

Э. Крюбези^a, О. Мельничук^b, А. Алексеев^c

^a UMR 5288, Национальный Центр Научных Исследований (CNRS), Университет Тулузы III, 37, аллея Jules Guesde, 31000, Тулуза, Франция

^b Северо-Восточный федеральный университет, ул. Белинского, 58, Якутск, 677007

^c Институт гуманитарных исследований и проблем малочисленных народов Севера СО РАН ул. Петровского, 1, Якутск, 677007

E-mail: eric.crubezy@univ-tlse3.fr (Крюбези Э.); madrid03@mail.ru (Мельничук О.); alekan46@mail.ru (Алексеев А.)

АРХЕОЛОГИЯ, ГЕНЕТИКА И ИСТОРИЯ: 15 ЛЕТ ИССЛЕДОВАНИЙ В ЯКУТИИ (2002–2017)

Территория Якутии была первоначально заселена в эпоху раннего палеолита более 300 тыс. лет назад, и с тех пор люди проживали здесь постоянно. В данной статье рассматриваются некоторые сценарии заселения Якутии предками современных якутов, их взаимодействие с местными племенами, а также с русским населением, которое начинает освоение Якутии с первой половины XVII в. К моменту появления якутов в IX–XII вв. здесь проживали аборигенные группы, этнонимы которых неизвестны, а также юкагиры и тунгусы, занимавшиеся оленеводством, охотой и рыболовством. Приход из южных районов Сибири скотоводов-якутов, а затем земледельцев-русских существенно видоизменил экономическую и этническую ситуацию в Якутии. Эти процессы определяют проблематику наших исследований в течение 15 лет. Мы проводим раскопки захоронений, а затем сравниваем культурные, исторические и палеогенетические данные. Наши исследования охватывают период между господством традиционного образа жизни и приходом европейцев вплоть до конца христианизации (раскопки погребений) и направлены на систематический поиск родственных связей между людьми, оставившими указанные захоронения. Исследования позволили выяснить, как якуты искали места, благоприятные для поселения (алаасы), и как заселяли их. Такие зоны были редкими и рассеяны за полярным кругом, что объясняет распространение якутов на территории более чем в 3 млн км². Наши исследования позволили заявить о выраженном «эффekte основателя» по мужской линии у якутов. Впервые нами был поставлен вопрос о совокупной ценности и значимости археологических, исторических и палеогенетических данных на примере изучения хорошо документированного долговременного периода. Подведение основных итогов всех опубликованных работ позволяет определить проблематику предстоящих исследований: необходимость разработки инновационных методов, особенно при сопоставлении данных в области биология — культура, проведение детальных исторических исследований по экономической и религиозной истории и истории эпидемий.

Ключевые слова: якуты, тунгусы, юкагиры, Якутия, русские, охотники-собиратели, скотоводы, оленеводы.

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E. Crubézy^a, O. Melnichuk^b, A. Alexeev^c

^a UMR 5288, Scientific Research National Center (CNRS), University of Toulouse III, 37, allées Jules Guesde, 31000 Toulouse, France

^b North-Eastern Federal University, Belinskogo st., 58, Yakutsk, 677007, Russian Federation

^c The Institute for Humanities Research and Indigenous Studies of the North (IHRISN) Petrovskogo st. 1, Yakutsk, 677007, Russian Federation

E-mail: eric.crubezy@univ-tlse3.fr (Crubézy E.); madrid03@mail.ru (Melnichuk O.); alekan46@mail.ru (Alexeev A.)

ARCHAEOLOGY, GENETICS AND HISTORY 15 YEARS OF RESEARCH IN YAKUTIA (2002–2017)

For the past 15 years, our research has focused on the evolution of the first Yakut populations, their interaction with local tribes as well as with the Russian population, which marks the beginning of Yakutia's development from the first half of the 17th century. We conducted the excavation of tombs and we analysed the cultural, historical and paleogenetic data uncovered. A review and a synthesis of the main results published in articles and monographs informs our research directions for the future.

Key words: Yakuts, Tungus, Yukagirs, Yakutia, Russians, hunter-gatherers, herders, reindeer herders.

Colonial neolithization

In 2002, the three authors of this article developed a program of studies on the recent peopling of the Yakut or Sakha Republic, an autonomous republic of the Russian Federation situated in north-east Siberia.

It has a little over one million inhabitants, half of which are Yakuts, descendants of the cattle and horse breeders, who still make up more than a third of the population (the others Yakuts became urban dwellers) they lived in the coldest inhabited region of the planet outside of the Arctic. They spoke one or more languages of Turkic origin mixed with some Mongolian elements and perhaps other extinct languages. During their expansion (whose beginnings are unknown), the Yakut people came into contact with other

populations who spoke a language of Siberian origin, which western and sometimes Russian historians termed Tungusic and Yukaghir peoples. In addition to these ethnic groups, indigenous tribes lived in Yakutia, whose history dates back to the Stone Age. Over time, they were completely assimilated by the Yakutes, Tungus and Yukagirs and disappeared as an independent ethnic group. Some of the Tungus and Yukagirs were also assimilated and absorbed by the Yakutian peoples. Originally hunter-gatherers, Tungus and Yukagirs turned, during the last centuries, increasingly to reindeer herding while the size of their population reduced drastically [Crubézy, Nikolaeva, 2017]. At the beginning of the 17th century, the Yakuts came into contact with the Russians who started to survey the region.

The evolution of the Yakut population is very particular as it is at the intersection of two historical contexts:

- The first very long historical trend is that of the supremacy of farmers and breeders — here of cattle and horses — over the hunter-gatherers (ancestors of the Tungusic and Yukaghir populations). This expansion, originating in the south of Siberia a few thousand years ago, ended in the 20th century below the polar circle.

- The second historical trend is that of the European colonial expansion. It began officially in Yakutia in 1632 and ended during the 19th century with the assimilation of the population, at least on a material level.

The success of the Yakuts, i.e. their expansion between 1632 and the beginning of the 20th century at the expense of the Tungusic and Yukaghir populations, is related to the interaction between two colonial models: that of the supremacy of farmers over hunter-gatherers in a process of neolithization, and that of European colonial expansion. We define this interaction as «colonial neolithization», a term which encompasses the characteristics of neolithization but which is specific of a recent era and whose actors were unconsciously supported by a global, colonial economy represented by the fur trade [Crubézy, Nikolaeva, 2017]. This colonial neolithization took place at a key time during the history of humanity, when the herder populations living a traditional lifestyle were confronted with European colonization. This situation reflects many similar situations around the world, which have been extensively studied by historians but are only starting to interest archaeologists, in the Americas notably [Hämäläinen, 2012, White, 2009].

Until recently, the peopling of Yakutia had never been analysed along these lines, because Yakut history and archaeology were born and evolved in a particular context until the creation of the Russian Federation. Yakut elites christianised at the end of the 19th century were the first to conceive the history of a Yakut nation, based on the ethnographic accounts of political exiles from the 19th century: R.K. Maak, V.L. Seroshevsky, historians of the local people [Popov, 1924; Ksenofontov, 1992] and the accounts of travellers since the 17th century [Nikolaeva, 2016]. During the soviet era, archaeological studies expanded. They benefited from the early interest of the soviet archaeologist A.P. Okladnikov who wrote a monograph [Okladnikov, 1968] published in the West [Okladnikov, 1970], then from that of A. Gogolev [Gogolev et al., 2007] and his student R. Bravina [Bravina, 1996] on Yakut funerary rites, and the wider synthesis of A. Alexeev [Alexeev, 1996]. A major theme of these studies is the Yakut ethnogenesis, that is the genesis of the Yakut culture in its totality (A. Gogolev in this issue). If Yakuts were present in the 17th century, who were their ancestors, notably among the populations of the southern steppe corridor? Outside of ethnogenesis, the archaeology of the Yakuts was mainly an ethnoarchaeology. What was observed in the excavated tombs was compared with the multiple accounts from travellers and what was still observable in the countryside where traditional ways of life endured until the end of the 20th century.

Chronology of our research

In Yakutia, the presence of frozen tombs gave us access to the totality of the material culture of the buried subjects (fig. 1), but also to an unprecedented mass of biological data. We are fortunate that this record allows us to study the Yakut archaeology before, during and after their contact with the outside world. Historical documents are numerous and remain to be totally explored, or re-analysed in a contemporary perspective. Ethnographic documents have been more thoroughly studied and give us unparalleled information on traditional ways of life, the economy, and the faith of the ancient Yakuts, notably shamanism [Czaplicka, 1914; Ksenofontov, 1992]. The archaeological study period ends with the soviet era. Within a few years, around 1922, Christian cemeteries were abandoned and new cemeteries were inaugurated, which in many cases are still those in use by the contemporary communities. During the last 15 years, our research has focused on: (i) the transition between a traditional way of life and the arrival of the Europeans until the end the Christian era, studied from excavated sepulchres; and (ii) the systematic search for parental links between individuals from uncovered tombs.



Fig. 1. 1 — Kerdugen, 2011, leather belt decorated with copper alloy plates; 2 — Tottouk, 2017, horse scraper knob in carved mammoth ivory; 3 — Ordiogone 2, 2007, copper ring and antler or elk hook attached to the belt; 4 — Kureleekh 2, 2011, Copper alloy solar disc fixed on the top of the chapka; 5 — Kouranakh, 2011, wooden pipe with its copper alloy stove; 6 — Kureleekh 2, 2011, bronze torque with a locking system consisting of a beaded leather tie; 7 — Atyyr Meit 1, 2010, bow made of larch covered with birch bark; 8 — Urun Myran 1, 2009, 7 arrows and their leather quivers; 9 — Kureleekh 2, 2011, iron knife with a wooden handle and leather case; 10 — Tyyt Bapyt, 2005, three-legged tchoron; 11 — Urun Myran 1, 2009, batilla with handle covered with birch bark; 12 — Bittiki, 2017, wooden spoon; 13 — At Daban 13, bronze cauldron pierced with a wooden spoon; 14 — Kureleekh 1, 2011, decorated birch bark pot.
 Рис. 1. 1 — Кердюген, 2011, кожаный ремень, украшенный пластинами из медного сплава; 2 — Тоттук, 2017, изготовленное из бивня мамонта навершие ручки скребка для очистки крупы лошади от снега, инея, изморози; 3 — Орджогон 2, 2007, медное кольцо и крюк из рога оленя или лося, прикрепленный к поясу; 4 — Кюрэлээх 2, 2011, диск-туосахта из медного сплава, закрепленный на верхней части шапки, символизирующий солнце; 5 — Куранах, 2011, деревянная трубка с медной чашей; 6 — Кюрэлээх 2, 2011, бронзовая гривна с застежкой из кожаного шнура с бисером; 7 — Атыыр Мейте 1, 2010, лук из лиственницы, покрытой берестой; 8 — Юрюн Мыран 1, 2009, 7 стрел и их кожаные колчаны; 9 — Кюрэлээх 2, 2011, железный нож с деревянной ручкой и кожаным чехлом; 10 — Тыйт Бапыт, 2005, трехногий чорон; 11 — Юрюн Мыран 1, 2009, пальма (батыя) с ручкой, покрытой берестой; 12 — Биттики, 2017, деревянная ложка; 13 — Ат Дабан 13, бронзовый котел с намеренно пробитым дном и деревянный черпак; 14 — Кюрэлээх 1, 2011, декорированный сосуд, орнаментированный берестяной обкладкой.

Our first campaigns conducted in 2002 and 2003 consisted in prospection and the first excavations in south Yakutia and in the territories of central Yakutia (fig. 2).



Fig. 2. Areas of surveys and excavations of the Archaeological Mission Franco-Yakut since 2002.

Рис. 2. Направления исследований и раскопок франко-якутской археологической экспедиции с 2002 г.

We established the core of our team and familiarised ourselves with the study of frozen tombs. This was followed by a three year period (2004 to 2006) during which we conducted large scale expeditions in Yakutia, still essentially an ethnoarchaeological study but coupled with: (i) fine excavation of the tombs and the autopsy of the remains conducted with anthropobiologists, forensic pathologists, topographers, professional archaeologists, draftsmen, photographers, and ethnoarchaeologists specialised in the recognition of furs and tanning methods; (ii) the first studies on the organisation of the territory, initiated with a two-year collaboration with geographers from Toulouse. During this time, we developed and structured the team which acquired new expertise in identifying frozen tombs, excavating them, and conducting autopsies on the remains. We began to reconstitute clothing, a practice which is now systematic (see [Hochstrasser-Petit et al., in this issue]).

Following the first synthesis [Crubézy, Alexeev, 2007] we initiated expeditions in zones less well known archaeologically: in Vilyuy in 2007 and 2008; Verkhoyansk (2010, 2011, 2012 and in 2013, 2014 and 2015 on the Indigirka and in Oymyakon). In 2009, we conducted a new campaign in Central Yakutia as it became important to settle a number of cultural questions and to complete our quantitative sample of tombs. In all the zones outside Central Yakutia we conducted historical studies prior to the archaeological prospections. These aimed to outline the zones of Yakut settlement which were then identified on maps established during the soviet era as well as satellite and aerial photographs. Later, as the genetic studies progressed, we opted to proceed with excavations south of Yakutsk: (i) On the quaternary terrace of the Lena river corresponding with the cemetery of the Kangalaski clan, the clan that represents the last and most powerful expansion of the southern ancestors of the Yakuts in the 14th–16th centuries. The material culture of the Khangalans of this period has been best studied in the Tuymaada Valley (c.f. above); (ii) in the alluvial plain which delivered tombs anterior to the 18th or even the 17th century of uncertain status corresponding perhaps to foreign populations. Target specific zones corresponding to certain tribes or particular study hypotheses. During all these campaigns we communicated our results via research articles and reviews [Crubézy, Alexeev, 2012; Crubézy, Alexeev, 2007;

Crubézy, Nikolaeva, 2017] and popularised our results via films for the general public, in French and Russian [Jampolsky, 2007; Molia and Lutz, 2017].

Results specific of Yakutia

Our results are analysed in the framework of the world of the dead (funerary practices), the world of the living (epidemiology), and the evolution of populations and cultures [Crubézy, Masset et al., 2017].

The world of the dead. Our first results, summarised in French for the general public, dealt with fifty or so tombs from Central Yakutia [Crubézy, Alexeev, 2007]. They were updated and expanded in Russian in 2012 [Crubézy, Alexeev, 2012] to take into account the latest findings from Central Yakutia (2009) and those of Vilyuy (2007, 2008). Several syntheses [Crubézy, Alexeev, 2007, 2012; Crubézy, Nikolaeva, 2017] described the unusual funerary rites in this region, particularly sacrifices of horses [Duchesne et al., 2014] and superstitions around the return of the dead (fig. 3, fig. 4). A major advance was the recognition of four chronological phases, which could be put in parallel with historical accounts (in this issue).



Fig. 3. Us Serge 2's horse grave with three horses (2016). A horse was deposited intact, for the other two, only skins comprising the ends of the legs and skulls.

Рис. 3. Конское захоронение Ус Сэргэ 2 с тремя лошадьми (2016). Одна лошадь захоронена целиком, две другие представлены черепами и цельноснятыми шкурами с копытами.



Fig. 4. Photo and drawing of the muffs and links attached to the coat of Ordioгон 2 (2007).

Рис. 4. Фотография и рисунок муфт и шнурков, прикрепленных к пальто, из погребения Орджогон 2 (2007).

The world of the living. Our first studies in Central Yakutia showed that the Yakuts were closely linked with an environment specific to Yakutia, that of the *alaas* [Crubézy, Alexeev, 2007]. It is a landscape unique in the world which lends itself to the development of cattle breeding in this country where the soil is frozen to a very deep depth and only thaws to a depth of a few decimetres during the summer. The *alaas* are hemispheric depressions, from 3 to 40 m deep, which expand progressively.

In the summer they are filled with water and form lakes surrounded by wetlands. These small lakes are surrounded by natural grasslands and support the proliferation of large herbivores such as moose. With a limited effort, human populations were able to widen these prairies, by setting fire to them in September for example, and turn them into ideal grazing lands for domestic cattle and large game. In the Verkhoyansk region, *alaas* are rare in the East and completely absent in the foothills of the Chersky mountains. In all the *alaas* of the region, the Yakut occupation, materialised by remains of ancient Christian cemeteries (1850–1922), was systematic. This observation allowed us to understand the search by Yakuts of favourable zones for their settlement, and their settling in these zones each time they encountered them. The fact that these zones are rare and dispersed under the polar circle explains the progression of the Yakuts — which was quantified [Crubézy, Nikolaeva, 2017] — and their expansion over more than three million square kilometres extending in some places outside the borders of today's Yakutia.

At a cultural level, we showed that: (i) the cultural rupture around 1689 was linked to several economic factors, with the opening of the Nertchinsk trading post [Crubézy, Alexeev, 2007, 2012], but also to political factors with the end of the civil war in Yakutia and the seizure of power by the members of the Kangalasky clan [Crubézy, Nikolaeva, 2017]; (ii) the end of the «Golden Age», (an absolutely fabulous period of wealth for Yakut chiefs that begins after 1689) around 1750, initially thought of as linked to the opening of the Khiakhta trading post (2007, 2012), was in fact linked to a series of political and economic episodes that affected Yakutia for two decades [Crubézy, Nikolaeva, 2017]; (iii) the different archaeological phases of Christianisation may have been linked with historical events around these episodes (fig. 5). Moreover, the

significance of certain artefacts recovered from the tombs was understood using artefacts coming from museum collections [Crubézy, Gérard et al., 2017]. Beads and tokens from France, England or Nuremberg uncovered in the tombs were described in a review [Crubézy, Alexeev, 2012] as well as some depictions of representations of paired horse heads in Yakut Art [Alekseev, Crubézy, 2016].



Fig. 5. Woman early Christianized (grave of Siniges-2009).

Рис. 5. Женщина из раннехристианского погребения Синигес-2009.

We were able to demonstrate that horses adapt to cold environments [Librado et al. 2015] and we discovered a number of epidemics previously unknown and not described in the literature, notably smallpox [Biagini et al., 2012; Thèves, Biagini, Crubézy, 2014; Thèves, Crubézy, Biagini, 2016], and one of the largest epidemics of tuberculosis of European origin described in the literature [Dabernat et

al., 2014]. We also found evidence of a number of infectious diseases such as whooping cough and some dysentery epidemics [Thèves et al., 2011]. A study of cemeteries of European immigrants in Krasnoyarsk showed that the most frequent infectious disease among them was syphilis, including its congenital form [Dabernat et al., 2014]. Only one case of syphilitic bone disease was suspected among the indigenous Yakut population.

Evolution of the Yakut population from the origins to today: The first elements [Crubézy, Alexeev, 2007] developed later [Crubézy et al., 2010] and which come from the genetic data of the frozen bodies found in the graves indicate an important male founder effect on the Yakut population and a no less important female founder effect on the peopling of the peri-Baikal zone. A comparison of biological and cultural data allowed us to understand sampling bias and explain these founder effects [Zvenigorosky et al., 2017]. Before 1689, male lineages were very variable and foreign to the Yakut population. Apart from the Ht1 lineage, these male lineages (called haplotypes) are not found in the later or contemporary populations. Those haplotypes were clearly those of chieftains, whose successors were eliminated by the clan or allies of the Kangalasky clan (with the haplotype Ht1S1). Among the female lineages, from the onset we found a lineage more prevalent than others which seemed to be selected at the occasion of marriages among the Ht1S1 clan. It was notably the case of the wife of Mazary Bozekov, known archaeologically as At Daban 6. Later, the Ht1S1 lineage expanded to Vilyuy, Olekma and the districts of northeast Yakutia, and the Yakuts experienced a demographic expansion at the origin or colonial neolithization (cf. supra). Some Yakut chieftains were polygamous and had a large number of children. Certain paternal lineages (including Ht1) have a frequency of over 20 % in the contemporary population, making it unique among global populations from the world.

Methodological significance of our results

Our results show the potential of paleogenetics in cultural studies. We demonstrated that similarities between tombs was linked to genetic parental links and, conversely, dissimilarities between tombs 200 m apart and formerly attributed to different cultural periods were nevertheless those of a brother and sister.

The mis-attribution was linked to the precocious evolution of one of the individuals compared to the rest of Yakutia [Zvenigorosky et al., 2017]. In the same way, we showed that strong cultural disruptions (1689, the Yakut golden age) were not accompanied by a population change but only by the dominance of one clan over the others in this population.

For the first time in the history of anthropobiology, we demonstrated [Zvenigorosky et al., 2017] that, apart from demography, an ancient sample from a funerary group was not representative of the population living in this period. It is a significant finding which raises the question of the value of paleogenetic or anthropologic studies that don't take into accounts the archaeological and cultural context.

For the first time, our research demonstrates the value and the significance of studying in parallel archaeological, historical and paleogenetic data from an group well documented over a long time. Not all the historical phases proposed by different authors to divide the history of Yakutia have an archaeological correspondence. On the other hand, these archaeological phases had historical correspondences but these were not necessarily those on which historians focused their efforts. From the 19th century onward, from the time the Yakuts adopted the Russian orthodox culture, a remarkable correspondence was found. We deduct from this that archaeology was representative of the history of the Yakuts, while history was representative of that of Russians. This led us to completely reconsider the history of colonization, to raise the question of the conquerors and conquered and to propose new perspectives to understand the history of colonization in general [Crubézy, Nikolaeva, 2017].

Program for the future

Our main objective will be to understand the diffusion of Yakut culture from the south of Yakutsk to the polar circle and the modalities of contact with Europeans. In addition to pursuing the excavations that have been initiated, we will need to (i) find arangas (outdoor platforms on which the Yakuts deposited the dead that they would not bury) of Yakut and Tungusic populations and Yukaghirs and study them in order to study populations which did not bury their dead but deposited them on platforms; (ii) target sites of specific regions or certain tribes, to excavate Ostrog cemeteries to study imported diseases. In the laboratory, we will pursue our analyses but we will also continue to develop innovative methods to compare biological and cultural data. This will allow us to understand to which extent the diffusion of Yakut populations followed the displacement of populations or families, or the diffusion of ideas. Until now, we studied individuals [Zvenigorosky et al., 2017] but from now on the entirety of the population will need to be studied, and we therefore need to develop new statistical methods. Apart from these analyses, we will develop fine

historical analysis tools, to study the economic, historical, and infectious history, so as to get closer to the historical environment of biological discoveries.

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- Crubézy E., <https://orcid.org/0000-0001-9417-9053>
Melnichuk O., <https://orcid.org/0000-0002-5864-3434>
Alexeev A., <https://orcid.org/0000-0002-9488-573X>



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Accepted: 07.09.2020

Article is published: 27.11.2020