ANTHONY WALLACE/AFP/GETTY

Pangolins are among the most trafficked animals, targeted for their scales (pictured).

WILDLIFE TRADE SHOULD BE FOCUS OF PANDEMIC ORIGIN INVESTIGATIONS

Call comes as World Health Organization sends scientists to China to probe the source of COVID-19.

By Smriti Mallapaty

China's wildlife trade should be thoroughly investigated as part of efforts to uncover the origin of the coronavirus pandemic, say researchers. The call came as the World Health Organization (WHO) sent scientists to China last week, ahead of plans for a larger international research team to probe the pandemic's origin.

"The mission objective is to advance the understanding of animal hosts for COVID-19 and ascertain how the disease jumped between animals and humans," said Tedros Adhanom Ghebreyesus, the WHO's director-general, at a press briefing on 7 July.

The team will work closely with officials and the scientific community in China to decide what kind of investigations are needed and where, said Michael Ryan, director of the WHO's emergencies programme. He said a good place to start is in Wuhan, where the first clusters of atypical pneumonia emerged.

Researchers say the focus should be on activities linked to China's wildlife trade — both legal and illegal — including hunting areas, storage facilities, farms and markets. "All parts of the wildlife supply chain need to be investigated," says Alice Latinne, an evolutionary biologist at the Wildlife Conservation Society Vietnam in Hanoi. "We need to test any wild or farmed wild animal species that could potentially be in close and frequent contact with humans in China," she says.

Most researchers agree that the SARS-CoV-2 virus probably originated in horseshoe bats, but the route it took to get to humans remains a mystery. The virus could have jumped directly from bats to people and evolved over time into the current pandemic strain, or it could have passed through intermediate animals.

Researchers say that the wildlife trade — in which many animals come into close proximity with each other and with people — offers the perfect conditions for a virus in one species to spill over into another.

Early in the pandemic, pangolins were thought to be a possible intermediate host. Researchers detected related coronaviruses in animals that had been seized in southern China between 2017 and 2019. Pangolins are found across southeast Asia and are among the world's most trafficked animals; their scales are used in traditional Chinese medicine. The viruses found in the pangolins were too different to be SARS-CoV-2's direct ancestor, but researchers say that finding out how the animals got infected could provide clues about where SARS-CoV-2 originated.

A preprint posted on bioRxiv on 19 June suggests that pangolins probably catch the viruses during the process of being traded (J. Lee *et al*. Preprint at bioRxiv http://doi.org/d3hq; 2020). The study found no coronaviruses among more than 300 pangolins in Malaysia that were seized by authorities or rescued by locals while en route to China between 2009 and 2019.

The evidence suggests that the pangolins seized in China were exposed to coronaviruses while being transported to their final destination, rather than in the wild, says Jimmy Lee, a researcher with the non-profit EcoHealth Alliance Malaysia in Kuala Lumpur, and the paper's first author. "Pangolins are most likely incidental hosts infected within the wildlife trade," says Lee, but more research is needed to rule them out as an intermediate host of SARS-CoV-2.

The pangolins could have been infected by other traded animals or the people who smuggled them, says Yujia Alina Chan, a geneticist at the Broad Institute of MIT and Harvard in Cambridge, Massachusetts. In raids, smuggled pangolins have been found with bat carcasses and with masked palm civets, an intermediate host of the virus that causes severe acute respiratory syndrome (SARS).

The investigators should scrutinize the circumstances in which the pangolins in China were seized, the animal species they were housed with, and whether people involved in the wildlife trade have coronavirus antibodies, says Arinjay Banerjee, a coronavirus researcher at McMaster University in Hamilton, Canada. Following that trail could help scientists find a closer relative to SARS-CoV-2.

The WHO investigations should also look at other mammals commonly hunted and traded in southern China, especially small carnivores and rodents, says Latinne. Another priority should be bats in the southern province of Yunnan, she says — a hotspot for bat coronaviruses, where the closest known relative to SARS-CoV-2, called RaTG13, has been identified (A. Latinne *et al*. Preprint at bioRxiv http://doi.org/d3hr; 2020).

But the investigations should not be limited to China, says Alice Hughes, a conservation biologist at the China Biodiversity Conservation and Green Development Foundation in Yunnan. Many species move across borders, and people in neighbouring countries are also in frequent contact with wild animals. Significant harvesting of bat excrement occurs under unhygienic conditions in Laos, Thailand and Cambodia, and many of countries in the region do not have the capacity to clamp down on the wildlife trade, says Hughes.

Researchers should also be prepared to find nothing, says Sophie Gryseels, an evolutionary biologist at the Catholic University of Leuven, Belgium. The search will be "looking for a needle in a haystack the size of Asia or larger".