was 204 on October 5. The main banded species were Orange-flanked Bush-robin (734), Yellow-throated Bunting (508), Pallas's Rosefinch (402), Redpoll (*Acanthis flammea*) (327), Pallas's Leaf-warbler (*Phylloscopus proregulus*) (302), Yellow-browed Warbler (*P. Inornatus*) (288), Great Tit (*Parus major*) (261) and Eurasian Siskin (*Spinus spinus*) (119). In spring bird banding, 481 birds were recaptured, among which 82 were homing individuals and 2 were banded at a different region. 58 birds were recaptured in autumn, among which 40 were homing individuals, the bird which banded at a different region haven't been recovered to the field.

Due to the impact of the COVID-19 epidemic, the number of trammel net decreased due to the shortage of manpower, which led to a decrease in the total number of bird banding records this year. Using the data of Maoershan station can help to carry out the research work in various fields of ornithology and provide rich basic data for the study of bird migration behavior. It is helpful to formulate reasonable conservation and management strategies of bird resources by studying the annual changes in the number of ring birds, monitoring the population dynamics of migratory birds and studying the impact of environmental changes on birds.

(Heilongjiang: Yuhui Si, Ke Rong)

**The inaugural meeting of the National Innovation Alliance for Dynamic Monitoring and Protection of Migratory Birds of the State Forestry and Grassland Administration and the first congress of the members of the Alliance were held in Beijing**

## News from China and Abroad

### **New version of the List of China National Key Protected Wildlife was published**

On February 6, 2021, the State Forestry and Grassland Administration and the Ministry of Agriculture and Rural Areas jointly released the newly adjusted List of Wildlife under national key protection (hereinafter referred to as the list). The adjusted new version of the list includes 980 species and 8 categories of wild animals, including 234 species and 1 category of wild animals under national first-class protection and 746 species and 7 categories of wild animals under national second-class protection. Among the above species, 686 species are terrestrial wild animals, 294 species and 8 categories are aquatic wild animals.

(Beijing: Zhengwang Zhang)

### **The first batch of national parks were officially established in China**

On October 12, 2021, at the 15th Conference of the parties to the Convention on biological diversity, China officially announced the establishment of the first five national parks, including Sanjiangyuan National Park, Giant Panda National Park, Amur Tiger and Leopard National Park, Hainan Tropical Rainforest National Park and Wuyishan National Park, involving 10 provinces and regions such as Qinghai, Tibet, Sichuan, Shaanxi, Gansu, Jilin, Heilongjiang, Hainan, Fujian and Jiangxi, with a protection area of 230000 square kilometers. These national parks covers nearly 30% of the land-based national key protected wildlife species.

(from Xinhua Net)

### **Two ornithologists of our branch were supported by the excellent talent program of the national foundation of China**

### **The 8th National Symposium on zoology and behavior (2021) was held in Shanghai**

### **Summary of activities related to the '2021 Migration with Siberian Cranes'**

From October 25 to December 18, 2021, the activities related to the '2021 Migration with Siberian Cranes' were organized by the Institute of Forest Ecology, Environment and Nature Conservation, CAF and the Beijing Representative Office of International Crane Foundation (U.S.A). The series of activities had a long-time span, and more than 5000 people participated, from online to offline, including the representatives from National Forestry and Grassland Administration, relevant provincial forestry and grassland bureau, local governments, protected areas, research institutes, communities, schools, volunteers, international organizations, and netizens. The campaign aimed to promote exchanges and cooperation between wintering ground, staging areas and breeding ground, and to promote home pride and conservation awareness among the public along the

flyway through environmental education.

(Hongxing Jiang, National Bird Banding Center of China, Ecology and Nature Conservation

Institute, Chinese Academy of Forestry;

Hou Bo, Beijing Representative Office of International Crane Foundation (U.S.A))

## **Establishment and application of Beijing Bird Resource Database based on Python**

The birds resources is abundant in Beijing, with a total of 503 bird species recorded in the city, according to data from bird monitoring stations in the city. Based on the Python, this paper established the Beijing Bird Resource Database with the source data table constructed with the records of these 503 bird species, together with their residency type and affiliation and other information. Using PyCharm2020.2.3 as the development environment, a visualization window was constructed using Tkinter, Pandas, Matplotlib, NumPy and other packages, and preliminary analysis of the data was possible with this database. The database system was tested by the bird survey data of 14 days in Beijing.

Analysis of data based on database system, a total of 112 species of birds, 17 orders, and 42 families were recorded during the survey period, accounting for 22.27% of the total bird species in Beijing. Among the birds surveyed, Passerine birds were the most, with 48 species, accounting for 42.86% of the total. In the survey results, there were 5 species of national first-class protected animals (4.46%); 12 species of national second-class protected animals (10.71%). There were 48 species of summer migratory birds in the survey area (42.86%); 33 species of resident birds (29.46%); 21 species of passenger birds (18.75%); 9 species of winter migratory birds (8.04%); 1 species of fascinating birds (0.89%). In terms of floristic analysis, a total of 5 species of palaeartic bird species were investigated (4.46%); 106 species were generalists (94.64%); and 1 species of oriental realm (0.89%). By further using the database system to analyze the bird composition similarity, Shannon Weiner diversity index, Pielou's evenness index, and Simpson dominance index between different investigated locations reveals that the highest bird similarity is between Hanshiqiao Nature Reserve and Dongjiao Wetland Park, with a similarity index of 0.66; the largest number of bird species is Yeyahu Wetland Park, with 51 species in total; the highest diversity index is Hanshiqiao Nature Reserve, with a diversity index of 4.28; the most uniform bird community structure is in the Labagou Pristine Forest Park with a evenness index of 1.22; the dominance index of the Hanshiqiao Nature Reserve is the highest among all survey points, 0.93, indicating that the ecological functions of its dominant species are not prominent, and the number of species in the community is the most evenly distributed.

The test results indicated that the Beijing bird resources database built based on Python language can alleviate much of the work of internal industry, and the computational analysis is accurate and has a high availability.

(Kangjun Zeng, He Wang)

## **Sleeping in a noisy world: Roosting sites of large aggregations of White Wagtails Haikou**

From December 2018 to December 2019, four nocturnal roosting sites with large aggregations of White Wagtails *Motacilla alba* were found in Haikou, Hainan, southern China. Three of them were located near road intersections in the city center of Haikou, and one was located at an airport terminal. Numbers of individuals exceeded 1,250 individuals at each roost. Characteristics of the environment and the nocturnal roosting trees were measured to elucidate the nocturnal roost preferences of white wagtails in urban areas, and some assistance was provided to the issues of urban greening and wildlife problems in cities (see Jiang et al. 2021, *Ornithological Science*).

(Hainan: Xingyi Jiang, Jiechang Zhang, Bo Zhou, Wei Liang)

## **Release and implementation of China's first code for the use of bird tracker**

The local standard of Heilongjiang Province - Code for the use of bird tracker (DB23 / T 2871-2021) was issued on May 14th, 2021, and implemented on June 13, 2021. It was prepared by the wildlife protection department of Heilongjiang Forestry and grassland Bureau, the rescue and breeding center of endangered wild animals of Heilongjiang Province, the service center of Black-billed Capercaillie National Nature Reserve of Heilongjiang Zhongyangzhan, School of ecology and nature conservation, Beijing Forestry University, Hunan global faith Technology Co., Ltd.

Bird tracker wearing refers to obtaining bird biological or ecological information by wearing electronic tracking equipment for birds, and downloading relevant positioning and other information through signal transmission or recapture after release.. It is currently the most effective method to study bird migration. At present, the signal transmission modes of the tracker include satellite transmission, mobile phone signal transmission, wireless receiver reception, download reception, etc. Corresponding trackers are worn depending on the size of birds and the information required. At present, backpack tracker is the most common, including leg ring type, neck ring type, wing ring type, tail clip type, etc.

The study of cranes, storks, raptors, wild geese, ducks and great bustard has led to the discovery of the migration route of the research object, the establishment of links between the wintering and breeding sites of migrating birds, and the updating of essential life history information needed for species and habitat protection. The miniaturization of tracker is a trend, but restricted to the current technical capacity and cost investment, this trend still has certain limitations.

Due to the high price and cost of data use, the tracker can only be used in the research of rare and endangered birds. The non-standard wearing of tracker will not only lead to tracking failure, but also pose a threat to the safety of birds. Thus, the standardized use of bird tracker has becoming increasingly important.

This standard regulates the wearing methods, precautions and recording contents of the tracker, fills a gap in national and international technical specifications for the wearing of bird

trackers. Operating according to this standard can ensure bird safety and maximize access to relevant information.

(Heilongjiang: Xianda Li)

### **National Wintering Cranes Survey Conducted by UCCC**

In order to grasp the distribution and population of wintering cranes in China, and to provide a scientific basis for conservation authorities, United Crane Conservation Committee of China Wildlife Conservation Association successfully organized the "Synchronous Survey of Wintering Cranes in China in the winter period of 2021 to 2022" from January 5 to 15, 2022. More than 70 organizations and 900 volunteers participated in the survey.

(Yihua Wang, Fawen Qian, National Bird Banding Center of China,  
Ecology and Nature Conservation Institute, Chinese Academy of Forestry)

### **Bird surveys conducted at the Maoliu National Wetland Park of Hunan Province**

The National Bird Banding Center of China conducted three surveys of birds at the Maoliu National Wetland Park of Hunan Province, in spring, autumn and winter from April 2021 to January 2022. The summer survey could not be carried out as scheduled because of the impact of the Covid-19 epidemic. The survey is a part of the "Biodiversity Demonstration Project of Maoliu National Wetland Park in Jinshi, Hunan" funded by the French Development Agency. The project would lay the foundation for biodiversity conservation by investigating the bird resources in the wetland park.

Bird surveys were carried out by line transect method for forest birds and fixed-point counting method for waterbirds roosting in the lake. A total of 124 bird species were observed in the three surveys, belonging to 38 families and 15 orders. Combined with the park's previous bird list, the wetland park has a total of 198 bird species belonging to 49 families and 18 orders, of which 35 species are new records in the park. There are 35 species of birds belong to the national key protected wildlife, including 4 species of national first-class protected birds, including Baer's Pochard (*Aythya baeri*), Scaly-sided Merganser (*Mergus squamatus*), Black Stork (*Ciconia nigra*) and Yellow-breasted Bunting (*Emberiza aureola*); 31 species of national second-class protected species, including Tundra Swan (*Cygnus columbianus*), Mandarin Duck (*Aix galericulata*) and Smew (*Mergellus albellus*), etc.

(Taotao Wu, Fawen Qian, National Bird Banding Center of China,  
Ecology and Nature Conservation Institute, Chinese Academy of Forestry)

### **Preliminary report on monitoring of *Aythya baeri* in Xianghai Nature Reserve**

The common pochard is a class protected wild animal in China and listed as a critically endangered species by IUCN. In recent years, due to the rapid decline of its population, it has

attracted international attention. This paper analyzed the distribution, population size and reproduction status of the *Aythya baeri* in the Xianghai Nature Reserve from 2005 to 2020 through long-term monitoring of the *Aythya baeri* in the Xianghai Nature Reserve, so as to provide scientific basis for the protection of the *Aythya baeri* in the Xianghai Nature Reserve. The monitoring results showed that : (1) During the monitoring period, the occurrence frequency and the largest population of *Aythya baeri* showed an overall increasing trend. A total of 50 *Aythya baeri* populations were observed, of which the largest population was 37; (2) Generally, they move to Xianghai Nature Reserve in mid and late March every year. Breeding pairs begin to appear in April. They prefer quiet clear water marshes with lush aquatic plants. They often move in the same domain with *Aythya nyroca* , *Aythya ferina*, *Aythya fuligula* and Coot; (3) The main habitat areas of the common *Aythya baeri* are the west side of Tongfalun Dam, Lu Fengjin Fish Pond, Youth Dam (including Lu Fengjin fish Pond and Fu Laowen Pond), the vicinity of reed gate (located in the west side of a reservoir), the vicinity of east gate (located in Da Du Pao), Heishan Ba Forest Farm (including Fu Tai Pao) and Xianhe Island.

(Lian Li, Lin Lin, Qing Bao, Lei Liu, Zhuo Xu,  
Wei Du, Zhe Li, Qingming Wu)

### **Survey of Black-necked Crane (*Grus nigricollis*) in the Altun Reserve, Xinjiang**

A survey on the distribution and population size about Black-necked Crane (*Grus nigricollis*) in the Altun National Nature Reserve was conducted from May 11th to May 25th of 2021 by the crane research team of Beijing Forestry University and the administration of Altun National Nature Reserve, Xinjiang. Conducted in the Altun Reserve and its surrounding area, such as Yixiekepati wetland, Aqikekule Lake and Tula Ranch, this survey recorded 113 individuals, including 10 breeding pairs.

Judging from 9 out of 10 breeding pairs were found in Yixiekepati wetland, it might safely draw a conclusion that this wetland is an essential breeding habit for Black-necked Crane in the Altun Reserve. Meanwhile, during this survey, infrared cameras were set around the nest to investigate the relationship between Black-necked Crane and its companion species. Moreover, although this survey did not cover the entire area of the Altun Reserve due to the poor road conditions, the result also brings expectation for the further investigation of Black-necked Crane's distribution and population size in the Altun Reserve and its surrounding area.

(Korla: Donghua Xu, Junquan Xu, Dilimulati Paerhati;  
Beijing: Jiajia Chen, Zhonghong Huang, Zhen Pu, Xuezhu Li, Yumin Guo)

### **Spring investigation report of Black-necked Crane in Qilian Mountain National Park (Qinghai area) and its surrounding area in 2021**

From May 31th to June 17th, 2021, the Crane research group of Beijing Forestry University and the Qinghai Provincial Administration of Qilian Mountain National Park investigated the number

and breeding status of Black-necked Crane in Qilian Mountain National Park (Qinghai area) and its surrounding area. The investigation area mainly involves Menyuan County, Qilian County, Tianjun County, Wulan County, Gangcha County and Dachaidan County.

A total of 195 Black-necked Cranes (including 5 juveniles) were recorded in this survey, including 31 breeding pairs, 30 non-breeding pairs, 20 wandering individuals and 7 subadult groups (48 individuals). Among them, 87 adult Black-necked Cranes were recorded in Qinghai area, including 23 breeding pairs, 15 non-breeding pairs and 11 wandering individuals.

To sum up, Qilian Mountain National Park (Qinghai area) is a superior breeding place and summering place for Black-necked Crane. It provides a continuous stream of new forces for the Black-necked Crane population every year. In order to protect and to have a better understanding of Black-necked Crane, the flagship species in Qilian Mountain National Park (Qinghai area), further investigation of Black-necked Crane's number and breeding status in this area is required.

(Xining: Yu Zhang, Yayue Gao, Cunxin Ma;

Beijing: Zhen Pu, Jiajia Chen, Zhonghong Huang, Yumin Guo)

### **Progress of bird survey in Lop Nur**

As we all know, Lop Nur has long been a desert restricted area. From May to October 2021, we had the opportunity to go deep into Lop Nur Wild Camel Nature Reserve for many times to investigate the status of bird resources. The difference is that with the help of infrared camera monitoring technology and satellite tracking data from home and abroad, combined with field investigation, the bird list of 14 orders, 31 families and about 89 species has been preliminarily sorted out. During this period, we investigated the salt ponds in the potash mining area within a hundred miles and found that many waterfowl and small birds died unexpectedly.

(Ming Ma and Y.T. Zhong et al., Xinjiang)

### **All regional airports attach importance to bird monitoring in Xinjiang**

Xinjiang Airport Group has nearly 30 branch airports. In order to prevent bird impact, exchange meetings were held in April and August respectively. Both online and offline, Jie Zhang and Weishi Chen from Beijing and Ming Ma from CAS were invited to introduce the knowledge of bird migration and the technology of radar monitoring. In June, Professor Ming Ma also participated in the EIA of the local airport to be built, and was invited to Hami airport to give lectures and research on birds in September. The prevention of bird damage at the airport has attracted more and more attention.

(Ming Ma et al., Xinjiang)

### **A series of Bird watching Festivals or races held in 2021**

A series of Bird watching Festivals or races were organized by the Joint Action Platform of Birdwatching Organizations in China in 2021, at Zixi of Jiangxi province, Yancheng of Jiangsu

province, Kunming of Yunnan province, Jinxiu & Nonggang of Guangxi, Poyang Lake in Jiangxi province. Also, technical supports were provided by the Platform to Shennongjia National Park and other agencies for the birdwatching races. More than 3000 person-times from more than 20 provinces took part in the activities, and several new provincial level distribution records were made, e.g. Blackthroat, Martens's Warbler & Gansu Leaf Warbler for Hubei. Through such kind of citizen scientists based quick survey, a checklist of local birds and broad collection of images, videos of biodiversity were submitted to the hosts of the activities, which provided the basic data for the long-term conservation, meanwhile promoted the social participating of the conservation, brand building on local ecological environment, and mainstreaming of the nature protection.

(Quehui Zhu, Jinyu Lei)

### **Commemorating the 40th anniversary of the national "bird week" and the launching ceremony of the "bird week" in 2021 in Beijing**

### **Special stamps of wildlife under national key protection (class I) (III) were issued on December 3**

### **The international influence of *Avian Research* has increased**

With the strong support of China Association for Science and Technology and Beijing Forestry University, the international influence of *Avian Research*, a journal sponsored by China Ornithological Society, has increased significantly. In 2020, the Impact Factor was 1.774, ranking the seventh among 28 international ornithological journals and entering the Q1.

(Beijing: Zhengwang Zhang)

### **The virtual special issue of the proceedings of the British Society of Ornithology congratulates the vigorous development of ornithology in China**

### **The 27th International Congress of Ornithology was held online**

## Publication

### ***The World Catalogue of Bird Classification and Distribution (2nd edition)* published**

*The World Catalogue of Bird Classification and Distribution* (1st edition) was published nearly 20 years ago. During this period, the systematic evolution of birds in the world developed rapidly, and the classification system changed frequently, making people overwhelmed. In the past two years, major international bird lists have become increasingly consistent in their classification systems, which provides an opportunity for the compilation of the second edition of this book. This book lists the Chinese, Latin and English names and the main distribution areas of each species in a succinct and practical manner. The classification system of this book refers to Bird Families of the World by Winkler et al. (2015). In terms of species revision, some major international bird lists were referenced: IOC World Bird List, The Howard and Moore Complete Checklist of the Birds of the World (4th edition) and the eBird/Clements Checklist of Birds of the World, etc. A total of 10,634 species of 36 orders, 142 families and 879 species more than the 9755 species included in the first edition, and more than 70 new orders and families. The number of birds distributed in China has increased to 1470, and 101 are endemic. Chinese names are an important part of the revision of this book. The Chinese names of new classification elements are generally not easily changed in accordance with the principles set out in the preface to the first edition of this book and *The Catalogue of Birds and Distribution in China* (3rd edition), so as to maintain the continuity and stability of the names. At the same time, the Chinese name has been moderately revised in line with the principle of being simple and easy to understand, scientific and accurate. This book can be used by professionals engaged in ornithology teaching and research, as well as professionals engaged in agriculture, forestry, environmental protection, wildlife management and other fields. It can also be used as a reference for teachers and students of zoology, ecology, conservation biology and other related majors in universities and colleges. It is a useful reference book for domestic scientific researchers, professional workers, birders and news media to understand the world's birds.

(Beijing: Yanyun Zhang)

### **The publication of *CNG Field Guide of Birds of China***

National Geographic China, together with Professor Yang Liu from the School of Ecology at Sun Yat-sen University and Shuihua Chen, Director of the Zhejiang Provincial Museum, decided to produce another "birdwatching handbook" that is both comprehensive and portable. The editorial team consists of more than 10 experienced birdwatchers and ornithologists in China, joined by more than 10 scientific painters. The combined effort resulted in the publication by Hunan Science and Technology Press in January 2021. The book systematically composes 1,489 recorded bird species in China, containing more than 1,000 accurate distribution maps, more than 800

song species and more than 4,000 scientific illustrations, and has received a very good market feedback.

(Zhejiang: Shuihua Chen; Guangdong: Yang Liu)

### ***Field Guide to the Birds of Guangxi was published in June, 2021***

Field Guide to the Birds of Guangxi, edited by Associate Prof. Aiwu Jiang and prefaced by Academician Jianzhang Ma, was published in June, 2021. 744 bird species of about 2000 pictures, belonging to 23 orders and 92 families, were collected in this book. We introduced the detailed identification feature and species name of birds which recorded in Guangxi. Moreover, we described the information of identification feature, habitat, behavior, distribution, population and presence month, strictly based on the data from Guangxi. This is the first comprehensive publication on birds in Guangxi, as well as Southern China, with features including: (1) This is the first book to comprehensively summarize bird diversity in Guangxi, Southern China, which add 62 species than Zhou et al 2011; (2) We described the characteristic as the identification key to help instantly identify birds in the field, which is very useful to enhance the known of birds for the readers. (3) Most birds in Southern China are also seen in Guangxi. Moreover, most migrant from north China will wintering in Guangxi. Hence, although this book is based the birds of Guangxi, it is also useful in most area of China and Southeast Asia.

(Guangxi: Aiwu Jiang)

### ***Annual Report of China Birds 2020***

Through analyzing the millions of data from the Birdreport on-line database (<http://www.birdreport.cn>), covering 1321 species of birds and 2032 county-level Administrative Divisions in China, which was submitted by more than 15 thousand citizen scientists during 2014 to 2020, the Joint Action Platform of Birdwatching Organizations in China compiled the Annual Report of China Birds 2020. In the report, the regions with high bird diversity of the country and the regions with high conservation priority for the threatened birds were identified, 81 species were identified as the most common bird in the whole country. Distribution status of the threatened and endemic species in different provinces were analyzed. Evaluation indices on the bird diversity based on the data from citizen scientists were developed, and experimental evaluation were made to the 12 provinces. Finally, challenges to the bird conservation were analyzed and suggestions on organizing different kinds of citizen sciences activities were proposed.

(Kunming: Jinyu Lei)

### ***Important Habitat of Waterfowl along China's Coast published***

## News and Notes

### **Notice of "the 16th China Ornithology Congress and Member Congress" (the first round)**

In order to promote the academic exchange and talent training of Ornithology in China, and help the construction of national ecological civilization and the green development of Guangdong, Hong Kong and Macao Bay area, the 16th China Ornithology Congress and the member conference will be held in Guangdong Province from November 11 to 15, 2021. The conference will be organized by the China Ornithology Society and hosted by the Guangdong Zoological Society and the Institute of Zoology of the Guangdong Academy of Sciences. The co-organizers are Guangdong Chimelong Animal and Plant Protection Foundation, the Institute of Zoology of the Chinese Academy of Sciences, the Zhuhai Campus of Beijing Normal University, Zhuhai Bird Watching Association, Avian Research, etc.

(Organizing Committee of the 16th China Ornithology Conference)

### **Notice on postponement of the 16th China ornithological Congress and member congress**

In view of the current epidemic situation and the seriousness of epidemic prevention work, the Organizing Committee of the 16th China ornithology conference and the organizers of the conference decided that the 16th China ornithology conference and member congress originally scheduled to be held in Zhuhai, Guangdong Province from November 11 to 15, 2021 will be postponed to April 7 to 10, 2022.

Delegates who have paid the registration fee can be kept until the formal meeting next year; For refund, please email [zgdwxh@ioz.ac.cn](mailto:zgdwxh@ioz.ac.cn).

(Organizing Committee of the 16th China Ornithology Conference)

### **China Animal Society bird branch WeChat official account opens**

### **Deeply mourn and deeply cherish the memory of Mr. Daojian Sai, Mr. Guanxun Guan and Mr. Jiachuan Chang**

黑颈鹤 (*Grus nigricollis*)

摄影 黄俊贤



黑枕燕鸥 (*Sterna sumatrana*)

摄影 邱小宁



白腹姬鹟 (*Cyanoptila cyanomelana*)

摄影 吴志华

