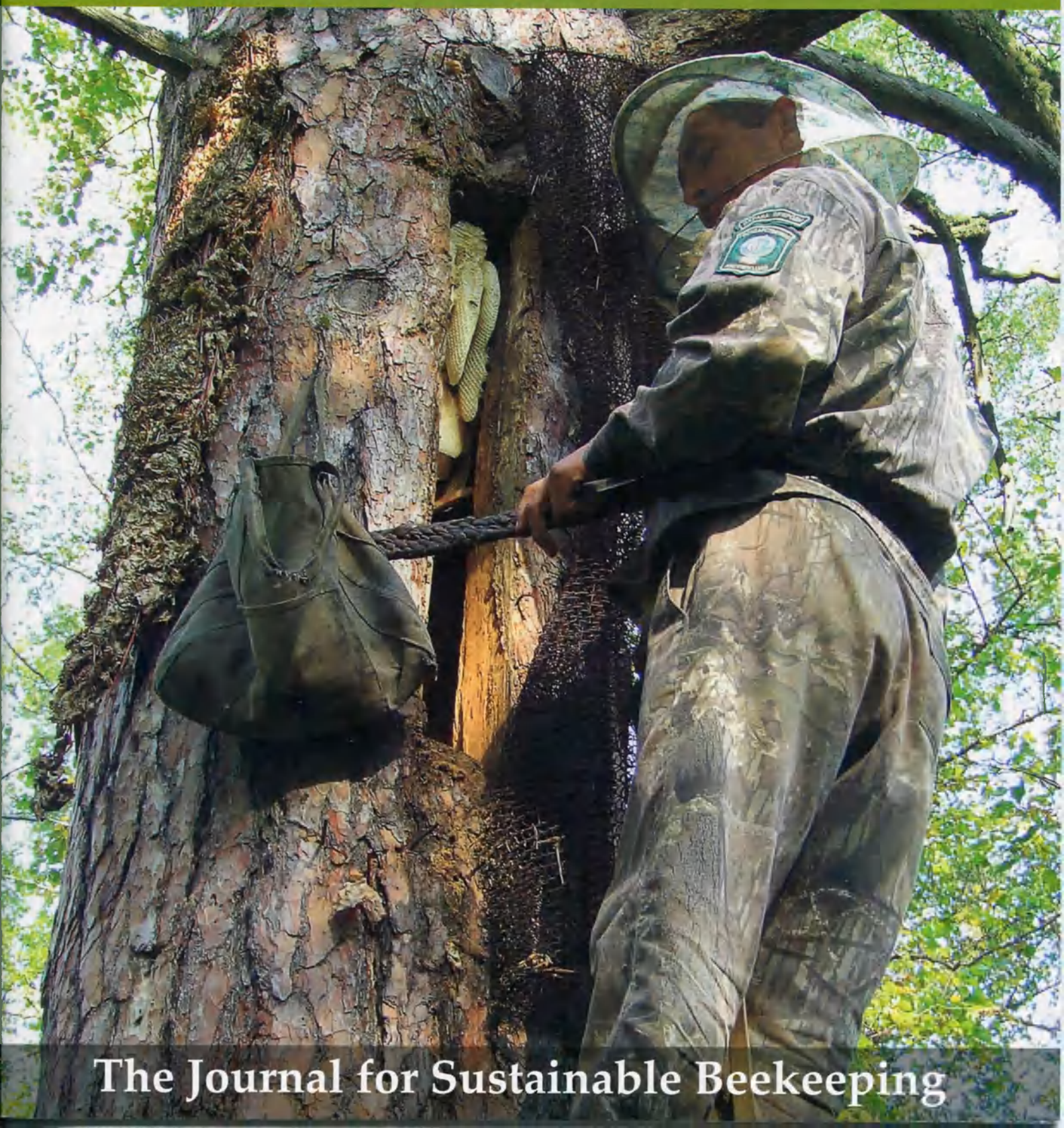
Bees *for* Development JOURNAL

114 – March 2015

- BURZYAN BEES
- NOSEMA CERANAE
- HONEY RETAIL TIPS
- WAX MOTH – FRIEND OR FOE?



The Journal for Sustainable Beekeeping

Dear friends

We hope that you enjoy reading this new style *Journal*: let us know what you think of our new look. We are delighted to bring you fresh news of European, extensive, local style beekeeping - ancient methods - still alive, well, and underway with European *Apis mellifera mellifera*, the European black bee, in Russia's Ural Mountains. Author Rustem Ilyasov mentions many intriguing aspects, among them that these methods have been practised since 500–600 years BC.

This *Journal* comes to you from Monmouth, county town of Monmouthshire in Wales in the west of the UK. Although a rural area, bees and other insect pollinators do not have an easy time here – farming practices and land development mean that every year there is less floral forage available.

Roadside verges and hedges used to be a great resource for bees, when verges were grazed by farm animals, or cut for hay and the mown grass and other plants taken away.

Nowadays there are no roadside grazing animals, the public expects to see 'tidy' roadsides, and the habit has developed for Councils to cut these verges regularly: even when flowers are in full bloom! Thus in Monmouth town, the regime (until now) was to cut 13 times during the year. Cuttings are left in place, adding nutrients to the soil and making it more fertile. Soil fertility is increased further by the huge amounts of fertilisers we use in agriculture, and further again by motor vehicle exhausts adding oxides of nitrogen to contribute more nutrients to these roadside verges. Many indigenous, herbaceous flowers, counter-intuitive as it may seem, need soil of low fertility to flourish well. When the nutrient level is too high, large and robust plant species out-compete the others. For these reasons, the biodiversity of roadside verges and odd scraps of land has gradually reduced and we are increasingly surrounded by green grass - just green concrete as far as bees are concerned.

Bees *for* Development has long been working in countries distant to us, to ensure better policies for bees and beekeepers. By 2013 it was compelling to begin work closer to home, and thus the new campaigning organisation *Bee Friendly Monmouthshire* was formed.

In fact the local County Council is legally required to show regard for biodiversity in all its actions, and readily adopted a new **Pollinator Policy**, reduced mowing, and created bee friendly plantings. During 2014 these activities proved an unexpectedly popular success - enjoyed by bees and taxpayers, and for which the Council received unprecedented public support. Win win win so far! We are continuing the campaign for a yet more *Bee Friendly Monmouthshire*.

Issue 114: March 2014

In this issue page

BfD Journal

Produced quarterly and sent to readers in over 130 countries

Editor: Nicola Bradbear PhD
Co-ordinator: Helen Jackson BSc

ISSN 1477-6588 © 2015
Printed on environmentally friendly paper

Subscriptions

Subscriptions cost £26 per year - see page 22 for ways to pay

Readers in developing countries may apply for a sponsored subscription. Apply online or use the form on page 24

BfD Trust

(UK Registered Charity 1078803) works to assist beekeepers in developing countries.

Support

Bees *for* Development Trust gratefully acknowledge Marr Manning Trust, E H Thorne (Beehives) Ltd, Size of Wales, The Waterloo Foundation, and the many groups and individuals who support our work. Please encourage your friends and colleagues to help. See our website for how to become a Supporter.

Bees *for* Development

1 Agincourt Street,
Monmouth, NP25 3DZ, UK
T: +44 (0)1600 714848
E: info@beesfordevelopment.org
www.beesfordevelopment.org

Cover picture

Beekeeper Syntimer Isyanguzhin, Inspector for Environmental Protection of *Shulgan-Tash* Nature Reserve Russia, visiting the European black honey bees he has been looking after in this hollow tree hive for 10 years. He has another 30 colonies living in trees in the Reserve.

The picture was taken by Hasan Yagudin (retired) Deputy Director for Environmental Protection of the Reserve (*Rustem Ilyasov*). More on pages 11–17

Burzyan bees in South Ural

R A Ilyasov[1], M N Kosarev[2], A Neal[3] and F G Yumaguzhin[1]

Key words: *Apis mellifera mellifera*, Bashkir beekeeping, biosphere, Burzyan wild hive bee, European black bee, gene pool, hollow tree hive, *Koloda* beekeeping, Russia

Summary

The hybridisation within honey bees in most European countries has led to loss of the European honey bee *Apis mellifera mellifera* gene pool. We believe that Russia still has pure populations of these European black bees. The most common honey bee, the Burzyan bee, is protected in the mountain forest zone of South Ural in the *Shulgan-Tash* State Nature Biosphere Reserve, the *Altyn Solok* Regional Nature Reserve and the *Bashkortostan* National Park. These bees nesting in hollow trees are of great interest for understanding the natural history of honey bees.

Evolution

The European black honey bee race of *Apis mellifera* is evolutionarily adapted to live in the continental long, cold winters of northern Eurasia. This race survives in a few isolated reserves. The largest areas are in Russia: about 300,000 colonies avoided hybridisation in the South Ural area of the Republic of Bashkortostan; about 200,000 colonies in the Middle Ural area (Shurakov *et al*, 1999; Ilyasov *et al*, 2006) and about 250,000 colonies in the Volga Region of Republic of Tatarstan (Krivtsov & Grankin 2004). We have information also about the large populations of this bee in the Altai Region of the Republic of Udmurtia. Of the European black bees in the South Ural, 99% are kept in frame hives in apiaries with 1% in natural and specially made tree hollows. The evolution of the European black bees was synchronous with the evolution of the widely distributed linden tree *Tilia cordata* and therefore the main forage crop for these bees is when these linden trees blossom (Kosarev *et al*, 2011).

Gene pool

Scientists at the Ufa Scientific Centre of the Russian Academy of Science have been monitoring the gene pool of the Burzyan honey bees for the last 20 years, using polymorphism of loci COI-COII of mtDNA and microsatellite loci ap243 and 4a110 of nuclear DNA. This extensive research confirmed the purity of the gene pool as a race of *Apis mellifera*

The Burzyan honey bee *Apis mellifera mellifera*

PHOTOS © RUSTEM A ILYASOV

mellifera (Sattarov, 2000; Nikolenko & Poskryakov 2002; Ilyasov *et al*, 2007b).

In 2011, at the request of the Institute of Beekeeping and *Shulgan-Tash* State Reserve, bees from this population were classified as a separate type: *Burzyan wild bee*. This was registered in the State Register Patent No 5956 on 14 June 2011 by the State Commission of the Russian Federation.

History

According to artefacts found at the *Bahmutin* culture burial site near Birsk, beekeeping in the southern Ural started 500-600 years BC among local Finno-Ugric tribes. Later beekeeping was adopted by Bashkir ancestors, who drove away the *Bahmutin* people (Kosarev *et al*, 2011).

This beekeeping does not require iron tools, and skills accumulated were passed on through many generations of hollow tree beekeepers (Kosarev *et al*, 1999).

Boards with *Tamga* signs in a local museum

Bashkir beekeeping flourished in the 18th century. It took longer to develop than in Belarus, Germany, Lithuania, Poland and central regions of Russia, however the Bashkir beekeepers developed more perfect, convenient and reliable tools and accessories. With special land tenure rights, the Bashkirs managed to avoid compliance with requirements of the Russian Forest Service, which

Tamga sign on a tree

in 1882 banned beekeeping in state forests "because of the risk of forest fires".

In the 19th century, due to deforestation and destruction of cultural traditions by the migrant population, Bashkir beekeepers developed Koloda beekeeping. Koloda uses handmade hollows inside tree trunks, made high up in a tree (Kosarev, 2014). Trees with *Koloda* were considered by Bashkirs as personal property and were marked with *Tamga*, the distinctive signs of tribal affiliation. Every beekeeper knew his mark and did not touch the property of others. Trees with *Koloda* and *Tamga* were kept by families for generations (Yumaguzhin, 2010).

A *Koloda* hollow tree hive. The beekeeper is using the *Lange* platform and *Kiram* belt

Hollow tree apiculture

In the second half of the 20th century Bashkir beekeepers began using movable-frame hives. Nevertheless despite the hard labour, hollow tree apiculture still continues in remote areas of the South Urals. Inspections of hollow tree bee colonies requires work as high as 16 m, and because they are located away from populated areas, the beekeeper has to travel on horseback 40-50 km each day (Yumaguzhin, 2010). Tools used by Bashkir beekeepers are mostly homemade and are similar to those used in other countries. However tools unique to the Bashkir beekeepers are the *Kiram* and the *Lange*. A *Kiram* is a braided leather belt up to 5 m in

Hollow tree hive

length used for climbing trees. A *Lange* is a small portable platform, which is fixed on the tree trunk with a rope (Kosarev, 2014).

In later centuries, when there were enough natural hollows in trees with bees, Bashkirs, like beekeepers around the world, in autumn would harvest all the honey from a colony and the bees that were left without reserves died. In spring, beekeepers would check these tree hollows, clean them and make them ready for fresh occupation by a swarm. This *killing colony* system was used until the 19th century and in some areas until the 1950s. The advantages of this system were considered to be that new comb was created every year, tree hollows rotted less, bees were rarely ill, their body size did not decrease and there was no inbreeding.

When the number of natural tree hollows declined sharply, beekeepers were forced to treat the wild bees with more care and leave sufficient honey for winter survival. As a result, colonies lived longer in the same place - up to 25 years!

In addition, Bashkir beekeepers began to keep wild bee colonies continuously for long periods in the same tree trunk hollow since

Kiram (a braided leather belt up to 5 m in length used for climbing trees), *Lange* (small portable platform which is fixed on the tree trunk with a rope) and a smoker fixed to a saddle

Climbing the tree

they had learned how to remove combs without damaging the colonies. But non-stop keeping of bees in the same hollows led to the decay of the nest more quickly than keeping bees in different hollows every year. Therefore wild beekeeping without change of nests reduces the service life of the hollows (Kosarev *et al*, 1999).

Wild bee colonies in the Ural area have many natural enemies that weaken the family and cause their death. These enemies are: brown bear *Ursus arctos*, European hornet *Vespa crabro*, forest mouse *Apodemus uralensis*, greater spotted woodpecker *Dendrocopos major*, pine marten *Martes martes*, red wasp *Dolichovespula rufa*, red wood ant *Formica rufa*, and wax moth *Galleria mellonella*.

They also could not avoid recent honey bee diseases and parasites, such as *Varroa destructor* (Ilyasov *et al*, 2014), *Nosema apis*, Chalkbrood *Ascosphaera apis* (Ilyasov *et al*, 2014), American foulbrood *Paenibacillus larvae*, and European foulbrood *Melissococcus pluton* (Kosarev, 1987; Bakalova, 2010).

Working at hive level

These problems are more severe in modern, movable-frame hives than in hollow tree hives. The populations of hollow tree bees have cyclical swings dependent on solar activity (Kosarev *et al*, 1999).

Biosphere

Currently, black European bees

Harvesting honey

exist in the southern Urals in the *Shulgan-Tash* State Reserve where they live in natural and handmade tree hollows. The Reserve was established in 1958 and it covers an area of about 22,000 ha. The bees live in the regional *Altyn Solok* Nature Reserve (90,000 ha) established in 1997, and the *Bashkiria* National Park (82,300 ha) formed in 1986 (Kosarev, 2008).

At the end of 2014, these three national parks had about 1,200 trees with *Koloda* handmade hollow tree hives but only 300 were occupied by bee colonies, while about 4,000 colonies were kept in apiaries in movable-frame hives. In 2012, these Reserves, together with others, were listed as specially protected areas, and acquired the status of biosphere with UNESCO, called *Bashkir Ural* complex, and a total area of 346,000 ha. The *Altyn Solok* Regional Reserve is protected by the Ministry of Environment of the Republic of Bashkortostan. To preserve the Burzyan honey bee, it is planned to expand the *Shulgan-Tash* State Reserve in a north-west direction through undeveloped territory between the Nugush and Uruk rivers (Kosarev *et al*, 2002; Yumaguzhin, 2009).

Apiaries in the *Shulgan-Tash* State Nature Biosphere Reserve

The staff from *Shulgan-Tash*, *Altyn Solok* and the *Bashkiria* National Park, together with local beekeepers, are constantly taking measures to increase the bee population and to carry on selection work to improve

Natural environment of the Burzyan honey bees

immunity, winter hardiness and productivity of the Burzyan bees.

This policy of state protected reservations allows us to save a unique population of these *Apis mellifera mellifera* bees in Eurasia, in the face of new threats from hybridisation and habitat destruction (Yumaguzhin, 2009; Kosarev *et al*, 2011).

A hard working, hollow tree beekeeper preparing his horse for the trip

Author details

[1]*Ufa Scientific Centre of the Russian Academy of Science, Institute of Biochemistry & Genetics, 450054, Russia*

[2] *Shulgan-Tash State Nature Reserve, Bashkortostan Republic, Irgizly, Zapovednaya 4, Russia*

[3] *c/o Ufa Scientific Centre of the Russian Academy of Science, Institute of Biochemistry & Genetics, 450054, Russia*

[4] *Zauralski Branch of Bashkir State Agrarian University, Bashkortostan Republic, Sibai, Pushkina 4, Russia*

References

BAKALOVA,M.V. (2010) Symbionts of honey bee in colonies of State Nature Reserve *Shulgan-Tash. Russian Journal of Beekeeping*. Vol 2: 12–13.

BRANDORF,A.Z.; IVOILOVA,M.M. et al. (2012) Population genetics differentiation of honey bees of Kirovskaya oblast. *Russian Journal of Beekeeping*. Vol 7: 14–16.

FARHUTDINOV,R.G.; ILYASOV,R.A. *et al.* (2014) Biological stimulator for honey bee colony productivity with fungicidal activity. *Biomics*. Vol 6 (2): 68-72.

ILYASOV,R.A; FARKHUTDINOV,R.G. *et al.* (2014) Influence of acaricides amitraz and fluvalinate on average daily egg and total honey productivity of honey bee colonies. *Biomics*. Vol 6 (2): 73-76.

ILYASOV,R.A.; PETUKHOV,A.V. *et al.* (2006) In the Urals preserved four populations of dark European bee *Apis mellifera mellifera* L. *Russian Journal of Beekeeping*. Vol 2: 19-20.

ILYASOV, R.A.; PETUKHOV,A.V. *et al.* (2007b) Local honey bee *Apis mellifera mellifera* L. populations in the Urals. *Russian Journal of Genetics*. Vol 43 (6): 709-711.

ILYASOV,R.A; POSKRYAKOV,A.V. *et al.* (2007) Saving *Apis mellifera mellifera* L. in the Udmurt Republic. *Russian Journal of Beekeeping*. Vol 6: 13-14.

KOSAREV,M.N. (2008). Saving of gene pool of Bashkir bees. *Russian Journal of Beekeeping*. Vol 7: 8–10.

KOSAREV,M.N. (1987) Burzyan wild bees and Varroosis. *Russian Journal of Beekeeping*. Vol 9: 12–13.

KOSAREV, M.N.; SHARIPOV, A.Y.A. *et al*, (2011) Saving of gene pool and breeding of Burzyan wild bees. *Materials of International Conference - Honey World*, Yaroslavl, Russia. pp 38–39.

KOSAREV,M.N. (2014) Wild bee beekeeping in the present: methodical recommendations for beginner wild beekeepers. Ufa: *Informreklama* p 50.

KOSAREV,M.N.; YUMAGUZHIN,F.G. *et al.* (1999) About dynamics of the number of bee colonies of Bashkir population, occupancy of hollow trees nest and hives *Koloda* in State Nature Reserve Shulgan-Tash. *Materials of International Conference: use of biologically active bee products in animal husbandry and veterinary medicine*. M Ufa: 118–121.

KOSAREV,M.N.;YUMAGUZHIN,F.G.; *et al.* (2002) The expansion area of the Nature Reserve *Shulgan-Tash* – is a way to saving the gene pool of native wild bees in the South Urals. *Proceedings of the Environmental Aspects of Yumaguzinski Reservoir. UfaGilem*: 114–124.

KRIVTSOV,N.I. (2011) The breed of bees for the northern regions of Russia. *Materials of the International Conference Honey World, Yaroslavl, Russia:* 25–26.

KRIVTSOV, N.I.; GRANKIN, N.A. (2004) Dark European bees breeding. *Rybnoe: GNU NIIP*. Pp 140.

NIKOLENKO,A.G., POSKRYAKOV,A.V.(2002) Polymorphism of loci COI-COII of mitochondrial DNA of *Apis mellifera* L. in South Urals . *Russian Journal of Genetics*. Vol 38 (4): 458–462.

SATTAROV,V.N. (2000) Population genetics polymorphism of Bashkir honey bees *Apis mellifera* L. *PhD thesis*.

SHURAKOV,A.I.; ESKOV,E.K. *et al.* (1999) Preservation of the gene pool of the dark European bee and the general ways of developments for beekeeping of the Perm region. *Perm Pedagogical University, Russia*.

YUMAGUZHIN,F.G. (2010) History and current state of wild Burzyan bees. *UfaGilem*: 07.

YUMAGUZHIN,F.G. (2009) The question about the expanding area of State Nature Reserve Shulgan-Tash. Orenburg State University, *Orenburg, Russia*. Vol 6: 461–463.