

Novel Divergent Rhabdovirus in Feces of Red Fox, Spain

Technical Appendix

Technical Appendix Table 1. Characteristics of RFFRV genes and intergenic sequences*

Gene	Length, nt	Length, aa	Conserved intergenic sequence between 2 ORFs†
N	1,629	542	<u>UAG-60nt-ACAAAAAAACUAACCUCAGCUAUG</u>
P	2,490	829	<u>UAA-75nt-UCAAAAAAACUAACACAAGCUCGAAUAUG</u>
M	813	270	<u>UAA-23nt-ACAAAAAAACUAACCUAAAACUAGGUUAUAUG</u>
G	2,010	669	<u>UAA-70nt-ACAAAAAAACUAACACAAGCUAUG</u>
U1	246	81	<u>UAA-29nt-ACAAAAAAACUAACACUACCUCGUGUUUAUG</u>
U2	231	76	NA
U3	459	152	<u>UAA-116nt-ACAAAAAAACUAACACUAUCUGUGUUUAUACAAACAUG</u>
L	6,591	2,196	NA

*NA, not applicable; ORF, open reading frame; RFFRV, red fox fecal rhabdovirus.

†Start and stopcodon of the flanking genes are underlined.

Technical Appendix Table 2. Pairwise amino acid identities between the L protein of RFFRV and other rhabdoviruses

	RFFRV	LNIV	BEFV	RABV	IHNV	RYSV	PRV	SIGMAV	VSIV	TBIV	BASV	FARV	LBV	SHIBV	OZEV
RFFRV		27	31	34	23	27	33	30	32	31	30	29	35	35	35
LNIV NC_007642	27		25	30	23	35	25	25	25	25	25	33	30	30	30
BEFV NC_002526	31	25		45	24	24	60	57	60	57	52	25	46	46	45
RABV SRV9 AAT48626	34	30	45		25	28	46	44	46	44	40	29	86	87	88
IHNV L40883	23	23	24	25		22	24	24	23	23	20	27	25	26	25
RYSV NC_003746	27	35	24	28	22		25	24	25	23	24	30	28	29	28
PRV HM566195	33	25	60	46	24	25		60	74	54	50	26	47	47	47
SIGMAV Q410979	30	25	57	44	24	24	60		59	52	48	23	46	45	45
VSIV AAA48441	32	25	60	46	23	25	74	59		53	51	27	47	46	46
TBIV GQ294472	31	25	57	44	23	23	54	52	53		52	24	43	43	42
BASV JX297815	30	25	52	40	20	24	50	48	51	52		23	41	41	41
FARV HM627182	29	33	25	29	27	30	26	23	27	24	23		28	28	28
LBV JX901139	35	30	46	86	25	28	47	46	47	43	41	28		92	86
SHIBV ADD84511	35	30	46	87	26	29	47	45	46	43	41	28	92		87
OZEV FJ905105	35	30	45	88	25	28	47	45	46	42	41	28	86	87	

Red Fox Fecal Rhabdovirus, Partial Genome (GenBank Accession No. KF823814)*

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ATTCTGTTATCAGGGCAACTTCACATGCTGGGAGATTGAGAGCCAGCTTAAAGCGAT
CGGAGCTGATCGGGCTAATAGGGACTGCTATCGGTGCCTCATGCTTGGTGTGAGCCA
TTTCTCATCCGCATGATTACTGCTTGTCTTGGAACCTTACAAGAATGGGGTGGATGT
TGTTTTGGGCAATGATAAAGGGAATATCAAGCCAATTGTGGTCAGAGCCTGGTCAG
GTGAGTCCACTCCTGTAACTATAACCCCAAAGGAACTCAAAAAGCCTGTTCATTCTA
TGGTGAGATACTTGGGGGGCTTATTGTGGAGCTCTGGTATTGATAGAATCACTCAA
GGTTAGAGTGGCTGGTAAGAGAAAAATATGAACTCGGCTTCTCGGAAGGGTACAAT
CACTTGGCAGTAGCCACTTGGGATAACGATACCTTAGACGTAGATCCATTGGAGTGT
ATAAGATGGGAGATGGAACAAGCTGCCGTCGAAGAAATCGATTTCTGGGGGGATAAT
TGATGAATAGCACTTGATTTCTAAAATAGTATCAGAGAAAAACAAAAACTAAAA
AACAAAAAACATATATACATATAAAATTAGGAGCAATAACTGAAGATCAAAGAG
CATTAAGAGATCTAAGAGAAAAAGAGAGAAGGACCTGGCAAAAAGCTAAAAGA
TAGAAATAAGGAAACAAAAGAATTTTCTGAGAGGGCAGCACATAAGGATGATAGG
GATCACATGAAGGCTTCGGGAACCTTGAAGCTTGTAaaaaaaAGCTCAAAGACAAAA
ATTGCAGAGAAGAGGGGAACCCAAGTTGCTCTGATTGCTGACTGGCGACATCTGAC
CATTTGCTCTTTTACTGAAAGACCAATCCTGATATAGATGACTTCTAGTTGTCTGGCT
ATGAGTGTGAGTATCGTACAAGGCATGGGTATGGGGGTATGGAGGGCAGCACCATT
GTGGGT

*Coding sequences of identified open reading frames are underlined; deduced amino acid sequences below, overlapping sequence of open reading frames U2 and U3 gene are in italics.

Deduced Amino Acid Sequences RFFRV Genes

N Gene RFFRV

MDHDNEKPISYTSIAEVPDNVAIGSTIYIQGEPIIYFGKSAATGITRKGGAQKDWTKDMIR
GVRVFLPQTDANLLNLIAGETEPELEKYTIQDPEKKGILKKFESKWEFANWANLLVDL
QSNTGNIPKGRFPYYSALFSITAIGAPVLAPAMKDLGDPVYVKAPDDLHPPTGDIEWH
GDKISVDEAAAYIGYGAWLIMPRFTIKAESKKDEIAASSKAFDTLRLLPEITKPQVLVSVV
TQLRLAYHGTLVPGSAYLAAEVAMRRAMNIEYDLKADRTECKAGEHFPGCQLRVLQDI
PQYDSGFWGFGQVGLEMAGYSALNMLHAGLDIYGKTIADLRMLINWRCYDNYIADEIK
EGPLLADDPWRAASYLLAPNIRTPLSMGKHSIVAYLGLSIQSAAANISTGAPSPPEGVKM
NELIRKTVYDHAVAIVSEWDNDRLQPSTVTTVMIGGQVIPFKGVDPKRVNDLSRMFTQR

QTPLYEVPPHNQRRERSPSVSSVHTSSRRDDEGSWEGGNEEELLRKLHERRGQYEEDTN
LGGFYSAT.

P Gene RFFRV

MANRVRKIHSVVS VNDPAEAWQVALQYWAKRILSTDKELLCRITKSMVAHMSV VYGN
VKLDCDAVWRVWALLALAWMKSPVDGIAMLALLEFGAKHVQRLRADLSKIGDPRIDD
FERLTNTSIARV PPKFFKENSITDDTKKKLEKAAAILSDLGKKCSYTGFCYADDSNVGD
MMSRVLTASGALGSEDPIGVWKPLELDEKAPYLFDEVKRIGGISAEKPSPEKKMCRLF
GKKGKFAAPETSYKSAHPFSTQVSSKEPPKLKVRGVELPSLDEVIGLLPKGAEAAELDD
TKELEGASAEPELADHAEPQLTQSRSDYQGDQNFTSSVLKASPPHGHSIDCDSSQIGASN
LSARSASLSPEWKEPDGATKGDDPEEVECANEI VGGNRRVSEEGCCLNEDTREEGSLQS
DQHPVKNYSSWAEFRASLESEVSPKHAEAAGSAIGHSHSPQAEAVMDSVGVASSTIKPL
KSGVTRPMQTDEPHAILEAGSQGITSLYPPLPVVPGVLLPSSLKSSLPPKAKGKFTEEFGL
MLRGIRRGLEERGLNWEAKWFDTHLEGIAKFGDPDTIGFQLGSYFAQLITNPYLKREET
KPSPKEDHAPPPPSAPRKESVNKFSQARPHSQVPTKEDPAPHPRAEEDPRSWMTGKPS
RVYLPGSDDVMEFRTNEAELDNFITSCVLEDKFTEPYILKPKELSKEQLKNLLEVVSQHG
QKASQLLCEHLTLRNYKSISALTANWAMKIKAE MPRSMGIYFTRLGEAYGNAFWALQ
VATAGREGIDKWIRAALVVKANTARGKVPPPGWFWVTTRAKDS DNPSVRARASALFKFL
NE.

M Gene RFFRV

MSNFRYTLMKFASKMSLTSSKSKYKVLGIGDELGQSNVNIHEGEEDHTSIYSESPSSKK
KTSRTMRPWVYPTYPEQKNIVRGTLRGARPKKVLSINLTGVSEPLDFPEVATVISDILD
GMEMSAMRKLVLQMMILSTRPMGRFSDGCYRYIFSNCFSTSCFPSSCLGEFMHDSGDFC
STTFDDKTYFGSYRLTFEDAIGSNHQYPLPLWFHLSYTNALKPDFTPGLAVCRACKGKFLI
YLDDKYFSFKTYS DNIVLLLMGRAPKAIKQK.

G Gene RFFRV

MYHLIVLLVMLGQRAVAEPADIARA AKIIQYAEERLRNKTGLRIELSSRDPAQSAASPPD
VPATKQPATKPAATTAAGTSAPIKVGLPESEYLRQVVEPWFTVCESKVPRTLTDVVHRIL
RKGDGKAHRMLRGTPNGDDHSVYTKFGSGISPAPSRLVVLSESLQEVQRPQLYRVSRLR
SSSTPHRVVLCEVMSAFSPLNVEEMECTGVLGKLSDTSSVTLNVVDPGYVLTMIRVCSC
SAMRVKRWTWTSFFNVKERLEDRWRIPDPKECESHCEPIFAGEVTSAVRGSVPDYCYA

WMSTCEVQGDVYQVSLGTAKFHRFLNQIRAPFIVDDPCTPSAPCKGSGDSLVLAKIEED
NPRFTTMNGELTPRYNWDTHKVYQVHLPGVTTSSILDASCGFLHGGYVYYQLMSGRIVS
VSVGTLQFGDKVKPPICTEWKGPYMPFVLPDSQVASTSEQLRQDLLHCQTRKEVVLNA
LTKRLPSITLFEGLGYKGSESYGLVSRKGLLYAAPCPSVEYTDLEHVEGNIWMVVNNG
REVGCLDGGLNFAVKSGCVVNPNASVSILLGEWKVISDRDGKLLAEPKAGWGSIPAL
ENISAAFGLDYLASLEQPPLWDDGNGPIIPTSNSTGDPVIHSGASSLWSSMSLASKITAILM
PLLSLAVVVGIIMCCRR.

U1 Gene RFFRV

MSCLTQDLRKEIRERSNSISQNPSVTTLIIIEVILWVGTLAYISIALGCHRYLQARIKNSVE
RRQRFRGDGVLLPDTGPA.

U2 Gene RFFRV

MEEKCSDSDYFKELTDAAIEGVWASPLYPITLATVIIFLILLIFVVAWRAAVIAKIRHRIDE
STARLRPDFGGRP.

U3 Gene RFFRV

MSPQH GASALISGVDPDHFSLIIESYPILVGNYAATLILTVTLVLSFSLATIIFSSVNNLT
DIRGVLIYHLGNEVSEFASHALAAVCSAQSTSARLTRELEQFRLSGQVTEVTPSSGATGE
LSIPQRYRMLLVEKDMLNEMFIAEHSLV.

L Gene RFFRV

MEKSFLDRIPDSVLHSPILREELCFCRPKETS DYP AIPQPDEFTISRRPELIELRSLSLTG
AISGVGCIKWLA YMRLNWIEAKDIMRLMAE EYQSSTIHPEIASDFNNVCEGLFSRLHDQ
WGENQHPSALQDIWNV FVAQYQSDA IIDNWT KYRILSAALLWSNHKERGNQSEFQNSII
AKAGWGVRAINGVEVITHKLLTKRERLGKLT VGAYWCLLELANQPPRLFRKSLLLCEK
DLYLQRWISLFLCNCQNAFGGIPLPQPKHLIKMYRMGD IILATEGNEGYN AIKTIESIMVG
SAHKQLEDE SISPTGDKFYEFITKXGLSACHLESSSAMRKIIHIGEIVTPEVAIEMAGCYR
HWGHPIINPVGGLTAVRENATAQLPTNERLMISLAADLNYLLLRSYFEEHGRWPPGVRY
EAAPEIAKDLFNK WVSTNQFPGPTSASQVRNSWFFVTYDSLFDKNQEIPILSLISDKSHSV
GRSALSTMCLKKNLLSPSRRVLQSTLSYAEIDVNKFLDSIDSTENGLSNDDL VILLREKE
RELKVKGRRFFSLMTYKLR TYFTATEYLI AKHILPVLPEITMMQGQIDLWKTFKGAVRTV
SQEKSTHHMIHVDFEKWNNFQREESTAPVFQIMDRAFGWSNVISRTHNFFSRCFVGYAG
RIDMFPIGLTDNWPWCWTGHKGGFEGLRQKGWSVVGALLIRHVMRLTGLHGKVLIQG

DNQVIILEYPLASSSNTSSLALERHRHSMKMTTHFLSVFSELSKSIGLRIKPEETWISSRMVY
YGKFPVIDGSARGMVLKKLKCRIFAISNDLTPSISNSISSLHTSCIAGCIQSSYAVPIYMFAIF
YGFLLHDFFEYNPLSMEPMIFTFRRALFGTTAVRDITKVRAPTTKDSIIISVARDWAPAS
NKQQSALGLDLLTRDSSLGGLGGASILKYMIRQFPDPVTEGLSFAKVGLSKAETPELKTI
FSSYGGLPIKSGSVELLEAPMSINLPSSSTRPVNVLRRFVEEKITQNMDTLVNNQLVYQA
LSMKQDMRPPFLKMCASLQPPFPFASLSYATPIGVAETIVGKFLGKTKTVARIALREGA
GQLGKKLVESEVELITTYLTVLKLKSALEHWGCSSKLADSYRSKSWGGQIWGVTVPHPAE
QFYLEWPMTSGCFKESLAWMNDFAEETVKVSLNERMIYGDTSPRSAGPMNPYLGGRS
ERSSVQSWLELETSSSIKRLVELINACGWAYQKGSHLHHAIKEMLTQLTGLVIPSDAVC
RITESGSLGHRFSDPRVSSGAMSATNYNTATHIAFSTNDLVRLKRGEDNYMVLFGGLFV
YFTSIIGELVRRGDNGSPTAHLHPKCEECMPCPDVSMELSNPVVPLYSMFLSPRLPNDL
TLPENLYVDIDPFKVKPDQIKTIVNIVPAYSTVSVDTLSGEEISDAISNVAIIAVTKTNPQ
GRWTLGIRTAIPVYAGYKCSWKVLKSKIVFWTFAMLAFRHINESEEHDCCEACQHILRK
QAADHWNLHNPTMLGGMLSNTDIIVELAKEQIALSAGFPISPMELSSAAGQSLFEQCVS
HGKEFSLPEFPKGVIALPRDMTGGGTPAYLIACMMCAYAGFFKGANTGPLKALAGLTTE
MKTSVIASQAFESEGVWSRLVDMLHENTSTLCCVLDIDFKTLTKRGQDVDHILPGSIPA
ISLDTVRGAYCIWNTASTTKGPESYLEEEGEPEVTQTPIMHLFRPILMSANGSIKILSVLK
TIQLQPKNVAVVGDGNGGFLRALLGLYPTAEFFFNLSSEMSNYGDQGEFTNYPACVLDS
PSDWGRVINLGEVLTLPDDLSSERWPSEVTKYWMKKCFDPDLLVCDAESYDSIKRSEILS
NLLKVCGRSHVIAKAHLSRMQDVQSLVNAHLHSHNVMYLRAPYSNWGKFEVYLWYT
RIVERNDMRYAPKDTYLMWTRAEFNAHPQLQLTAFHSWVFPHLEKDDRLRAVRRMLS
LRRHISR YTKIRPQELSRVERKAKEHGDMGFCELLLHYLGSKFISSMNNSVIRATSHAGR
LRASLKRSELIGLIGTAIGASCLVSAISHPHDYCLFLELYKNGVDVVLGNDKGNIPIVR
AWSGESTPVTITPKELKKPVHSMVRYLGGLLWSSGIDRITQRLEWLVRKYELGFSEGY
NHLAVATWDNDTLDVDPLECIWEMEQA AVEEIDFGGIIDE.