



MACACA NIGRA PROJECT



ANNUAL REPORT 2022

TANGKOKO NATURE RESERVE



UNIVERSITÄT
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DEAR FRIENDS AND SUPPORTERS

With a third year in a row dealing with the global SARS-CoV-2 pandemic that does not let people and societies rest much, the project struggles to find some stability and to impulse new actions. But just like in 2021, 2020 and before, the MNP team, on the ground and abroad, adapted and remained very active. One of the international co-directors even managed a visit to Indonesia! We are confident the project is in good hands with a resilient enthusiastic and motivated team in place in Indonesia. Read on to find out what we did achieve and what our plans for the future are.



HIGHLIGHTS

In 2021, we started working on a Special Issue in the International Journal of Primatology to celebrate 15 years of existence of the MNP. Of course, it takes longer to published it than anticipated! Nevertheless, everybody was committed and worked really hard towards finalising it. It will soon be there for all to read, showcasing the very important and diverse research, conservation and education projects MNP has been involved in all these years.

MNP education initiative, Tangkoko Conservation Education (TCE), also continued with their well-established programme of environmental education and piloted one of the first instalment of a governmental initiative “Merdeka Curriculum” (Independence Curriculum), focusing on projects, field trips and interactive/hands on activities rather than classic lessons in the classroom.

For the first time in 3 years, Julie Duboscq (National Museum of Natural History, CNRS, Paris, France), one of MNP co-directors and long-time team member, finally managed to visit Indonesia, including IPB University, the field site in the Tangkoko Reserve, and many friends and partners! The visit was restricted to 2 weeks, but fruitful with meetings with our Indonesian directors, Ibu Wita and Pak Agil, from IPB Bogor, and with long-term collaborator Pak Tasirin from UNSRAT Manado. She also met with the Dean of the IPB Veterinary Medicine Faculty, the manager of the Advanced Research Lab and of the Hormone Lab at IPB, with BKSDA chief officer and staff, Selamatkan Yaki and the mayor of Batu Putih Bawa, in an effort to connect and strengthen ties with local and national cooperation partners.





STAFF CORNER

The project saw some changes of staff this year again, and at the end of the year, we managed to reach a more stable organisation (hopefully!). **Indra Kaletuang**, employed as a field assistant since October 2019, left the project to start new adventures elsewhere in January 2022. **Simon Pontoh** was trained to replace Indra. Simon worked with us from January to July and then went on to help tourists and media crews as a porter-guide. **Randika Joseiknasio Baweleng** was employed as the field station attendant since June 2021 and was also called to new adventures in December. Finally, **Billy Tatede** and **Ivan Pontoh** are the two new field assistants. They joined us in November 2022, they are fast learners and are doing great work already!

RESEARCH CONDUCTED

Genetic diversity of crested macaques' populations, Eleonora Neugebauer

Eleonora Neugebauer, a PhD student at Leipzig University (Germany) supervised by two MNP co-directors Profs. Anja Widdig (Leipzig University) and Dyah Perwitasari-Farajallah (IPB Bogor, Indonesia), focuses on assessing the genetic diversity of remaining populations of crested macaques, threatened with extinction due to habitat loss and hunting. Using non-invasive techniques, she is planning to collect faecal samples of crested macaques in their entire native range in North Sulawesi, as well as in an introduced population on the Moluccan island of Bacan (300 km from Sulawesi) and the island of Kasiruta and Mandioli. These islands outside the native range can be considered as an important genetic reservoir for depleted populations on Sulawesi. She aims at carrying out DNA analysis to determine the genetic variability and diversity of the different populations. This will include genomic analysis for a subset of animals per population. We also work with European Zoos keeping *M. nigra* to receive blood samples for high coverage whole genome sequencing, to establish a reliable reference genome of *M. nigra*. The labs of Julie Duboscq and Anja Widdig also currently aim to establish an enrichment protocol for faecal samples to undergo sequencing. The results of this study will provide crucial information about the status of the population (i.e., healthy or inbred). This work is critical to inform conservation action such as the possible creation of green corridors between population and potentially an introduction of Bacan monkeys to the main island of Sulawesi. In this project, our local partners are involved, importantly, Selamatkan Yaki, the Tasikoki Wildlife and Rescue Center and the government agency for natural resource conservation (BKSDA).



Special Issue in International Journal of Primatology

With the special issue, we not only make use of a trove of short- and long-term data and take stock of the demographical, behavioural, or ecological changes of the studied groups and their environment over the last 10 to 15 years, we also realise the importance of having rich diverse long-term data, notably climate, home ranges, reproduction and vegetation data. These data are now used by the local natural resources conservation agency BKSDA to identify key factors shaping the interactions between the human and non-human primates in and around the reserve, whether it is a question of food availability, forest disturbance or demographical shift. This will help informing wildlife management and conservation actions further.

Conservation education

Tangkoko Conservation Education (TCE) investigated the impact of the environmental education programme on the children participating in school activities. We assessed whether TCE's programme had a positive impact on children's knowledge, habits and behaviours towards their local environment. Ten years of data from our evaluation questionnaires provided to the pupils have been analysed and showed that pupils' knowledge and behaviour scores significantly increased after their participation in the programme. Their habits score also improved but this increase was not statistically significant. These positive results encourage us to keep implementing our activities in order to engage more children every year. In the next step, we will look at the impact of interventions on longer time scale and test other means of assessing the children and adults' knowledge, habits and behaviours towards their local environment, like free text and speech production instead of questionnaires. This analysis is also part of the Special Issue.

Kin bias and social networks

Finally, Julie Duboscq visited the zoo of Cerza in Normandie (France) which hosts a group of crested macaques in the framework of a collaboration on the development of genomic analysis technics for relatedness. Julie and Delphine Ordonneau, the head veterinary of the zoo discussed further study they could run together, specifically on the monkeys' social networks. With the same idea, Julie is also in discussion with the Zoo of Mulhouse which also hosts a group of crested macaques and has been a great supporter of MNP and TCE in the past years (thank you!). Stay tuned!



Julie at CERZA, France

PUBLICATIONS

Scientific peer-reviewed articles

- Bertrand D.A., Berman, C.M., Agil, M., Sutiah, U., and Engelhardt, A. (2022). Rethinking tolerance to tourism: Behavioral responses by wild crested macaques (*Macaca nigra*) to tourists. In: Gursky, S.L., Supriatna, J., Achorn, A. (eds) *Eco-tourism and Indonesia's Primates. Developments in Primatology: Progress and Prospects*. Springer, Cham [\[link\]](#)
- Clark P. R., Waller B. M., Agil M., and Micheletta J. (2022). Crested macaque facial movements are more intense and stereotyped in potentially risky social interactions. *Philosophical Transactions of the Royal Society Biological Sciences* 377: 20210307 [\[link\]](#)
- Mielke A., Waller B. M., Pérez C., Rincon A. V., Duboscq J., and Micheletta J. (2022). NetFACS: Using network science to understand facial communication systems." *Behavior Research Methods* 54.4 (2022): 1912-1927 [\[link\]](#)
- Neumann C., Kulik L., Agil M., Engelhardt A. and Widdig A. (2022). Temporal dynamics and fitness consequences of coalition formation in male primates. *Proceedings of the Royal Society, Biological Sciences* 289: 20212626 [\[link\]](#)
- Rebout, N., De Marco, A., Sanna, A., Micheletta, J., Lone, J. C., van den Berg, R. F., ... & Lemasson, A. (2022). Tolerant and intolerant macaques differ in the context specificity of their calls and how they 'comment' on the interactions of others. *Behavioral Ecology and Sociobiology*, 76(5), 1-13. [\[link\]](#)
- Rincon A. V., Waller B. M., Duboscq J., Mielke A., Pérez C., Clark P. R., and Micheletta J. (2022). Socially tolerant macaques use more complex facial behavior than intolerant macaques. *bioRxiv* [\[link\]](#)
- Twining-Ward C., Luna J.R., Back J.P., Barakagwira J., Bicca-Marques J.C., Chanvin M., Diko N., Duboscq, J., Fan P., Galán-Acedo C., Gogarten J.F., Guo S., Guzman-Caro D. C., Hou R., Kalbitzer U., Kaplin B.A., Lee S. L., Mekonnen A., Mungongo P., Nautiyal H., Omeja P., Ramananjato V., Raoelinjanakolona N. N., Razafindratsima O., Sarabian C., Sarkar D., Serio-Silva J. C., Rismayanti and Chapman C.A. (2022). Social media's potential to promote conservation at the local level: an assessment in eleven primate range countries. *Folia Primatologica*, 93:2, 1-11 [\[link\]](#).



CONSERVATION

Human-wildlife interactions:

With partner NGO Selamatkan Yaki, BKSDA the local conservation agency, and many other local organisations, we continued our human-wildlife interaction mitigation actions. We organised ranger patrols with 2 teams of 6 people patrolling the Tangkoko area over 2 days. For this, in 2021, together with BKSDA, we trained 60 people (villagers, volunteers from local NGOs, ect) in patrolling skills (data collection and environmental survey technics). Patrols took place already in 2021 (5 patrols) and continued in 2022 (7 patrols), although more sporadically than planned (once a month), still due to the ongoing Covid-19 pandemic and local conservation agency management disruption (until April 2022). We are still making plans to participate in organising additional patrols in 2023 (additional to the usual patrols rangers do in any case here and there).

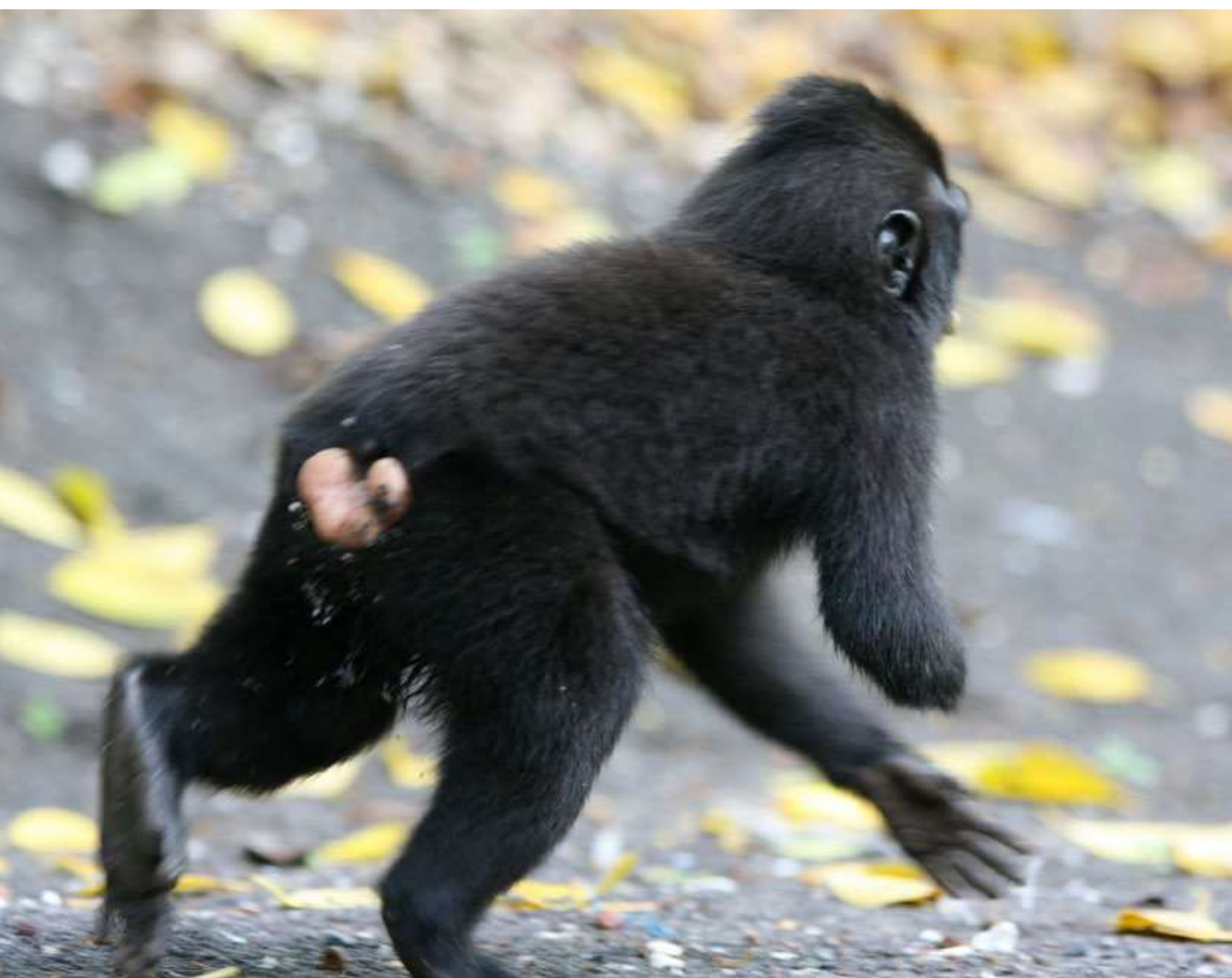
We also led 5 focus-group discussions and small public social events in 5 towns settled around the Greater Tangkoko area (Batu Putih, Dua Saudara, Kasawari, Winenet and Pinangunian) to discuss all things related to human-wildlife encounters and how best to tackle problems and find solutions together with the local community. These sessions were very successful in bringing people together and have them openly discuss together, to the point that we will continue organising such sessions. This also constituted a small pilot study about gathering the opinions and views of the people undirected and with their own words. In the future, we will record such open-discussion sessions and use text mining and free-speech analyses to complement the information we usually gather with questionnaires to dig deeper into people's knowledge, attitudes and behaviours towards their environment.



From January 2022 to December 2022, our conservation officer, Ferdi Daletang, has patrolled the border of the Reserve with the village Batu Putih for 155 days out of 365 days and recorded 357 instances of macaques ranging outside the reserve (2.30 encounters/day). Upon encountering the macaques near the border of the reserve (<100m) or already outside the reserve, in yards and/or gardens, Ferdi is tasked to drive the macaques away, for example by making a lot of noise banging on large palm tree leaves or trunks or shouting. Ferdi also mediates issues between and discusses directly with people, the local authorities and the rangers of the reserve in order to find optimal solutions respecting the monkeys, the livelihood of people and the workload of the rangers. In addition, BKSDA also tasked their rangers to help Ferdi whenever possible and Selamatkan Yaki hired a help in the last half of 2022. We are in the process of assessing the efficacy of these border patrols at mitigating human-wildlife conflicts to improve our practice, but in any case, the villagers find them useful and are attached to having somebody to call directly in case of problems.

Direct protection

This year, our conservation officer, field assistants and managers found and destroyed 52 traps and rescued 2 monkeys from traps. Although it looks like anthropogenic pressures has decreased in 2022, we need several more years of data to be certain about this trend and we do hope our efforts in many directions are paying and that this is not an artefact



EDUCATION

School activities

Over the period between August 2021 and May 2022, TCE delivered 6 school interventions combined with a visit to Tangkoko for 9 primary and secondary schools in Bitung region, for a total of 180 students aged 9 to 15 years old. Despite the continuous COVID-19 pandemic, the local TCE team was able to resume their interventions as normally (pre-2020) as possible, making sure that safety precautions were in place when delivering interventions. However, less schools have opened their doors to TCE interventions this year due to the difficulties linked to COVID 19. Interventions from external organisations were still not considered a priority for most schools. Where TCE staff is welcome, the interventions are being delivered in small groups and outside the classroom whenever possible.

Independence Curriculum

In 2022, the Indonesian Ministry of Education, Culture, Research, and Technology launched a new curriculum, namely the Merdeka Curriculum (Independence Curriculum), focusing on projects, field trips and interactive/hands on activities rather than classic lessons in the classroom. The Education Department of Bitung has encouraged TCE team to implement this new project-based curriculum, which is a great opportunity to enhance local young people interest, knowledge and care for their local environment. This is why, in August 2022, TCE has launched a pilot project to conduct this Independence Curriculum as part of its conservation education programme with the aim to replicate it to other classes in the future. The aim is to base the interventions on the existing material delivered by TCE with the addition of several activities adapted to the student's biology curriculum. From implementing a vegetation survey, creating a mini volcano or identifying animals' foot-prints, our activities implemented since August have received a warm and enthusiastic welcome from the students and teachers!





Science Camp

Thanks to the support of the Rainforest Rescue and French Association of Zoos (AFdPZ), we could welcome 10 students from the 11th Grade of 4 Negeri Senior High School in Batu Putih for the third edition of the Science Camp: a week of immersive research and conservation training at the MNP research station. Between the 17th and the 30th of October 2022, the students (5 boys and 5 girls) learnt different field and scientific methods and research tools. For example, they conducted experiments on water and air quality and observed micro-organisms with a microscope. In addition, they took time to observe the macaques in the forest and collect data about their behaviour. In the camp, they followed environmental lessons and met several local conservation partners (for example, Tasikoki Wildlife Rescue and Education Centre, Selamatkan Yaki). On the 19th of January 2023, a symposium will be organised at the BKSDA office and all participants will share their knowledge about biology, ecology, and macaque behaviour with the local community. Here are some messages shared by the Science Camp participants after their week spent at the MNP research station (see pictures above).

Awareness campaigns

- Empower villagers about human-wildlife conflict mitigation:

In 2022, MNP, together with Selamatkan Yaki, BKSDA Sulawesi Utara and many more organisations, have started focus group discussions in 5 villages around the Greater Tangkoko area (see above). At the same time, TCE organised community-led outreach events with children's theater, songs and photo exhibition. We took the time to ask visitors a few open questions about their perception of and behavior towards nature. These events were very well attended and it was a great opportunity to openly discuss how people and macaques can live together.

- Earth Day 2022:

On the 22nd April 2022, TCE team together with the participants of the 2021 Science Camp have organised an Earth Day event, when they did litter picking in the forest and sorted the waste found by the beach in order to recycle it. Afterwards, they monitored the growth of various trees that were planted in one specific area of the Tangkoko forest by the same team during Earth Day 2021.

- Talk about waste to orphan children:

On the 23rd April 2022, TCE team together with the students part of the nature lover club of Manado State Islamic Institute implemented a talk aimed at local orphan children about the issue of waste and how we can recycle more. Children have designed posters to raise awareness about how we can protect our Planet Earth.



MNP FINANCIAL STATEMENT

Revenues come from three principal sources. Individual researchers and students pay a fee to stay at the station and use the facilities. It is currently of 500€ per person per month. For the Indonesian staff and students, the fees are paid either by MNP directly or by their international counterparts. The second source comes from grants obtained by the head and co-heads of the project and by the Universities or international partners. The third source comes from donations from individuals or organisations.

Items	Description	Costs in 2021 (€)
7 to 9 employes	research organization, data collection and analysis, reports, outreach, conservation education, liaison with villagers and authorities, staff management, health insurance	27 192
Camp maintenance and food	repairs, food, gasoline generator, communication, etc.	13 563
Transportation	car rental, gasoline motorbike, bus etc.	1 682
Research	consumables, technique, cooperations	6 582
Administration	permits, postbox, covid-19 related expenses	307
TOTAL		49 326

The project permanently employs between 7 and 9 people: a research manager organising research, a liaison manager responsible for liaising with different authorities, linking research, outreach, education and conservation, as well as managing human resources issues (salaries, health insurance, permits). We are also very proud that our research assistants not only collect biological and behavioural data on the 3 groups of monkeys that are habituated for research, but are also heavily involved in outreach, education, conservation, and eco-tourism. One of them is specifically dedicated to patrolling the forest, linking with the rangers and mitigating issues between people living around the nature reserve and the monkeys. They make the very essential link to the local community. In addition, a cook and a janitor take care of the camp daily maintenance. They are also members of nearby villages and keep the team together through good food and good moods.

Health and risk insurance is required by Indonesian laws for all people working in Indonesia. We provide it for free to our employees as an essential benefit for a rural community.

Permits are required for carrying out research and any professional activities (to the national government) as well as for accessing the nature reserve (to the national and local government).

TCE FINANCIAL STATEMENT

Items	Description	Costs in 2021 (€)
Coordinators' salaries and insurance	Local coordinators' and assistants salaries and casual staff (school activities, Science Camp); Coordinators' insurance and medicine fees	11 633
Transportation	Car rental, motorbike rental and gasoline for general coordinators' and volunteers' transportation (meetings, education interventions in schools, events and trainings); Service and maintenance (for the project's motorbikes); Bus rental for pupils' transportation to Tangkoko reserve	2 597
Food	Food for the local coordinators (when outside the headquarters)	3 255
Pedagogical material	Stationeries: books, games, pens, paper, notebooks, ink, photocopies, etc; Creation, edition and printing of our environmental lessons (7 lessons)	4 376
Equipment	Electronic (phone, laptop, printer, speakers, tripod, etc); Personal protection material (masks, sanitizing gel, face shields)	1 478
Communication	Post, Internet and phone expenses	416
Office	Office rental, electricity, furniture and small equipment	732
Awareness campaigns	Earth Day, material (banners, posters, T-shirts), food/transport of participants.	197
Administration	Foundation fees and other administrative expenses	68
Other	"Solidarity" expenses (wedding, funerals, etc)	131
TOTAL		24 883

ACKNOWLEDGEMENTS

MNP and TCE received the financial, logistic and moral support from Amiens Zoo, the Darmstadt Zoo, Chester Zoo, Mulhouse Zoo, Vallée des Singes/Conservatoire des Primates, the French Association of Zoos (AFdPZ), the Zoologischen Gesellschaft für Arten und Populationsschutz e.V. (ZGAP), Rettet den Regenwald e.V. (Rainforest Rescue), UNIVET Nature, the Asian Species Action Partnership – Rapid Action Fund (ASAP-RAF) initiative, Tayto Park, the French National Centre for Scientific Research (CNRS), the French National Museum for Natural History (MNHN), as well as private donations from individuals. We sincerely thank these organisations and donators for their invaluable support during this year.



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