

## Short Note

Arum Setiawan, Muhammad Iqbal\*, Amran Halim\*, Rio Firman Saputra\*, Doni Setiawan and Indra Yustian

# First description of an immature Sumatran striped rabbit (*Nesolagus netscheri*), with special reference to the wildlife trade in South Sumatra

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**Abstract:** The Sumatran striped rabbit (*Nesolagus netscheri* Schlegel, 1880) is the least known lagomorph in the world. This paper describes the first record of a young *N. netscheri* that was offered for sale (the size is approximately 52–56% of the adult), together with an adult, by a social media group in February 2018. The rabbits were reportedly obtained from the Dempo mountain, South Sumatra. Compared to previous descriptions of *N. netscheri*, the Dempo mountain specimens have longer ears (47–52 mm vs. 34–50 mm), shorter tails (9–15 mm vs. 17 mm) and shorter hindfeet (60–65 mm vs. 67–87 mm). The threats to *N. netscheri* are revisited and discussed.

**Keywords:** hunting; juvenile; morphology; *Nesolagus netscheri*; South Sumatra; Sumatran striped rabbit.

The Sumatran striped rabbit (*Nesolagus netscheri* Schlegel, 1880) is allegedly the rarest lagomorph in the world. *Nesolagus netscheri* is endemic to Indonesia, and classified as Vulnerable on the International Union for Conservation of Nature (IUCN) Red List (Meijaard and Sugardjito 2008, Schai-Braun and Hackländer 2016). Only a dozen museum specimens collected between 1880 and 1916 and camera trap records show that this species is very scarce (Jacobson 1921, Flux 1990, Surridge et al. 1999, Hoffmann and Smith 2005, Dinets 2010, McCarthy et al. 2012). This rare rabbit occupies dense forest at moderate

elevations in Sumatra, a habitat that is under increasing development pressure. There is an urgent need to better understand *N. netscheri*, and the current threats in order to inform conservation and management strategies (Smith 2008, Smith et al. 2018).

The most recent sighting of *Nesolagus netscheri* was from the Gunung Raya Wildlife Reserve. Interviews with locals indicated that hunting was a major threat (Setiawan et al. 2018). After a field survey and exploration of local knowledge of *N. netscheri* in the Gunung Raya Wildlife Reserve (Setiawan et al. 2018), we continued to learn about *N. netscheri* in South Sumatra. Recently, we began following various social media groups which focus on wildlife trading. In a private WhatsApp group, we received information on two individuals of *N. netscheri*, one of which was a young rabbit. From the discussions among the members, it appeared that *N. netscheri* is greatly desired by collectors.

On 14 February 2018, a young *Nesolagus netscheri* was offered for sale on WhatsApp. This individual was reportedly caught from a forest within the Dempo mountain, South Sumatra province. The size is ca. 52–56% of the adult (Figure 1). Unfortunately, this individual died a few days later. As very little information is available on young *N. netscheri* and its reproduction, we requested the seller to donate the specimen. On 20 February 2018, the same seller offered an adult of *N. netscheri*. This individual also died after a few days. It was caught from the same area as the young *N. netscheri*. We also requested this specimen from the seller, and it was finally received on 23 February 2018. The specimens were deposited in the biology museum of Gadjah Mada University, with voucher catalog Musbio/Mam/Deposit/Coll.01.28112018.

Measurements of the *Nesolagus netscheri* from South Sumatra and previous available data are presented in Table 1.

*Nesolagus netscheri* is about the size of the European rabbit (Flux 1990). The young *N. netscheri* has a body length of 220 mm (Table 1). This size is between one-third

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**Figure 1:** A young *Nesolagus netscheri* when it appeared for the first time for sale on 14 February 2018.

**Table 1:** Measurements of *Nesolagus netscheri*.

Characteristics	YN	AN	Fl	SH
Head-body (mm)	220	390	368–417	370–420
Tail (mm)	9	15	17	17
Ear (mm)	47	52	34–45	30–50
Hindfoot (mm)	60	65	67–87	67–87
Weight (kg)	0.32	1.5	1.5	1.5

YN, Young *Nesolagus netscheri*; AN, adult *Nesolagus netscheri*; Fl, Flux 1990; McCarthy et al. 2018; SH, Schai-Braun and Hackländer 2016.

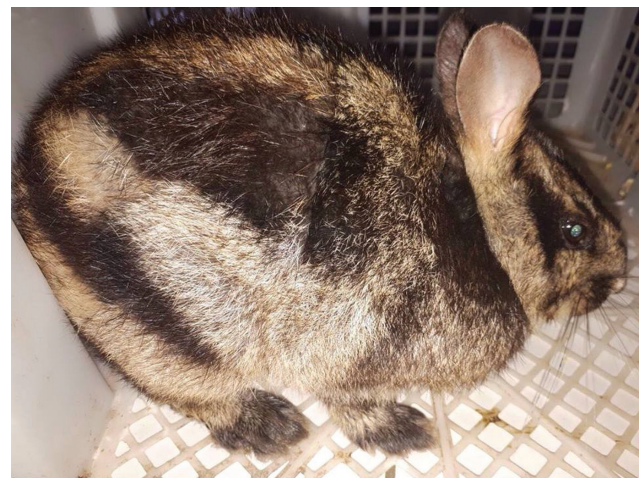
and one-half ( $1/3-1/2$ ) of the adult of *N. netscheri* (368–420 mm). Comparison of *N. netscheri* specimens from the Dempo mountain with previously available specimens suggests that specimens from the Dempo mountain have longer ears (47–52 mm vs. 34–50 mm), shorter tails (9–15 mm vs. 17 mm) and shorter hindfeet (60–65 mm vs. 67–87 mm). Although only two individuals were measured, the different morphological characteristics are interesting. Further investigation is needed to study the morphological differences of *N. netscheri* populations between the sites in Sumatra. At present, it is regarded as a monotypic species (Flux 1990, Schai-Braun and Hackländer 2016, McCarthy et al. 2018); but if the listed characteristic differences are significant and if it occupies rich soils in isolated volcanic areas, it could be possible that the Dempo mountain population represents a distinct subspecies. Some tissues are needed for DNA analyses to examine the northern and southern populations of *N. netscheri* to test the hypothesis if there is a difference in characteristics between them.

All previous information on the morphometrics of *Nesolagus netscheri* is from adult individuals, and there

is no information for young or juvenile individuals (Flux 1990, Schai-Braun and Hackländer 2016). The only recent observation of young *N. netscheri* was reported by Setiawan et al. (2018), and no previous information is available on breeding. We previously reported a young *N. netscheri* from the Dempo mountain, and in February, sightings of young and adult ones from the Gunung Raya Wildlife Reserve were reported (Setiawan et al. 2018). In some genera of lagomorphs, e.g. *Nesolagus*, *Pronolagus* and *Caprolagus*, little or nothing about reproduction is known. However, repeated observations of young *N. netscheri* in February suggest that *N. netscheri* might breed between December and February. In European rabbits which are nearly the same size, the gestation is ca. 4–5 weeks and nursing ca. 4 weeks (Schai-Braun and Hackländer 2016).

With reference to colors and morphological measurements, the color of *Nesolagus netscheri* is apparently variable among individuals, and stripes might be absent in the front or much reduced (Flux 1990, Schai-Braun and Hackländer 2016). The color of the young Sumatran striped rabbit from the Dempo mountain is consistent with that of the adult: having black ears and conspicuous wide black or dark brown stripes on a yellowish gray background that become rusty brown toward the rear, the ventral fur and the chin; and the inside of the legs are whitish (Flux 1990, Francis 2001, Schai-Braun and Hackländer 2016). However, this young individual looked significantly darker than the adult (Figures 1 and 2).

Through the monitoring of *Nesolagus netscheri* on a private WhatsApp group, comprising local south Sumatran hunters and wildlife traders, we found that five individuals of *N. netscheri* were trapped during 2017, and three individuals between January and March 2018 – a total of



**Figure 2:** An adult *Nesolagus netscheri* when it appeared for the first time for sale on 20 February 2018.

eight individuals between 2017 and 2018. According to the trappers, all individuals were collected from the highlands around the Dempo mountain of South Sumatra. After receiving a rabbit from a local trapper, a collector will offer the *N. netscheri* for sale. Quoted sales prices are Rp 5.000.000 (or \$365), the price includes shipping within South Sumatra; and Rp 7.000.000 (or \$510), including the shipping cost to Java. The data obtained from the trading group suggest that *N. netscheri* is a favored species based on its rarity, and the ease of smuggling due to its similarity to a domestic rabbit.

The *Nesolagus netscheri* reported for sale in this WhatsApp group is a bycatch of hunting mouse-deer *Tragulus* sp., using snares for trapping, and cassava as the bait. Blouch (1984) suggested that *Nesolagus netscheri* was not subjected to much hunting pressure, probably because they naturally occur at low densities and in remotes areas. In addition, Meijaard and Sugardjito (2008) stated that the main threat to *N. netscheri* is the clearing of mountain forest for agriculture, primarily coffee, tea and cocoa plantations; and it is not apparently hunted routinely, probably due to its natural rarity; 30 years later, now, many highland forested areas have become more accessible and communication technologies allow information exchange between hunters, wildlife traders and collectors. Poaching in many of the protected areas of Sumatra is a major threat to *N. netscheri*, alongside deforestation and human encroachment (Schai-Braun and Hackländer 2016). Information from local people in the Gunung Raya Wildlife Reserve of South Sumatra suggests that the fact that overseas collectors are prepared to pay high prices may be a new, additional and very worrying threat to *N. netscheri* (Setiawan et al. 2018).

It is necessary to take urgent action to ensure *Nesolagus netscheri* continues to survive in the highland forest of Sumatra ecosystems. There is much we do not know, and what little we do know about many of the species highlighted earlier is frightening. Further field studies, monitoring of social media platforms dealing with hunting and wildlife trading, conservation awareness and regular field patrols by park managers are needed, to ensure local populations of *N. netscheri* can survive in the wild.

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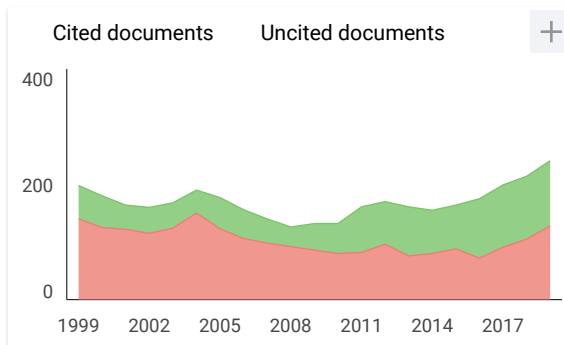
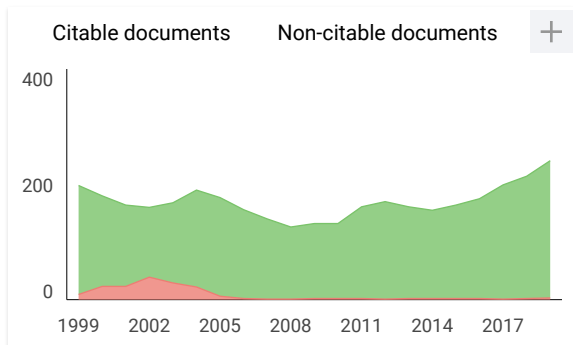
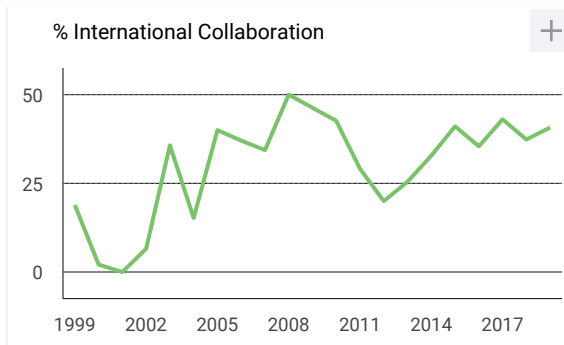
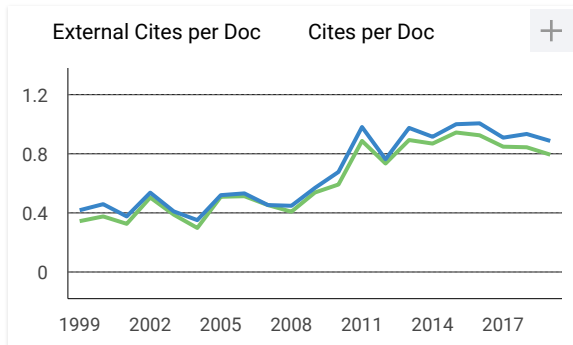
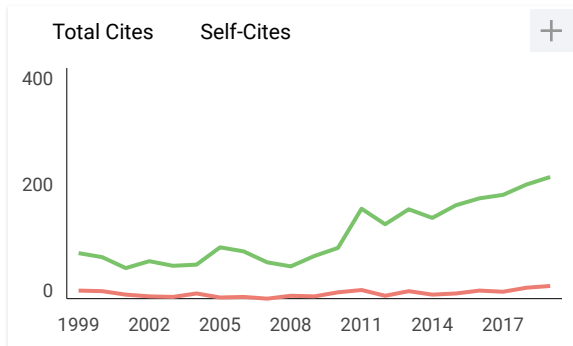
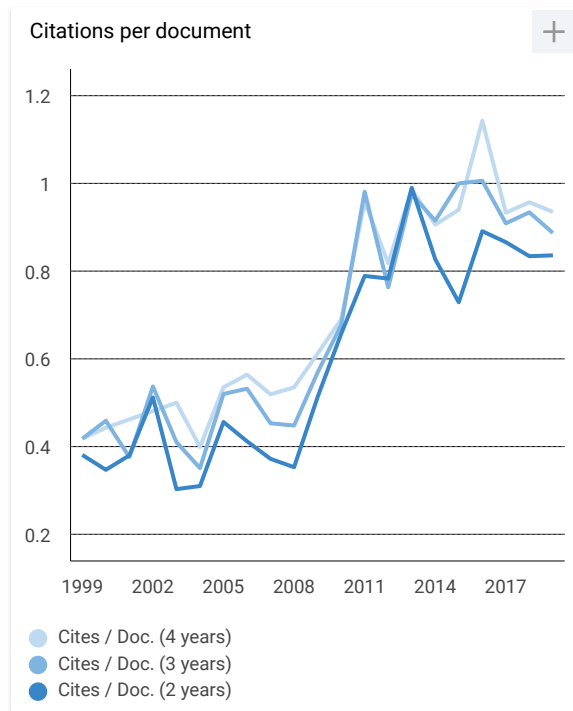
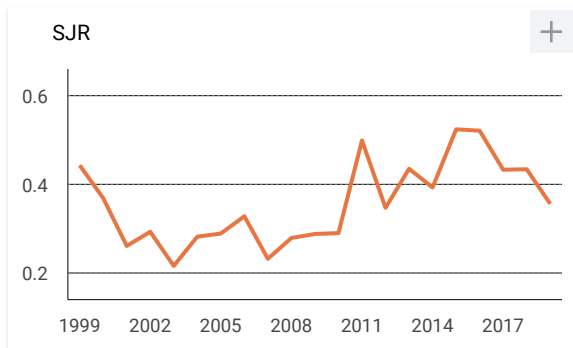
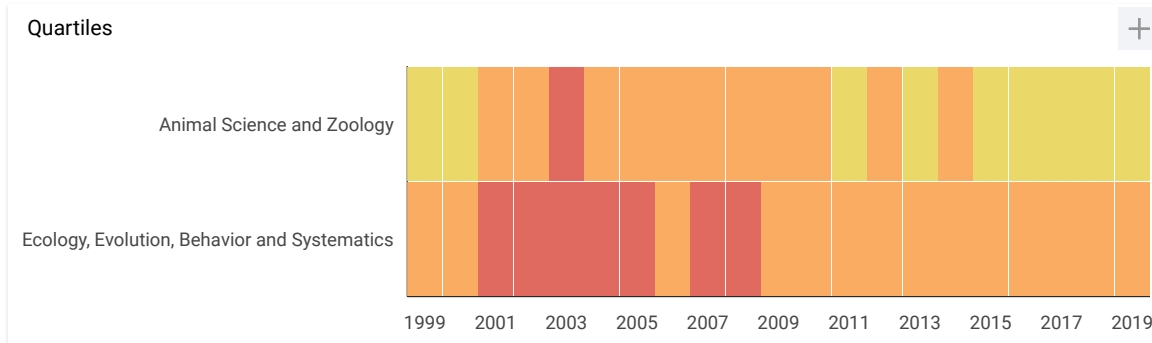
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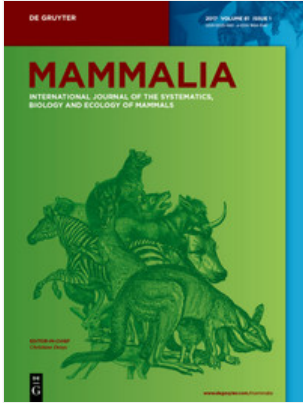
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Keywords: [hunting](#); [juvenile](#); [morphology](#); [Nesolagus netscheri](#); [South Sumatra](#); [Sumatran striped rabbit](#)

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*By* Arum Setiawan

## Short Note

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## First description of an immature Sumatran striped rabbit (*Nesolagus netscheri*), with special reference to the wildlife trade in South Sumatra

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**Abstract:** The Sumatran striped rabbit (*Nesolagus netscheri* Schlegel, 1880) is the least known lagomorph in the world. This paper describes the first record of a young *N. netscheri* that was offered for sale (the size is approximately 52–56% of the adult), together with an adult, by a social media group in February 2018. The rabbits were reportedly obtained from the Dempo mountain, South Sumatra. Compared to previous descriptions of *N. netscheri*, the Dempo mountain specimens have longer ears (47–52 mm vs. 34–50 mm), shorter tails (9–15 mm vs. 17 mm) and shorter hindfeet (60–65 mm vs. 67–87 mm). The threats to *N. netscheri* are revisited and discussed.

**Keywords:** hunting; juvenile; morphology; *Nesolagus netscheri*; South Sumatra; Sumatran striped rabbit.

The Sumatran striped rabbit (*Nesolagus netscheri* Schlegel, 1880) is allegedly the rarest lagomorph in the world. *Nesolagus netscheri* is endemic to Indonesia, and classified as Vulnerable on the International Union for Conservation of Nature (IUCN) Red List (Meijaard and Sugardjito 2008, Schai-Braun and Hackländer 2016). Only a dozen museum specimens collected between 1880 and 1916 and camera trap records show that this species is very scarce (Jacobson 1921, Flux 1990, Surridge et al. 1999, Hoffmann and Smith 2005, Dinets 2010, McCarthy et al. 2012). This rare rabbit occupies dense forest at moderate

elevations in Sumatra, a habitat that is under increasing development pressure. There is an urgent need to better understand *N. netscheri*, and the current threats in order to inform conservation and management strategies (Smith 2008, Smith et al. 2018).

The most recent sighting of *Nesolagus netscheri* was from the Gunung Raya Wildlife Reserve. Interviews with locals indicated that hunting was a major threat (Setiawan et al. 2018). After a field survey and exploration of local knowledge of *N. netscheri* in the Gunung Raya Wildlife Reserve (Setiawan et al. 2018), we continued to learn about *N. netscheri* in South Sumatra. Recently, we began following various social media groups which focus on wildlife trading. In a private WhatsApp group, we received information on two individuals of *N. netscheri*, one of which was a young rabbit. From the discussions among the members, it appeared that *N. netscheri* is greatly desired by collectors.

On 14 February 2018, a young *Nesolagus netscheri* was offered for sale on WhatsApp. This individual was reportedly caught from a forest within the Dempo mountain, South Sumatra province. The size is ca. 52–56% of the adult (Figure 1). Unfortunately, this individual died a few days later. As very little information is available on young *N. netscheri* and its reproduction, we requested the seller to donate the specimen. On 20 February 2018, the same seller offered an adult of *N. netscheri*. This individual also died after a few days. It was caught from the same area as the young *N. netscheri*. We also requested this specimen from the seller, and it was finally received on 23 February 2018. The specimens were deposited in the biology museum of Gadjah Mada University, with voucher catalog Musbio/Mam/Deposit/Coll.01.28112018.

Measurements of the *Nesolagus netscheri* from South Sumatra and previous available data are presented in Table 1.

*Nesolagus netscheri* is about the size of the European rabbit (Flux 1990). The young *N. netscheri* has a body length of 220 mm (Table 1). This size is between one-third

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**Figure 1:** A young *Nesolagus netscheri* when it appeared for the first time for sale on 14 February 2018.

**Table 1:** Measurements of *Nesolagus netscheri*.

Characteristics	YN	AN	FI	SH
Head-body (mm)	220	390	368–417	370–420
Tail (mm)	9	15	17	17
Ear (mm)	47	52	34–45	30–50
Hindfoot (mm)	60	65	67–87	67–87
Weight (kg)	0.32	1.5	1.5	1.5

YN, Young *Nesolagus netscheri*; AN, adult *Nesolagus netscheri*; FI, Flux 1990; McCarthy et al. 2018; SH, Schai-Braun and Hackländer 2016.

and one-half (1/3–1/2) of the adult of *N. netscheri* (368–420 mm). Comparison of *N. netscheri* specimens from the Dempo mountain with previously available specimens suggests that specimens from the Dempo mountain have longer ears (47–52 mm vs. 34–50 mm), shorter tails (9–15 mm vs. 17 mm) and shorter hindfeet (60–65 mm vs. 67–87 mm). Although only two individuals were measured, the different morphological characteristics are interesting. Further investigation is needed to study the morphological differences of *N. netscheri* populations between the sites in Sumatra. At present, it is regarded as a monotypic species (Flux 1990, Schai-Braun and Hackländer 2016, McCarthy et al. 2018); but if the listed characteristic differences are significant and if it occupies rich soils in isolated volcanic areas, it could be possible that the Dempo mountain population represents a distinct subspecies. Some tissues are needed for DNA analyses to examine the northern and southern populations of *N. netscheri* to test the hypothesis if there is a difference in characteristics between them.

All previous information on the morphometrics of *Nesolagus netscheri* is from adult individuals, and there

is no information for young or juvenile individuals (Flux 1990, Schai-Braun and Hackländer 2016). The only recent observation of young *N. netscheri* was reported by Setiawan et al. (2018), and no previous information is available on breeding. We previously reported a young *N. netscheri* from the Dempo mountain, and in February, sightings of young and adult ones from the Gunung Raya Wildlife Reserve were reported (Setiawan et al. 2018). In some genera of lagomorphs, e.g. *Nesolagus*, *Pronolagus* and *Caprolagus*, little or nothing about reproduction is known. However, repeated observations of young *N. netscheri* in February suggest that *N. netscheri* might breed between December and February. In European rabbits which are nearly the same size, the gestation is ca. 4–5 weeks and nursing ca. 4 weeks (Schai-Braun and Hackländer 2016).

With reference to colors and morphological measurements, the color of *Nesolagus netscheri* is apparently variable among individuals, and stripes might be absent in the front or much reduced (Flux 1990, Schai-Braun and Hackländer 2016). The color of the young Sumatran striped rabbit from the Dempo mountain is consistent with that of the adult: having black ears and conspicuous wide black or dark brown stripes on a yellowish gray background that become rusty brown toward the rear, the ventral fur and the chin; and the inside of the legs are whitish (Flux 1990, Francis 2001, Schai-Braun and Hackländer 2016). However, this young individual looked significantly darker than the adult (Figures 1 and 2).

Through the monitoring of *Nesolagus netscheri* on a private WhatsApp group, comprising local south Sumatran hunters and wildlife traders, we found that five individuals of *N. netscheri* were trapped during 2017, and three individuals between January and March 2018 – a total of



**Figure 2:** An adult *Nesolagus netscheri* when it appeared for the first time for sale on 20 February 2018.



eight individuals between 2017 and 2018. According to the trappers, all individuals were collected from the highlands around the Dempo mountain of South Sumatra. After receiving a rabbit from a local trapper, a collector will offer the *N. netscheri* for sale. Quoted sales prices are Rp 5.000.000 (or \$365), the price includes shipping within South Sumatra; and Rp 7.000.000 (or \$510), including the shipping cost to Java. The data obtained from the trading group suggest that *N. netscheri* is a favored species based on its rarity, and the ease of smuggling due to its similarity to a domestic rabbit.

The *Nesolagus netscheri* reported for sale in this WhatsApp group is a bycatch of hunting mouse-deer *Tragulus* sp., using snares for trapping, and cassava as the bait. Blouch (1984) suggested that *Nesolagus netscheri* was not subjected to much hunting pressure, probably because they naturally occur at low densities and in remotes areas. In addition, Meijaard and Sugardjito (2008) stated that the main threat to *N. netscheri* is the clearing of mountain forest for agriculture, primarily coffee, tea and cocoa plantations; and it is not apparently hunted routinely, probably due to its natural rarity; 30 years later, now, many highland forested areas have become more accessible and communication technologies allow information exchange between hunters, wildlife traders and collectors. Poaching in many of the protected areas of Sumatra is a major threat to *N. netscheri*, alongside deforestation and human encroachment (Schai-Braun and Hackländer 2016). Information from local people in the Gunung Raya Wildlife Reserve of South Sumatra suggests that the fact that overseas collectors are prepared to pay high prices may be a new, additional and very worrying threat to *N. netscheri* (Setiawan et al. 2018).

It is necessary to take urgent action to ensure *Nesolagus netscheri* continues to survive in the highland forest of Sumatra ecosystems. There is much we do not know, and what little we do know about many of the species highlighted earlier is frightening. Further field studies, monitoring of social media platforms dealing with hunting and wildlife trading, conservation awareness and regular field patrols by park managers are needed, to ensure local populations of *N. netscheri* can survive in the wild.

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HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*  
KARYA ILMIAH : JURNAL ILMIAH**

Jurnal Artikel Ilmiah : First description of an immature Sumatran striped rabbit (*Nesolagus netscheri*), with special reference to the wildlife trade in South Sumatra

Penulis Artikel Ilmiah : Arum Setiawan

Identitas Jurnal Artikel Ilmiah : a. Nama Jurnal : Mammalia  
b. Nomor/Volume/Hal : 3/84/1-3  
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d. Penerbit : Walter de Gruyter GmbH  
e. Jumlah Halaman : 3

Kategori Publikasi Jurnal Ilmiah :  Jurnal Ilmiah Internasional Bereputasi  
(beri  $\surd$  pada kategori yang tepat)  Jurnal Ilmiah Internasional  
 Jurnal Ilmiah Nasional Terakreditasi S1, S2  
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**I. Hasil Penilaian Validasi :**

No.	ASPEK	URAIAN/KOMENTAR PENILAIAN
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2.	Linearitas	Sudah linier dengan bidang biologi konservasi

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Komponen Yang Dinilai	Nilai Maksimal Jurnal Ilmiah (isikan di kolom yang sesuai)					Nilai Akhir Yang Diperoleh
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Kelengkapan dan Kesesuaian unsur isi jurnal (10%)	4					4
Ruang lingkup dan kedalaman pembahasan (30%)	12					12
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Total = (100%)	40					40
Kontribusi Pengusul (Penulis Pertama /Anggota Utama)	Penulis Utama $0,6 \times 40 = 24$					24

**KOMENTAR/ULASAN *PEER REVIEW***

• Kelengkapan dan Kesesuaian Unsur:	Paper terkait deskripsi kelinci liar <i>Nesolagus netscheri</i> di Sumatera Selatan. Isi paper sudah memenuhi kaidah-kaidah karya ilmiah dan sudah sesuai dengan bidang biologi konservasi
• Ruang Lingkup dan Kedalaman Pembahasan:	Hasil penelitian dibahas secara komprehensif dengan penyampaian pembandingan dari temuan-temuan penelitian lainnya dan teori terkait. Referensi yang diacu dalam pembahasan sudah cukup update untuk bidang kajian ini.
• Kecukupan & Kemutakhiran Data & Metodologi:	Data-data hasil penelitian sudah baik dan didukung peta lokasi sampling dan gambar yang ditampilkan menarik. Data didapatkan dengan menggunakan metode yang standard.
• Kelengkapan Unsur & Kualitas Penerbit:	Penerbit Walter de Gruyter GmbH berkualitas sangat baik, tidak termasuk predatory publisher, dan jurnal masuk di Q2.

Surabaya, 13 Mei 2020  
Penilai 1



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## FORMAT PENILAIAN (VALIDASI &amp; PEER REVIEW)

## LEMBAR

## HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW

## KARYA ILMIAH : JURNAL ILMIAH

- Jurnal Artikel Ilmiah : First description of an immature Sumatran striped rabbit (*Nesolagus netscheri*), with special reference to the wildlife trade in South Sumatra
- Penulis Artikel Ilmiah : Arum Setiawan
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e. Jumlah Halaman : 3
- Kategori Publikasi Jurnal Ilmiah (beri v pada kategori yang tepat) :  Jurnal Ilmiah Internasional Bereputasi  
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Kelengkapan dan Kesesuaian unsur isi jurnal (10%)	4					4
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Kecukupan dan Kemutakhiran data/informasi dan metodologi (30%)	12					10
Kelengkapan unsur dan kualitas penerbit (30%)	12					12
Total = (100%)	40					37
Kontribusi Pengusul (Penulis Pertama /Anggota Utama)	Mammalia 84(3): 1-3. Ada abstrak hingga sepintas kesimpulan. Penulis ke 1 dari 6 penulis. Ada author korespondensi (M. Iqbal, A. Halim dan R.F. Saputra). Nilai maksimal: 92,5%. Nilai pengusul: $(0,6 \times 0,925 \times 40) = 22,3$					22,2
<b>KOMENTAR/ULASAN PEER REVIEW</b>						
• Kelengkapan dan Kesesuaian Unsur:	Format relatif lengkap dari Abstrak hingga Daftar Pustaka. Sumatra atau Sumatera, mana yang baku?					
• Ruang Lingkup dan Kedalaman Pembahasan:	Masih dalam bidang ilmu peneliti. Pembahasan cukup dipahami.					
• Kecukupan & Kemutakhiran Data & Metodologi:	Data masih dirasa kurang karena hanya 8 sampel. Metode sudah biasa dilakukan.					
• Kelengkapan Unsur & Kualitas Penerbit:	Penerbit Walter de Gruyter GmbH termasuk baik.					

Yogyakarta, 16 Juni 2020

Penilai 2

tanda tangan .....

Prof. Dr. Suwarno Hadisusanto

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Bidang Ilmu : Biologi/Ekologi

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