The Feral and Near Feral Animals of Iriomote Island: —Pigs, Goats and Cattle—

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I. BACKGROUND

Domestic animals and their descendants that have gone wild are known as feral animals. These animals are free-living, are not under the effective ownership of humans, and do not receive protection, care, or food as a deliberate gift from man (McKNIGHT, 1964).

Feral animals are relatively rare in Japan compared, say, with Australia or the USA. However, feral pigs, goats and cattle occur in Japan. All occur in some form or other on Iriomote Island. This is one of the southernmost islands of the Nansei Islands and is relatively close to Taiwan. About 90 per cent of this Island (see Fig. 1) is covered with subtropical vegetation. Most of the Island is rugged and of volcanic origin. Furthermore most of it has been set as a National Park (Iriomote National Park) and as National Forest. Before discussing the feral animals of Iriomote in detail, let us consider some general information about feral animals in Japan.

Pure feral pigs occur in only one place in Japan, namely only on Otouto Island in the Ogasawara Islands (TAKAHASHI, 1989). This is because wild boars, *Sus scrofa* were not present in the Ogasawara Islands.

In the Nansei Islands, *Sus scrofa riukiuanus*, a variation of the Eurasian wild boar, is present in the wild. Domestic pigs will interbreed with this variety. In fact, some farmers have captured *Sus scrofa riukiuanus* specimens for the purpose of crossing them with domestic pigs and producing *ino-buta*. Since domestic pigs have been present in the Nansei Islands for several hundred years some are likely to have escaped. Instead of forming independent feral

pig colonies, these have interbred with *Sus scrofa riukiuanus*. This possibility was suggested by HAYASHIDA (1966) and YASUMA (1984) for Iriomote Island and by IMAIZUMI (1973) for Ishigaki Island. TAKAHASHI (1990) points out that domestic pigs are likely to have escaped on Ishigaki Island and Okinawa Island during World War II. Recent examples of escape of *ino-buta* exist, as discussed below.

Figure 1. Iriomote Island.

Pasture-land where fences are broken is shown by dark shading. Cattle sometimes escape from this pasture-land.

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Feral goats exist on several of the Nansei Islands and also on the Ogasawara Islands. They arise from a number of separate causes such as being abandoned by their original owners due to socio-economic changes as on Iheya Island or because of escape from custody, e.g. due to broken fences or destruction of goat sheds by typhoons. Because there are no indigenous wild goats in Japan, they cannot interbreed with such populations as in the case of domestic pigs gone wild.

In Japan, feral cattle are claimed to occur in one place, namely on Kuchino Island in the Tokara Islands (HAYASHIDA AND NOZAWA, 1964). They derive from domestic cattle brought to the island in 1918–1919 and abandoned later. However, temporary feralization of cattle has occurred in other places such as Otouto Island in the Ogasawara Islands (TAKAHASHI, 1990) and appears to have occurred on Iriomote Island for reasons outlined below. Let us consider the position of all three types of feral animal in relation to Iriomote Island.

II. FERAL PIGS

As mentioned above, feral pigs stemming solely from domestic stock do not exist on Iri-

omote Island but mixtures with *Sus scrofa riukiuanus* do occur. On the adjacent islands, Sotobanare Island and Uchibanare Island, the feral *ino-buta* (the cross between domestic pigs and native pigs, in this case a cross between *riukiuanus* and landrace) occurs. On the main island the position is less clear. But it seems likely that there has been interbreeding of escaped domestic pigs and of *ino-buta* with native pigs. They appear to have merged with the population of wild pigs, and some large captured pigs exhibit characteristics of domestic pigs (Photo 1).

The running of *ino-buta* on Sotobanare Island and Uchibanare Island was started ten years ago by partnership of two men from the main island. They brought about 200 *ino-butas* to Sotobanare Island and about 10 to Uchibanare Island. These pigs were allowed to run freely on these islands which were uninhabited.

At first they brought food to the islands every day by ship. The food included sugar cane, sweet potatoes, pumpkins, papayas and food scraps. They had regular feeding places and the *ino-buta* would come to these places whenever their owners visited to feed them.

But after 2–3 years the partners disagreed and their cooperation ended. After this, no

Photo 1. A large captured pig.

The weight of this pig is estimated to be over 100 kg, though the weight of large *Sus scrofa riukiuanus* is about 60 kg on Iriomote Island. This pig was captured on western Iriomote. (January, 1986, by Y. Ikeda)

further attention or management was given to their *ino-butas*. It is claimed that a number of *ino-butas* crossed to Iriomote Island at low tide. At low tide, only a narrow channel separates Sotobanare Island from Iriomote Island. Today, *ino-buta* remain on Sotobanare and Uchibanare Island and can be regarded as feral.

On the main island, domestic pigs have been kept since early times. However the exact time at which pigs were introduced to Iriomote Island is unknown. Shipwrecked Korean sailors who visited the Island in the 1470s did not report the presence of domestic pigs on Iriomote although they did so for Okinawa (INAMI, 1927).

A traditional method of keeping domestic pigs was to make a hole in the pig's ear, tie a rope through the hole and attach the rope to a fixed object so as to tether the pig. Sometimes the rope broke or otherwise got loose allowing the pig to escape and join wild pigs. It is also said that during oestrus or sexual heat some domestic sows roamed into the forest and would have been serviced by wild boars.

Recently, but over 10 years ago, some *ino-buta* escaped from eastern Iriomote. These *ino-butas*, which were a cross of *riukiuanus* and landrace, were chased by a dog and driven away their lightly fenced area. Today, *ino-butas* on the main island are all kept in sheds rather than fenced in large areas (Photo 2). So they

have little chance to escape.

Mr. S. T. was one of the first farmers on Iriomote to rear *ino-butas*. His main aim was to produce meat low in fat content given that preference is now for meat which is not fatty.

He crosses *riukiuanus* boars with landrace sows. He catches young *riukiuanus* boars in traps and selects the best for breeding. Out of the offspring of the cross, he castrates the males and rears them for meat. The females are kept for breeding and once more crossed with *riukiuanus* boars. The average number of a litter is 5–7.

These *ino-butas* are fed on sugarcane, pumpkin, corn, rice bran, wheat bran and grass. They are not fed with pig pellets because these tend to produce too much fat and also contain antibiotic and hormones and can destroy the natural character of the pork. The meat is mostly sold to restaurants and hotels in Okinawa Prefecture and the seller is paid about ¥2,500 per kg. for it.

Today Mr. S. T. only keeps *ino-butas* in sheds but in the past he had free range *ino-butas*. He was one of the partners in the venture on Sotobanare Island and Uchibanare Island. At that time, he also exported *ino-buta* meat to the Japanese mainland.

III. FERAL GOATS

The exact time at which goats were introduced to Iriomote Island is unknown but they were present in Okinawa in the 1470s (INAMI, 1927) according to an account of shipwrecked Korean sailors. These sailors visited Iriomote Island for five months but did not report the presence of goats. Presumably they were introduced there at a later time because the sailors did report the presence of various types of livestock on Iriomote, without mentioning goats. Goats appear to have been introduced principally to the Nansei Islands from Southeast Asia (e.g. Philippines and Malaysia) possibly via the east coast of Taiwan, but there was some infusion of black goats from China probably by way of Taiwan. In any case, the original native goats were pygmy goats mostly brown, with some black in colour.

Beginning in the 1930s, Japanese Saanens

Photo 2. *Ino-buta* kept in shed on the main island.
(September, 1989, by S. Takahashi)

were imported from the mainland to increase the size of these goats. Many feral goats today are white as a result but some are fawnish. This appears to be the case on Iriomote Island and today's feral goats are much larger than the original native goats. Nevertheless, genetically it seems that the goat population of the Nansei Islands has been little affected by the infusion of Japanese Saanen blood. According to blood analysis undertaken by Nozawa *et al.* (1978), the cross flow of genes from Japanese Saanen to Nansei Island native goats is less than 13% (Cf. SELVARAJ *et al.*, 1991). This they consider to be low but suggest it may be because of the low resistance of Saanens to *Filaria* *cerebrospinalis* (lumbar paralysis) and the strong resistance of the native goat population to this disease.

Feral goats occur mainly on Iriomote Island (Photo 3) and on Sotobanare Island. The number is unknown but it was suggested by a forest officer on Iriomote that the number is declining.

Information is available about four recent cases of feralization. The partnership, mentioned earlier, introduced 20 goats to Sotobanare Island about 10 years ago. When the

partnership failed, the goats were abandoned and became feral.

A second case involved the Yaeyama-kaiatsu company, a subsidiary of the Japanese paper manufacturer Jyujō-seishi. This company had a contract for logging in the National Forest and for planting a small area with Ryukyu pine. It ceased operation in 1974, after 21 years of operating since 1953 when it signed a contract with the Government of the Ryukyu.

It maintained a flock of goats in its logging area. When it ceased operation it abandoned the goats, which subsequently became feral. At first, they were reported to remain in the vicinity of the new planted pine plantation. But once the plantation grew larger, they moved elsewhere in the forest. They appear to be a major source of feral goats on Iriomote Island. A third case occurred because of a typhoon. This occurred over ten years ago in the village of Mihara (Figure 1) and destroyed a shed in which goats were housed, so releasing the goats. At first these goats remained on the open land near the village but within 2–3 years they migrated to the nearby forest.

A fourth case was also reported in which goats were allowed to roam in the village of Komi (Figure 1). They left the village over 10 years ago to live in the forest, behind the village.

Today there is little interest in the feral goats of Iriomote. This is because no use is made of these goats and they are rarely seen. They are not perceived as a pest since they do not cause damage to agricultural crops on the Island. Their damage to native flora is unrecorded even though they undoubtedly have some adverse effect on it. Although the size of their population is unknown it appears to be small. Furthermore, no one claims ownership of these goats.

IV. FERAL CATTLE

Cattle were present on Iriomote Island from very early times. Shipwrecked Korean sailors reported their presence in the 1470s (INAMI, 1927). How and when they were introduced is unknown. It is not known if feral cattle existed in earlier times. Since cattle are comparatively

Photo 3. Head of feral goat captured on western Iriomote in 1983.
(September, 1989, by S. Takahashi)

large and tend to avoid relatively inaccessible places, feral cattle would have been easily hunted or captured and thus would not have remained feral for long.

Recently feral or semi-feral cattle have been reported on Iriomote. They occur on the western part of the main island and on the attached islands, namely, Sotobanare and Uchibanare Islands. The size of their population is unknown, but they seem to have two sources. On the main island, cattle sometimes escape from pasture land (Figure 1) because fences are broken. This may happen because fences are constructed weakly and are not kept in a good state of repair or because of fallen trees, e.g. during a typhoon.

A second source of feral cattle on Iriomote may be cattle which were introduced to Sotobanare and Uchibanare Islands by the partnership mentioned above. These cattle were not fenced in. Consequently they could cross to the main island at low tide by swimming the narrow channel between Uchibanare Island and the mainland, and some probably did so. The cattle which remain on Sotobanare and Uchibanare do not seem to be well kept after the failure of the partnership and so they may be considered to be feral or semi-feral.

Sometimes feral or roaming cattle are captured on Iriomote by using a trap or an anaesthesia gun and sold for bullfighting purposes. If the original owner can identify such cattle, he usually insists on his ownership and requires a payment.

Such cattle seem to cause no agricultural harm because they avoid inhabited areas. They may, however, cause damage to native flora since they roam into Iriomote National Park. Further investigation of this matter is required.

V. DISCUSSION

Iriomote has three types of domestic animals that have become feral or joined with native animals as in the case of domestic pigs. Domestic pigs and *ino-butas* can interbreed with *Sus scrofa riukiuanus* and have done so. The rearing of *ino-butas* and their escape increase the likelihood of cross gene flow from domestic pigs to *Sus scrofa riukiuanus* because *ino-butas*

are hardier than domestic pigs, such as land-race, and therefore more likely to survive in the wild and reproduce. Natural scientists were concerned about this possibility when *ino-butas* were kept on Iriomote under free-range conditions and adjoining islands unfenced and thus had opportunities to escape (YASUMA, 1984; BRISBIN AND OLIVER, in press). As a result of such criticism, today *ino-butas* are kept in sheds on Iriomote.

The extent to which there has been gene flow from domestic pigs to *Sus scrofa riukiuanus* is unknown. This would at least require examination of blood samples with a view to detecting genetic transfer. However, studies of blood by KUROSAWA *et al.* (1989) indicate that genetically Iriomote wild pigs are closer to Southeast Asian native domestic pigs than European pig breeds. This may indicate that domestic pigs on Iriomote Island were originally from Southeast Asia (as were goats in the main) and that these crossed with pre-existing wild stocks.

Feral goats and cattle do not have the potential to interbreed with native species, but they can be expected to damage native flora in the National Park and Forest. The extent and type of this damage, it seems, have not been recorded for Iriomote, possibly because the population of such feral animals seems to be small and they are rarely seen. It would be useful to have more information about the populations of these feral animals and their effects. But there is little or no social pressure (private or official) to collect such information because these animals cause no damage to agricultural crops in Iriomote and their effects on native vegetation go largely unseen. Furthermore, the numbers of goats does not appear to be increasing (the opposite has been suggested to be the case) and feral cattle seem to be incapable of establishing a permanent large population.

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西表島の再野生化・半再野生化動物 —ブタ、ヤギ、ウシ—

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わが国には再野生化または半再野生化動物はまれであるが、西表島には再野生化あるいは半再野生化したブタ（イノブタを含む）、ヤギ、ウシが生息している。

ブタについては、これまでに在来種のブタの離脱とそれらとリュウキュウイノシシの混血が指摘されてきた。近年でも、内離島や外離島でイノブタ（リュウキュウイノシシ×ランドレース）が再野生化状態にあり、一部は本島に侵入している。また、本島でもイノブタの離脱が生じた。近年のイノブタの離脱の要因は、粗放的な飼育方法や管理の不行届きに求められる。これらのイノブタもまた、リュウキュウイノシシと混血しているものと推測される。西表島で、再野生化したブタの集団が形成されないのは、在来のイノシシ集団に何かのかたちで吸収されているためと考えられる。ブタやイノブタの離脱によるリュウキュウイノシシとの混血は、リュウキュウイノシシの遺伝子を攪乱するため、在来動物の保護の点から問題がある。

ヤギとウシの場合は、同島にそれらの原種が生息しないため、混血や原種集団へのとけこみが生じることがない。現在みられるヤギの再野生化は、近年の森林伐採作業用キャンプ地の撤去に伴う遺棄や台風による小屋の破損などのために生じた。近年、ウシもまた一部が内離島、外離島、本島西部で再野生化状態となっている。これらは、管理の不行届きが原因である。当地では、再野生化したヤギやウシによる在来の植生への影響が生じているものと推測される。

西表島では、行政当局によるこれらのイノブタ、ヤギ、ウシに対する関心は高くない。それは、これらの頭数が多くないこと、在来の動植物への被害状況が不鮮明であること、農業被害がほとんどみられないことなどによる。しかし、西表島は大部分が国立公園に指定されていることから、特に在来の生態系への影響に注意する必要がある。

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