

**Computational alignment of  
Greek and Hebrew  
with Bible translations,  
using Swahili as a  
proof of concept.**

by David Instone-Brewer  
Tyndale House, Cambridge

a See Matt. 14:33  
 c For ver. 2-8, see Matt. 3:1-11; Luke 3:2-16  
 e Matt. 11:10; Luke 1:17, 76; 7:27; Cited from Mal. 3:1  
 f John 1:23; Cited from Isa. 40:3  
 g Luke 1:76  
 i John 1:6, 7  
 j Josh. 15:61; [Judg. 1:16]  
 k Acts 2:38  
 l ver. 15  
 m Matt. 26:28; [Luke 1:77]  
 n Acts 19:18  
 o [2 Kgs. 1:8; Zech. 13:4; Heb. 11:37]

# Mark 1

## John the Baptist Prepares the Way

- 1 The beginning of the **gospel** of Jesus Christ, <sup>a</sup> the Son of God. ▾
- 2 <sup>c</sup> As it is written in Isaiah the prophet ▾  
  - e "Behold, I send my messenger before your face, who will prepare your way,
- 3 <sup>f</sup> the voice of one crying in the wilderness:  
  - g "Prepare <sup>h</sup> the way of the Lord, make his paths straight,"
- 4 <sup>i</sup> John appeared, baptizing in <sup>j</sup> the wilderness and proclaiming <sup>k</sup> a baptism of repentance <sup>l</sup> for the forgiveness of sins. <sup>m</sup> 5 And all the country of Judea and all

Or crying: Prepare in the wilderness

### Vocab

εὐαγγέλιον  
 (euangelion) 'gospel'  
 (G2098)  
 gospel, good news; see also G2294

Search for this word (~77 occurrences)

### Meaning

glad tidings, good, or joyful news, Mt. 4:23; 9:35; **the Gospel**; doctrines of the Gospel, Mt. 26:13; Mk. 8:35; meton. **the preaching of**, or

BETA Feedback & contact

javascript:void(0)



← → **ESV** | THGNT | SpaRV1909 | CUNs | Mar 1



**Mark 1:1**

(ESV) The beginning of the **gospel** of Jesus Christ, the Son of God.

(THGNT) Ἀρχὴ τοῦ **εὐαγγελίου** Ἰησοῦ χριστοῦ υἱοῦ θεοῦ·

(SpaRV1909) PRINCIPIO del **evangelio** de Jesucristo, Hijo de Dios.

(CUNs) 神的儿子，耶稣基督**福音的**起头。



**Mark 1:2**

(ESV) As it is written in Isaiah the prophet

“Behold, I send my messenger before your face,  
who will prepare your way,

(THGNT) καθὼς γέγραπται ἐν τῷ Ἡσαΐα τῷ προφήτῃ· ἰδοὺ ἀποστέλλω τὸν ἄγγελόν μου πρὸ προσώπου σου, ὃς κατασκευάσει τὴν ὁδόν σου.

(SpaRV1909) Como está escrito en Isaías el profeta: He aquí yo envío á mi mensajero delante de tu faz, que apareje tu camino delante de

**gospel** (*euangelion* - εὐαγγέλιον) – gospel, good news; see also G2294

glad tidings, good, or joyful news, Mt. 4:23; 9:35; the Gospel; doctrines of the Gospel, Mt. 26:13; Mk. 8:35; meton. the preaching of, or instruction in, the Gospel, 1Cor. 4:15; 9:14 ...

(Occurs 77 times in the Bible.) - Click on the word to see more information.



ESV THGNT SpaRV1909 CUNs Mar 1



**ESV 1:1**

The beginning of the **gospel** of Jesus Christ, the Son of God.

**εὐαγγελίου**  
**evangelio**  
**福音的**



THGNT

Ἀρχὴ Ἰησοῦ χριστοῦ υἱοῦ θεοῦ

SpaRV1909

PRINCIPIO de Jesucristo de Jesucristo, Hijo de Dios

CUNs

起头, 耶稣基督儿子神的

**ESV 1:2**

As it is written in Isaiah the prophet, "Behold, I

THGNT

[which/how] γέγραπται ἐν προφῆτῃ ἰδοὺ

SpaRV1909

Como está escrito en profeta : He aquí

CUNs

正如 以赛亚 (有古卷无以赛亚三个字) 书上记著 正如 先知 说: 看哪

send my messenger before your face, who will prepare your way,

**gospel (euangelion - εὐαγγέλιον)** -- gospel, good news; see also G2294

glad tidings, good, or joyful news, Mt. 4:23; 9:35; the Gospel; doctrines of the Gospel, Mt. 26:13; Mk. 8:35; meton. the preaching of, or instruction in, the Gospel, 1Cor. 4:15; 9:14 ...

(Occurs 77 times in the Bible.) - Click on the word to see more information.

GEN 1.1	→	In the	→	beginning	→	<b>	<07225>
GEN 1.1	→	,	→	God	→	<00430>	
GEN 1.1	→		→	created	→	<01254a>	
GEN 1.1	→	the	→	heavens	→	<00853>	<h> <08064>
GEN 1.1	→	and the	→	earth	→	<v>	<00853> <h> <00776>
GEN 1.1	→	.	→				
GEN 1.2	→	The	→	earth	→	<v>	<h> <00776>
GEN 1.2	→		→	was	→	<01961>	
GEN 1.2	→		→	without form	→	<08414>	
GEN 1.2	→	and	→	void	→	<v>	<00922>
GEN 1.2	→	, and	→	darkness	→	<v>	<02822>
GEN 1.2	→	was	→	over	→	<05921a>	
GEN 1.2	→	the	→	face	→	<06440>	
GEN 1.2	→	of the	→	deep	→	<08415>	
GEN 1.2	→	. And the	→	Spirit	→	<v>	<07307>
GEN 1.2	→	of	→	God	→	<00430>	
GEN 1.2	→	was	→	hovering	→	<07363>	





a Mal 3:1; Mt

11:10; Yn

3:28

b 1:2-8) Mt

3:1-12; Lk

3:1-18; Yn

1:19-30

c Isa 40:3

d 2 Fal 1:8;

Zek 13:4

e Mdo 13:25

f Lk 2:51

g 1:9-11) Mt

3:13-17; Lk

3:21-22; Yn

1:31-34

h Mwa 22:2;

Zab 2:7; Isa

42:1; Mt 3:17;

12:18; Mk

## Mark 1

**1** Mwanzo wa Injili ya Yesu Kristo, Mwana wa Mungu. **2** <sup>a</sup> Kama ilivyoandikwa katika nabii Isaya,

Tazama, namtuma mjumbe wangu  
Mbele ya uso wako,

Atakayeitengeneza njia yako. <sup>b</sup>

**3** <sup>c</sup> Sauti ya mtu aliaye nyikani,  
Itengenezeni njia ya Bwana,  
Yanyosheni mapito yake.

**4** Yohana alitokea, akibatiza nyikani, na kuuhubiri ubatizo wa toba liletalo ondoleo la dhambi. **5** Wakamwendea nchi yote ya Yudea, nao wa Yerusalemu wote, wakabatizwa katika mto wa Yordani,

a See Matt.

14:33

c For ver. 2-8,  
see Matt. 3:1-  
11; Luke 3:2-16

e Matt. 11:10;  
Luke 1:17, 76;

7:27; Cited  
from Mal. 3:1

f John 1:23;  
Cited from  
Isa. 40:3

g Luke 1:76

i John 1:6, 7

j Josh. 15:61;

[Judg. 1:16]

k Acts 2:38

l ver. 15

m Matt. 26:28;

[Luke 1:77]

n Acts 19:18

o [2 Kgs. 1:8;

Zech 12:4;

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make his paths straight,"

**4** <sup>i</sup> John appeared, baptizing in <sup>j</sup> the wilderness  
and proclaiming <sup>k</sup> a baptism of <sup>l</sup> repentance <sup>m</sup> for  
the forgiveness of sins. **5** And all the country of  
Judea and all Jerusalem were going out to him  
and were being baptized by him in the river

# Swahili verb prefixes & suffixes

## Prefixes:

Negative	ha
Subject	ni, u, a, tu, m, wa, i, ki, vi, zi, ya, li, mwa, twa, cha, vya, kwa, n, ku, pa, mu, na, la, za, si, hu, u, a
Late Negative	si
Continual	ka
Tense	na, li, ka, me, ta, nge, lipo, ki, ku, sha, hu, singali, ngali, singe, japo, nga, lo, to, ja, sipo, si
Continual2	ka
Relative particle	yo, cho, vyo, po, ye, o, lo, zo, ko, mo
Object	ni, ku, yu, tu, wa, i, ki, vi, zi, ya, li, ji, m, u, pa, mu, mw, tu, kw

## ROOT

e.g. aga, dai, faa, fua, iba, iga, ita, jaa, jua, kaa, kua, lea, lia, oga, ona, ota, oza, pia, poa, tia, toa, tua, uma, uza, vaa, vua, vua, zaa, fa, la, oa, pa, ua, wa

[up to 3 Suffixes]  
Mood vowel

File 1: Source file (English)  
I gave him the book .  
He read the book .  
He loved the book .

File 2: Target file (French)  
Je lui donne le livre .  
Il a lu le livre .  
Il aimait le livre .

**Berkeley Aligner**

File 3: Alignment  
1-1 2-3 3-2 4-4 5-5 6-6  
1-1 2-3 3-4 4-5 5-6  
1-1 2-2 3-3 4-4 5-5



Approve Verse | 
 [→ Next Unapproved Verse](#) | 
 Gloss Phrase... | 
 Export To Text...

23 Ἴδου ἡ παρθένος ἐν γαστρὶ ἔξει καὶ τέξεται υἱόν  
 Behold be worldly in pregnant sell and call son  
 καὶ καλέσουσιν τὸ ὄνομα αὐτοῦ Ἐμμανουήλ ,  
 and — the name his — ,  
 ὃ ἐστὶν μεθερμηνευόμενον <sup>\qt</sup> Μεθ ἡμῶν ὁ θεός  
 which is which means With our say god

## <MorphGroup>

<root xsi:type="StemRoot" type="Stem" Stem="anza" />

<glossItem xsi:type="SemanticItem" str="RSV52:[begin]" />

## <morphGroupInfls>

### <InflSet>

<infls xsi:type="PrefixInfl" prefix="ilipo" />

<infls xsi:type="SuffixInfl" suffix="" />

### </InflSet>

### <SurfForms>

<string>ilipoanza</string>

### </SurfForms>

Mat.1:1 G0976 G1078 G2424 G5547 G5207 G1138 G5207 G0011  
Mat.1:2 G0011 G1080 G3588 G2464 G2464 G1161 G1080 G3588 G2384  
G2384 G1161 G1080 G3588 G2455 G2532 G3588 G0080 G0846

Mat.1:1 Yesu Kristo ali- kuwa m- zawa wa Daudi m- zawa wa Abrahamu Hii  
ndiy -o orodha ya ukoo wake  
Mat.1:2 Abrahamu ali- mzaa Isaka ali- mzaa Yakobo ali- mzaa  
Yuda na ndugu zake

Matt.1:1 7-8 3-1 2-0 1-11 6-7 5-5 4-4  
Matt.1:2 0-0 14-9 16-10 17-11 15-9 8-5 11-7 13-8 6-4 9-6 3-2 4-3 1-1

Left # = word# in Hebrew/Greek original; Right# = word# in translation.  
Highlight = prefixes and suffixes that are removed

# sort

## sorted

### abud

akaabudu  
akiabudu  
humwabudu  
kukiabudu  
mnaabudu

### achan

ameachana

### achi

akamwachia  
asingaliachiwa  
kutuachia  
nikuachie

### achili

akaachilia  
amemwachilia

## sorting

akaiabudu  
ataabudu  
hutaiabudu  
kumwabudu  
mnamwabudu

kuachana

akamwachisha  
asingalituachia  
kuwaachia  
nitawaachisha

akamwachilia  
ataachiliwa

## unsort

akamwabudu  
atamwabudu  
hutamwabudu  
kuviabudu  
mtamwabudu

niliachana

akawaachia  
hawataachiwa  
lisiachilie  
ukawaachilie

akawaachilia  
ataliachilia

## re-sort

akauabudu  
hamtamwabudu  
kuabudu  
kuwaabudu  
ninaryomwabudu

nilipoachana

aliiachia  
hukuachia  
mmeachiwa  
wasikuachie

akuachilia  
hakuuachilia

## consort

akaziabudu  
huabudu  
kuiabudu  
kuziabudu  
tukaabudu

utaachana

amewaachia  
huwaachia  
nawaachieni  
wataachiwa

aliyeachiliwa  
hakuwaachilia



00 Ref in Heb»	Hebrew»	Westminster Morph»	Lexical tagging»	»	Gloss
01_Gen.001.001-01»	בְּרֵאשִׁית+בראשית	Pp/ncfsa»	H9003#1=b/HN{H7225#4=יתשית=first}»		in.beginning
01_Gen.001.001-02»	בָּרָא=ברא	vqp3ms»	HV{H1254a#4=ברא=to create}»		he.created
01_Gen.001.001-03»	אֱלֹהִים+אלהים	ncmpa»	NT{H0430#4=אלהים=God}»	»	God
01_Gen.001.001-04»	אֶת+את	Po»	HP{H0853#4=את=obj.}»	»	(et)
01_Gen.001.001-05»	הַשָּׁמַיִם+השמים	Pa/ncmpa»	H9009#1=h/HN{H8064#4=שמים=heaven}»		the.heavens
01_Gen.001.001-06»	וְ/אֶת+את	Pc/Po»	H9002#0=c/HP{H0853#4=את=obj.}»		and.(et)
01_Gen.001.001-07»	הָאָרֶץ+הארץ	Pa/ncfsa»	H9009#1=h/HN{H0776#4=ארץ=land}\H9016#7=:»		the.earth
01_Gen.001.002-01»	וְ/הָאָרֶץ+והארץ	Pc/Pa/ncfsa»	H9002#0=c/H9009#1=h/HN{H0776#4=ארץ=land}		and.the.earth
01_Gen.001.002-02»	הָיְתָה+היתה	vqp3fs»	HV{H1961#4=יהי=to be}»	»	it.was
01_Gen.001.002-03»	תָּהוּ+תהו	ncmsa»	HN{H8414#4=תהו=formlessness}»		formlessness
01_Gen.001.002-04»	וְ/בָהוּ+ובהו	Pc/ncmsa»	H9002#0=c/HN{H0922#4=בהו=void}»		and.emptiness
01_Gen.001.002-05»	וְ/חֹשֶׁךְ+וחשך	Pc/ncmsa»	H9002#0=c/HN{H2822#4=חשך=darkness}»		and.darkness
01_Gen.001.002-06»	עַל+על	Pp»	HP{H5921a#4=על=upon}»	»	[was].over
01_Gen.001.002-07»	פָּנָיו+פני	ncbpc»	HN{H6440#4=פנה=face}»	»	the.surface
01_Gen.001.002-08»	תְּהוֹמוֹת+תהום	ncbsa»	HN{H8415#4=תהום=abyss}»	»	of.the.deep
01_Gen.001.002-09»	וְ/רוּחַ+ורוח	Pc/ncfsc»	H9002#0=c/HN{H7307#4=רוח=spirit}»		and.the.spirit
01_Gen.001.002-10»	אֱלֹהִים+אלהים	ncmpa»	NT{H0430#4=אלהים=God}»	»	of.God
01_Gen.001.002-11»	מְרַחֵף+מרחפת	vpPfsa»	HV{H7363b#4=רחף=to hover}»		[was].hovering
01_Gen.001.002-12»	עַל+על	Pp»	HP{H5921a#4=על=upon}»	»	over
01_Gen.001.002-13»	פָּנָיו+פני	ncbpc»	HN{H6440#4=פנה=face}»	»	the.surface
01_Gen.001.002-14»	הַמַּיִם+המים	Pa/ncmpa»	H9009#1=h/HN{H4325#4=מי=water}\H9016#7=:»		of.the.waters



אֶכְפֹּרָה פָּנָיו בַּמִּנְחָה הַהִלְכָת לְפָנָיו

וְאַחֲרֵי־כֵן אֶרְאֶה פָּנָיו אוֹלִי יִשָּׂא פָּנָיו

**Gen.32.20 translated word-by-word:**

“I may cover his face with the gift that goes to my face.  
After that I will see his face. Perhaps he will lift my face.”

**Gen.32.20 translated literally (taking idioms into account):**

“I may appease him with the gift that goes ahead of me.  
After that I will see him. Perhaps he will accept me.”

**Gen.32.20 translated into normal English:**

“I may appease him with the gift I have sent ahead.  
Then, when we meet, perhaps he will accept me.”

## To weep:

דָּמַע (da.ma - H1830) 'to weep'	occ. 1x
דִּמְעָה (dim.ah -H1832) 'tears / weeping'	occ. 22x
בָּכָה (ba.khah - H1058) 'to weep'	occ. 99x
בְּכִית (be.khit - H1068) 'weeping'	occ. 1x
בְּכִי (be.khi - H1065) 'weeping'	occ. 29x
בִּכְּהָ (be.kheh - H1059) 'weep bitterly'	occ. 1x
δακρῦω (dakruō - G1145) 'to weep'	occ. 1x
δάκρυον (dakruon - G1144) 'teardrop'	occ. 11x
κλαίω (klaiō - G2799) 'to weep'	occ. 34x
κλαυθμός (klauthmos - G2805) 'weeping'	occ. 9x



Stanford  
ARTIFICIAL  
INTELLIGENCE



# Plant, flora, plant life

(botany) a living organism lacking the power of locomotion

127  
pic

Numbers in brackets: (the number of synsets in the subtree).

- ImageNet 2011 Fall Release
  - plant, flora, plant life
    - phytoplankton (2)
    - microflora (0)
    - crop (9)
    - endemic (0)
    - holophyte (0)
    - non-flowering plant (1)
    - plantlet (0)
    - wilding (141)
    - ornamental (1)
    - pot plant (0)
    - acrogen (0)
    - apomict (0)
    - aquatic (0)
    - cryptogam (1)
    - annual (0)
    - biennial (0)
    - perennial (1)
    - escape (0)

## Treemap Visualization

## Images of the Synset

ImageNet 2011 Fall Release > Plant, flora, plant life

### Vascular



### Autophyte



### Perennial



### Biennial



### Aquatic



### Garden

1	\$01_Gen.001.021			
2	Y	001-c<{=}		
3	crió	002-H1254a{to create=אָבַר}		
4	Dios	003-H0430{God=אֱלֹהִים}		
5	las	004-H0853{obj.=אֵת}		
6	grandes	008-H1419a{great=גָּדוֹל}		
7	ballenas,	006-H8577b{serpent=תַּנִּין}		
8	y	009-c<{=}		
9	toda	011-H3605{all=כֹּל}		
10	cosa			
11	viva	012-H5315{soul=נְפֹשׁ}	*#013-d<{=}	*014-H2416a{alive=חַי}
12	que	015-d<{=}		
13	anda			
14	arrastrando,	016-H7430{to creep=רָמַשׁ}	*#018-H8317{to swarm=צָרַח}	
15	que	017-H0834a{which=אֲשֶׁר}		
16	las	019-d<{=}		
17	aguas	020-H4325{water=מַי}		
18	produjeron	=018-H8317{to swarm=צָרַח}		
19	según	=022-H4327{kind=מִין}		



Lexical value»	English»	Swahili»	»	Lexical value»	English»	Swahili»	»
G0001= Α	{alpha}	alfa		G0020= αγαλλιασις»	{joy}	furaha, kwak	
G0002= Ααρων»	{Aaron}	aroni		G0021= αγαλλιαω»	{to_rejoice}	furahi, shangilia, kitambo	
G0003= Αβαδδων»	{Abaddon}	apolioni		G0022= αγαμος»	{unmarried}	jishughulisha, hawajaoana	
G0004= αβαρης»	{not_burdensome}	nisiwe, nilete		G0023= αγανακτεω»	{to_be_indignant}	kasirika, wakasirikia, chukiz	
G0005= Αββα»	{Father}	aba, kavyo, hulia		G0024= αγανακτησις»	{indignation}	shtuka, jitihada	
G0006= Αβελ»	{Abel}	abeli		G0025= αγαπαω»	{to_love}	pend, mpend, wapend	
G0007= Αβια»	{Abijah}	abiya, abia		G0026= αγαπη»	{love}	upend, pend	
G0008= Αβιαθαρ»	{Abiathar}	abiathari		G0027= αγαπητος»	{beloved}	penzi, rafiki	
G0009= Αβιληνη»	{Abilene}	abilene		G0028= Αγαρ»	{Hagar}	hagari	
G0010= Αβιουδ»	{Abiud}	abiudi		G0029= αγγαρευω»	{to_force}	lazimish	
G0011= Αβρααμ»	{Abraham}	abrahamu		G0030= αγγειον»	{jar}	chupa, vyao	
G0012= αβυσσος»	{abyss}	zimu, shimo, utia		G0031= αγγελια»	{message}	liyoisiki, ndio	
G0013= Αγαβος»	{Agabus}	agabo		G0032= αγγελος»	{angel}	malaika	
G0014= αγαθοεργεω»	{to_do_good}	mema, waamuru		G0034= αγελη»	{herd}	teremk, chung	
G0015= αγαθοποιεω»	{to_do_good}	mema, tend		G0035= αγενεαλογητος»	{without_genealogy}	hawatajwi, haisemwi	
G0016= αγαθοποια»	{doing_good}	wanaoteseke		G0036= αγενης»	{lowly}	nayodharauliwa, ayafutilie	
G0017= αγαθοποιος»	{doing_good}	wasifu		G0037= αγιαζω»	{to_sanctify}	wakfu, takas	
G0018= αγαθος»	{good-doer}	mema, wema, njema, jema		G0038= αγιασμος»	{holiness}	takatifu, zina	
G0019= αγαθωσυνη»	{goodness}	timiz, fadhili, kamili		G0039= αγιον»	{holy}	hali, takatifu	







← → SRUV\_TH | ESV | SBLG | Mat 1



**SRUV\_TH 1:1**

ESV  
SBLG

Kitabu	cha	ukoo	wa	Yesu	Kristo,	mwana	wa	Daudi,	mwana	wa	Abrahamu.
The book	of the	genealogy	of	Jesus	Christ,	the son	of	David,	the son	of	Abraham
Βίβλος	γενέσεως	Ἰησοῦ	χριστοῦ	υἱοῦ	Δαυιδ	υἱοῦ	Ἀβραάμ.				

**SRUV\_TH 1:2**

ESV  
SBLG

Abrahamu	alimzaa	Isaka;	Isaka	akamzaa	Yakobo;	Yakobo	akamzaa	Yuda	na	ndugu	zake;				
Abraham	was the	father	of	Isaac	Isaac	the	father	of	Jacob	Jacob	the	father	of	Judah	brothers
Ἀβραάμ	ἐγέννησεν	Ἰσαάκ,	Ἰσαάκ	ἐγέννησεν	Ἰακώβ,	Ἰακώβ	ἐγέννησεν	Ἰουδαν	ἀδελφούς						

**SRUV\_TH 1:3**

ESV  
SBLG

Yuda	akamzaa	Peresi	na	Zera	kwa	Tamari;	Peresi	akamzaa	Esromu;	Esromu	akamzaa	Aramu
Judah	the	father	of	Perez	Zerah	by	Tamar	Perez	the	father	of	Ra
Ἰούδας	ἐγέννησεν	Φαρῆς	Ζάρα	ἐκ	Θαμάρ,	Φαρῆς	ἐγέννησεν	Ἐσρόμω,	Ἐσρόμω	ἐγέννησεν	Ἀράμ	

**SRUV\_TH 1:4**

ESV  
SBLG

Aramu	akamzaa	Aminadabu;	Aminadabu	akamzaa	Nashoni;	Nashoni	akamzaa	Salmoni;						
Ram	the	father	of	Amminadab	Amminadab	the	father	of	Nahshon	Nahshon	the	father	of	Salmon
Ἀράμ	ἐγέννησεν	Ἀμιναδάβ,	Ἀμιναδάβ	ἐγέννησεν	Ναασσών,	Ναασσών	ἐγέννησεν	Σαλμών,						