



தொடர்புக்கு:

இந்திய வாசனைப்பயிர்கள் ஆராய்ச்சி நிறுவனம்
(இந்திய வேளாண்மை ஆராய்ச்சிக் கழகம்)
கோழிக்கோடு – 673 012, கேரளா
போன் 0495 – 2731410
E-mail: atic.spices@icar.gov.in
Website: www.spices.res.in



இஞ்சி



हर कदम, हर डगर
किसानों का हमसफर
भारतीय कृषि अनुसंधान परिषद

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கோழிக்கோடு – 673 012, கேரளா



, " rþ;- rhFgo Elg ' f s;

bjhFgghshf s;

rþ. rhu jhkghs;

f. mHF gHK jþhþ;nrh i y

, uh. rþ tu" r dþ

br s. Mh;j jþ

J. gþurh j;

tþ. _ dþ thr d;

br.nk. bre;j þy;Fkhh;

bt sþaþLg th;

reþ jh #; n\$ h. <gg d;

, a fþF dh;

, e;j þa thr i dggaþh,f s;Muhaþþþ eþW t d k;

nfhHþfþfhL/ nfush

brg;l kgh;2020

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Mission for Integrated Development of Horticulture

Government of India

ml;i l tot i kgg[

v. R jhfud;

, " r

, " r xU bghUshjhu K f f a j j t k] t h a e j g y y h z l t h G k] F W " b r o , d j j i j r] n r h e j t h r i d g] g a u h F k] , J t h r i d g] g a u h f k l] k y y h k y ; g y n e h a f S f F k U e j h f t k] g a d g L f w J . , e j p a h , " r c w h j j p a y ; c y f n y n a K j d ; i k a h f j] j p f H f w J . m j h t J 2018-19 M k] M z p y ; 1,73,578 b Q f h l h] e y g h u g h p y U e ; J 18.5 y l j k] l d f s ; c w h j j p b r a j s s J . , " r a h d J , e j p a h t p y ; g y k h e y ' f s p y ; g a h p l g h l t e j h Y k] F w g h f f h e h l f h / k j j p a g u n j r k] x o r h / m ! ; ! h k] n k f h y a h / m U z h r j y g h u n j r k] k w W k] F \$ u h j] n g h d w k h e y ' f s p y U e ; J 65 r j t j k] r h F g o b r a a g h L f w J .

f h y e i y k w W k] k z ;

, " r k j b t g h k] k w W k] < u g h j K s s f h y e i y a y ; e d w h f t s u f] T o a J . , J f l y ; k l] j j p y U e ; J 1500 k l] l h] c a u k] t i u k h d h t h h a h f t k] e h h r d j j l D k] g a h] b r a a g h L f d w J . e l t p y U e ; J f p H ' F f s ; K i s f F k] t i u k j k h d k i H a k] g a h] t s U k] r k a j j p y ; e y y g u t y h d k i H a k] m W t i l f F x U k h j j j p w F K d g [c y h e j f h y e i y a k] , " j p r h F g o f F k f t k] c f e j J . e y y t o f h y ; t r j p a l d ; T o a k l F k] b g h U s ; e p i w e j b r k k z] f y e j b r k h [i w k z] k w W k] f s p k z] f y e j b r k h [i w k z] z p y ; m k p y f h u j j d ; i k 6 - 6.5 y ; e d w h f t s u f] T o a J . b t g h e p i y 19° b r y r p a ! ; - 28° b r y r p a ! ; k w W k] < u g h j k] 70 - 90 r j t j k] , " r p f F k f t k] c f e j J . , " r r j j p f f i s m j p f k] < h f F k] j d ; i k b f h z j] g a u h F k] v d n t x n u e y j j p y ; , " r p i a x t p t h U t U l K k] g a h p l f j T l h J .

, u f ' f s ;

, e j p a h t p y ; b t t j t W , l ' f s p y ; r h F g o b r a a g h L k] g y n t W , u f ' f s ; m i t g a h p l g h L k] , l ' f i s f] b f h z l b g a h p l g h L f d w d . k h u d ; F U g h k h o / V h e h L / t a e h L / Q p k h r j y ; k w W k] e h o a h v d g d e k] e h l p y ; K f f p a k h d , u f ' f s h F k] , J n g h y h p n a h - o b \$ d p n u h v d w b t s p e h l , u f k] t p t r h a f s p i l n a k f t k] g u r p j j p b g w j v J . , " r p a y ; c a h] t p i s r j y ; , u f ' f S k] m i t f S i l a r p w g h [m k] ' f S k] m l] t i z - 1 y ; b f h L f f g h l] s s d .

ml] t i z 1. , "]a d; c ah] t i s r] y; , u f '] s; k w] m i t f s d; r w g] k] '] s;

, u f k k w] m i t f s d; r w g] k] '] s;	ruhrh p k f R] y (l d; b Q - gr] i r)	t a J (e h l] f s)	c y h j p w d (%)	T l] L e h h (%)	x y] n a h b u r] d (%)	e W k z v z p z a; (%)
, e j] a t h r i d g] g a h] f s; M u h a r] p e p W t d k] n f h H p f h f h L/ n f u s h-673 012.						
l . l . v ! ; M h] t u j h	22.6	200	20.7	4.5	6.7	1.8
l . l . v ! ; M h] k Q p k h	23.2	200	23.0	3.3	4.5	1.7
l . l . v ! ; M h] b u \$ j h	22.4	200	19.0	4.0	6.3	2.4
c a h] k i y M u h a r] p e p i y a k] b g h l] h '] f p – x o p r h-764 039.						
R g] l] g h	16.6	230	20.5	4.4	8.9	1.9
R U r] p	11.6	220	23.5	3.8	10.0	2.0
R u g] p	17.5	225	23.5	4.0	10.2	2.1
R g j h	18.0	210	22.4	3.4	10.4	2.0
b r s u g]	14.0	220	21.7	4.1	4.5	1.3
l h f] l] h] x a; v ! ; g h h] k h] n j h l] l] f, f i y k w] m i t f s d; r w g] k] '] s; Q p k h r] y; g u n j r k] 173 230.						
Q p k f p h p	13.5	230	20.6	6.4	4.3	1.6
n r h y d; f p h p f ' , f h	12	220	21.0	4.5	4.7	1.4
n f u s h n t s h z j i k g y; f i y f] f H f k] j p h p r] N h] n f u s h-680 656.						
M j p u h	21.0	220-240	22.6	3.4	6.8	3.1
f h h] j] j p f h	19.0	220-240	21.6	3.7	7.2	3.2
m ! ; t j p	23.0	220-240	19.7	3.5	7.5	3.3
c j] j u g ' , f h f] p # p t p ! ; t t p j] a h y a h/ g [z p g h h p/ n k w] F t ' , f k] 736 165.						
n k h Q p d p	14	220	21.7	5.3	4.1	1.3

gUt k]

nkWf flwfiug] gFjpfspy; gUt kiH bga:jt[d/ nk khjk] Kjy; thujjpy;
, "]p i a e l t[bra:t J eyy J. j kHphlpy;Vguy;nk (rpj]piu- i t fhrpgl] k] khj 'fspy;
ehghrdk] c s s , l 'fspy; Kd; T l pna mjht J ggjthp , uz]ht J thuk]myy J khh]]
Kjy; thujjpy; e l t[braayhk] nfhi l kiH bga:jt[ndna e l t[brajy; neha, f i s
F i wj] , "]pad; k f R(i y m j p f h f F k]

eyk]j ahhj]y;

nfhi l kiH bga:jt[d; eyj]i j 4 Kjy; 5 Kiw cHt[bra:J g z gLj]i
nt z]k] xU k!l]h]mfyk] 30 br.k! c auk] kwWk]nj i tahd m s t[e'sk] , UfFkhW
ghj]pfs; mikf]f nt z]k] xU ghj]p f F k] , d b d h U ghj]p f F k p i l n a 50 br.k!
, i l b t s p , UfFkhWghh]j] f]b f h s s nt z]k] eh]ghr dg]ga p u h d h y; ghj]p f S f f i l n a
40 br.k! , i l b t s p , UfFkhW m i k f f nt z]k] f p H ' F m G f y; kwWk]E}w g j h f F j y;
c s s , l 'fspy; e l t j w F K d / ghj]p f i s x s p C L U t k] g h y p j j p d; e y g h g h h i t
b f h z] 40 e h l f s ; \ o i t j] R h a x s a h f f k] b r a : j k z ; i z R l h f ; g
gh e ; j i u f f g g L f w J . f L F k w W k] K l j i l n f h ! ; K j y h d f j r p b g n u r p n a F L k j j i j n r h e j
g a p h f s p d ; v r j ' f i s e l t [b r a a k] n g h J k z ; z p y ; , l] c G t J (c a h) g [i f \ l] j y)
n t h] m G f y ; n e h i a f l] g g L j j V J t h F k]

e l t[

t p i j f f h f g] g a d g L j j g g L k] , "] p f] f p H ' F f s / J z] f s ; 2.5 Kjy; 5.0 br.k!
e's K i l a j h f t k] 20 Kjy; 25 fpuhk] v i l a [i l a j h f t k] 1 myy J 2 b k h l] f f S I D k]
n j h e p j L f f nt z]k] , j j i f a t p i j f] f p H ' F f i s n k d n f h b r g] 0.3 r j f] f i u r y p y ; (x U
y p l] h] j z] z h p y ; 3 f p u h k] t j k] 30 e p k p l k] C w i t j j g] g d g [e p H y p y ; 3-4 k z p n e u k] c y h j j p
e l t [b r a a nt z]k] f p H ' F f i s t h p i r f F t h p i r k w W k] b r o f F b r o 20-25 br.k!
, i l b t s p a y ; e l nt z]k] x U b Q f h l U f F 1500 Kjy; 1800 f p n y h t i u a k]
k i y g g F j p f S f F 2000 Kjy; 2500 f p n y h t i u a k] t p i j f f p H ' F f s ; n j i t g g L k]

FHj]j l] e l t K i w b j h H y ; E l g k]

, e j e l t [K i w b j h H y ; E l g k] , "] p a y ; m j p f k] g a d g L j j h t p l] h Y k]
y h g f u k h d j h f f z] w a g g l] s ; s J . , k] K i w a y ; x U b k h l] c s s t p i j f] f p H ' F f s ;
(Rkhh] 5 fpuhk] eyy , "] p e h w W f i s b f h L g g j h f f z] w a g g l] s ; s J . , j d ; k f R (y ;

rhjhu z Kiway; cwɔjɔjɔ braagɔLk] , "ɔpaɔ;kfR[y;ms tɔwF rkkhf c s s J. xU bkhl] , "ɔfɔH'Ffs;FHɔj l] Kiway; cwɔjɔjɔ braagɔl] 30-40 ehlɔf sɔy; tayy; el t[braagɔLfwJ. , k]Kiway;Mnuhfɔkhd kwWk]Fiwej ms t[tɔi j fɔH'Ffns nghJkhd jhy;tɔi j fɔH'Ffwfhd cwɔjɔjɔ bry t[F i wfwJ.

bjhHyElɔk]

- Mnuhfɔkhd tɔi j fɔH'Ff i s njh]t[brajy;
- njh]t[braj tɔi j fɔH'Ff i s nkdnfhbrg](0.3 %) kwWk] **Faɔdhygh!**; (0.075 %) , kɔlhfnshghl] (0.01 %) fiuryy;30 epkl'ɔS fF Cwi t jɔɔ gɔd;ɔh]fhwɔhwl]khd , l jɔy;nrkɔjɔ i t fɔnt z]k]
- tayy;el t[bra;tjwF xU khj jɔwF Kdg[tɔi j fɔH'Ff i s xU bkhl] Rkhh]4-6 fɔuhk]v i l bf h z] jhf eWfɔvL fɔnt z]k]
- edF Ki s tɔl] bkhl]f i s 0.3 rj nkdnfhbrg] fiuryy; 30 epklk] Cwi t jɔɔ gɔd;ɔh]c yhj jɔnt z]k]
- brwɔt{l]gɔl] bjd;i d ehh]f fHɔt[kwWk]k z ɔG cuk](75:25) gaɔh]t sh]ɔ C fɔf s/ o i unfhb l hkh (10] fɔuhk]fɔnyh fy i t) Mfpa i t fyej fy i t i a FHɔj j lɔy;(98 FHɔf s) epugɔnt z]k]
- , "ɔbkhl]f i s FHɔj j lɔy:elnt z]k]
- ku eHyɔy;myyJ eHy;t i yaɔy;i t jɔ FHɔj l]i l ghJ fhfɔnt z]k]
- nj i tahd ms t[j z]z ɔ i u g{thsɔ myyJ b j sɔgɔ[eh]ghrdk] Kiway; msɔfɔnt z]k]
- , k]Kiway; 30-40 ehlɔS fF s; , "ɔ ehwWfs tayy;el t[bra;tjwF jahuhFk]

cukLjy;

eL t jwF Kdg[nj i t fF Vwɔ R z ;z hkɔ] (500-2000 fɔnyh) nrhj jɔ ep y j j i j g z ; braj k z ;z ɔd;mkɔy j j d;i k 5.5-6.5 fF s; , UfFkhW braa nt z]k] eL t jwF Kdg[moaɔkhf k fɔpa bjhG cuk] myyJ f kɔgh! ;] xU bQ fɔh l UfF 20-30 l d f s; t i u ghj]paɔ; k]J J]tɔnah myyJ el tɔdnghJ FHɔaɔnyh , l yhk] el tɔd; nghJ xU bQ fɔh l UfF 2 l d; ntgɔkɔ[z]z hfF , Ljy; fɔH'F mGFjy/ EɔwɔG jhfFj i yf]

Fiwj] k fR(y; m]p f h f f c j t f w J. b t t h t W k h e y ' f S f f h d c u g h e J i u m l] t i z 2 y ; b f h L f f g g l] s s J.

ml] t i z 2. b t t h t W k h e y ' f S f f h d c u g h e J i u

k h e y k]	c u g h e J i u
nfush	b j h G c u k ; (30 l / b Q) j i H / k z p / r h k b y ; r j] (70 : 50 : 50 f p n y h / b Q). r h k b y ; r j] c u j] i j K G t J k] m o a [k h f , l n t z] k] g h j p m s t [j i H k w W k] r h k b y ; r j] i j e l t [b r a j 45 t J e h s y ; , l n t z] k] k i j K s s j i H k w W k] r h k b y ; r j] c u ' f i s e l t [b r a j 90 t J e h s y ; , l n t z] k]
f h p h l f h	b j h G c u k] f h k h g h ! ;] (25 l / b Q) j i H / k z p / r h k b y ; r j] c u ' f s ; 100 : 50 : 50 f p n y h / b Q . e l t [b r a j 30 - 40 t J e h s y ; g h j p a s t [j i H k w W k ; k z p r] j] j u f J o a c u j] i j , l n t z] k] k i j K s s c u ' f i s 60 , 90 , 120 e h l f s y ; x U k h j , i l b t s p a y ; r p t f p j k h a ; g h j j] , l n t z] k]
nk f h y a h	b j h G c u k] (10 l / b Q) j i H / k z p / r h k b y ; r j] K i w n a 60 : 90 : 60 f p n y h / b Q
Xo # h	b j h G c u k] (25 l / b Q) , j i H / k z p / r h k b y ; r j] K i w n a 125 : 100 : 100 f p n y h / b Q . m o a [k h f K G i k a h f k z p r] j] i j a k] g h j p a s t [r h k b y ; r j] i j a k] , l n t z] k] j i H / r h k b y ; r j] i j , u z] , i l b t s p a y ; e l t [b r a j 45 / 90 e h l f s y ; , l n t z] k]
பிகார்	b j h G c u k] (30 l / b Q) , j i H / k z p / r h k b y ; r j] K i w n a 80 : 50 : 50 f p n y h / b Q . m o a [k h f K G i k a h f k z p r] j] i j a k] g h j p a s t [r h k b y ; r j] i j a k] , l n t z] k] j i H / r h k b y ; r j] i j , u z] , i l b t s p a y ; e l t [b r a j 45 / 90 e h l f s y ; , l n t z] k]

k z] t s k h d J k z] t i f / f h y e i y k w W k] n k y h z] i k i a b g h W j] k h w f J o a J . M j d h y ; k z] g h n r h j i d m o g g i l a y ; K f f p a C l] r j] f f s ; g h e J i u f f g g L f d w d . g h e J i u f f g g L k] K f f p a C l] r j] f s d ; m l] t i z - 3 y ; b f h L f f g g l] s s J .

ml] t i z 3: k z ghnrhj i d kwWk]eh]z a]j] k fR[y; mogh i la y; c uggh]e; J i u

C l l r r j J f s p d k z ghnrhj i d m s t [(f pnyh/b Q)		k f R [y , y f F f i s m i l t j w f h d c u g g h] e ; J i u	
		25 l/b Q	30 l/b Q
j i H r] j j p	<150	250	340
	150-250	180	270
	250-400	90	175
	>400	-	50
k z p r j j p (P ₂ O ₅)	<110	55	75
	10-30	35	55
	30-50	15	25
	>50	-	5-10
r h k h y r j j p (K ₂ O)	<110	100	130
	110-300	75	100
	300-500	35	50
	>500	5	15

k z] t s j j p w F V w h c u m s t f i s \ d W m y y J e h d F j l i t a h f (30/ 60/ 90/ kwWk]120 e h l f s p y) r h p t p f p j k h f g h p j j p n k Y u k h f g h p j j p , I n t z L k] E z ; q } l] r j j p F i w g h L s s k z] z p y ; m o a [k h f b Q f h l U f F 6 f p n y h t i u J j j e h f k] (x U b Q f h l U f F 30 f p n y h J j j e h f r y n g l] k w W k] n g h u h f] ! ; 5 f p n y h / b Q t i u k z ; z p y ; n e u o a h f , L j y ; e y y k f R [i y f] b f h L f f p w J . E z ; q } l] r j j p F i w g h L f s ; c s s k z ; z p y ; m j d ; n j i t f i s g [h j j p b r a a / I C A R - I I S R , " x p f f h d E z ; q } l] f y i t i a j a h p j j s s J . m f f y i t i a 5 f p u h k] y p l] h j j z ; z h p y ; f y e ; J , i y t H p b j s p g h j d ; \ y k] 15-25 r j t j j k t i u t p i s r j y ; m j p f h f F k]

epygghh]i t m i k j] y;

, "] p g h j j p f s p y] g R i k , i y f s / m '] f f f] f H p t f s ; b f h z] e p y g h g h h] i t m i k j] y ; k f t [k] , d w p a i k a h j J . V b d d p y / , J k z] m h p k h d j j i j j L g h J l d ; m y y h k y / k z] z p w F m '] f f g] b g h U l f i s n r h j f f p w J . f i s a p d ; t s h j] p i a j] j L f f t [k] k z] z p d ; < u j j d ; i k i a g] g h J f h f f t [k] g a d g L f p d w J .

Kjd;Kiwahf eltdnghJ bQfhIUfF 10-12 ld;gr]ir , iyfif]bfhz] epyghghh]i t mikf]f nt z]k] ikaeuk]f i s e]f]fpa nj 'fha; , iyfs;myyJ bey; itf]fhfhy; 2-3 f]nyh/ghj]p t]jk] epyghghh]i t mikf]f ghpe;J iuf]fghLfwJ. , J f i s a d; tsh]r]p i a bgUkst [F i w f]f]wJ. epyghghh]i t , uz]ht J Kiwahf elt [braj 60 ehl]f S f]Fg]g]wFk] \ d w h t J Kiwahf elt [braj 90 ehl]f S f]Fg]g]wFk] bQfhIUfF 7.5 ld;t]jk]f i s vLj]p cuk]l] t]ld;braa nt z]k]

f i s b a L g g] [k w] [k] k z] m i z g g]

cuk]l] epyghghh]i t mikj]YfF Kdghf/ f i s vLj]y; nt z]k] f i s a d; tsh]r]p i a g] bghWj]p 2 myyJ 3 K i w f i s vL f]f]y h k] e h] n j 'f]p e w]f]h j t h W e y y t o f h y; m i k g g] [f i s V w g] L j] n t z] k]

k z] m i z g g] J f]H'Ffs; b t s p n a b j h p t i j j] j L f]f]t]k] f]H'Ffs; e d F t s u t]k] m t r p a k h F k] K j y; K i w a h f e l t [b r a j 40 e h l] f S f] F g] g] w F k] , u z] h t J K i w a h f 90 e h l] f S f] F g] g] w F k] k z] m i z f]f] n t z] k]

e h] g h r d k]

, "f]p a h d J m j p f k i H b g W k] , l'f]s p y; (5-7 k h j 'f]s; g u t y h f k i H f p i l f]F k] l'f]s p y) k h d h t h p a h f g a p h] g g] L f w J. k i H F i w t h f c s s g F j p f s p y; g h r d t r j p a] d; g a p] b r a a g g] L f w J. , "f]p f]F b g h J t h f 1300-1500 k p. k] t i u j z] z] h] n j i t g g] L k] b k h l] f s; K i s f]F k] g U t k] g f]f] J] h]f]s; t p L k] g U t k] f]H'Ffs; J t f]f] j U z k] (90 e h l] f s) k w] [k] f]H'Ffs; g U f]F k] j U z k] (135 e h l] f s) M f p a i t K f]f]p a k h d f h y f l] 'f]f]s h f e h] g h r d j] j] w F g h p e; J i u f]f]g g] L f w J. e l t [b r a j t] l] d; K j y; g h r d k] c l n d j u n t z] k] m L j] j] L j] g h r d k h d J 7 K j y; 10 e h l] f s p y; j u n t z] k] b r h l] e h] g h r d k] k w] [k] b j s g g] [e h] g h r d k] M f p a g h r d K i w f s; e h] g a d g h l] j p w i d m j p f g g] L j] p t n j h L k f R (i y a k] m j p f h g g] j h f f z] j] w a g g] L f w J.

f y g g] g g] a h] k w] [k] g a p] R H w] p

bghJthf , "f]p k z]z p y; c s s r j] j f i s m j p f m s t p y; c g n a h f j] p t s U k] g a p u h j y h y; b j h l h p e; J g y M z] f S f]F x n u g a p u h f , "f]p i a k l] k] m n j e p y j] p y; r h F g o b r a; t J c f e j j y y. v d n t , "f]p i a k u t s s p f]f]H'F/ n f H] t u F/ b e y / v s / e p y f]f] l i y / k f]f]h r]r h s k] k w] [k] f h a; f w p f S l d; R H w] p g] g a p u h f g a p h] l y h k]

fhphl fhtpy; , " }pahdJ nfH]tuF/ J t i u kwWk] Mk z fF l d; fygg[gauphf
gauphlggLf wJ. nfush kwWk]fhphl fhtpy;k i y j j h j h l] gauphf shd b j d; i d/ghfF/ fhg
kwWk] Mu" R gauphf s p d; C L gauphft[k] , " } gauphlggLf wJ. v d p D k] j f f h s p /
c U i s f p H ' F / k p s f h a / f j j h p f f h a ; k w W k] f l i y gauphf S l d ; , " } gauphL t i j j t p h f f
ghp e ; J i u f f g g L f w J . V b d d p y ; , g g a p h f s : t h l y ; n e a , f f h u z p a h d u h y ; ! n l h d p a h
R n l h b r h y h n d r p a h u k] v D k] g h f p h a h i t j d d f j j h j b f h z l , U f f y h k]

gauph]ghJ fhgg[

neha f s ;

f p H ' F m G F j y ;

, J , " } gauphlggLf wJ. m j p f n r j j i j c z] h f F k] n e h a h F k] , e j n e h a h d J
k z] z p y ; e p i y j j p e w F k] g p j j p a k] i k h p n a h i l y k] (m) g p j j p a k] m g h d p l h h k l] k] n g h d w
g (" } h z j j p d ; j h f F j y h y ; c z] h f w J . b j d n k w F g U t k i H a p d ; n g h J k z] z p y ;
f h z g g L k] m j p f k h d < u g g j j j p d h y ; , e j f] g (" } h z ' f s ; b g U F f p d w d . K i s j j , s k]
J s p h f s ; , e j g] g (" } h z j j p d ; j h f F j Y f F m j p f k h f c l g L f p d w d . K j y p y ; j z l k w W k]
f p H ' F n r U k] f G j j p g] g F j p a y ; m G f y ; V w g l l n k Y k] f i G k h f g] g u t f w J . g h j p f f g g l l
j z p d ; f G j j p g g F j p b k d ; i k a h f t [k] < u k w W k] g G g g [e w k h f t [k] f h z g g L k] , J
f G j j p g g F j p a y ; , U e ; J f p H ' F f F g] g u t p m G f i y t p i s t p f f w J . , j d ; g p d g [n
t h j j h f F j y ; V w g l l n t h p y ; m G f y] k w W k] J h p h w y k] V w g l l k]

, e n e h a p d h y : j h f f g g l l , i y f s ; b t s p w f] f h z g g L k] , i y a p d ; E d p K j y p y ;
k " } s ; e w k h f k h w p g p d g [b k J t h f , i y a p d ; t p s p k] i g n e h f f p g u t f w J . X u k] k " } s h f t [k]
e L t p y ; g r] i r a h f t [k] f h z g g L k] , t] t w F w / n e h a ; j t p u k] m i l a k h g h J / k " } s ; e w k]
b r o a d ; m o g g F j p a y p U e ; J n k y ; n e h f f g g u t M u k g j j p v y y h , i y f i s a k] g h j p f f w J .
n e h a ; K w p a e p i y a y ; , i y f s ; c j p h p ; J j z l f h a M u k g f F k] , e j n e h a h d J
t p i j f s ; \ y k] g u t [t j h y ; t p i j , " } p i a 0.3 r j k] n k d n f h b r g] f i u r y ; (m) 0.125 r j k]
b k l] y h f ! p y] n k d n f h b r g] f i u r y p y ; 30 e p k l k] e i d j j n r k p f f n t z l k] e l t f F
K d g [k] k w W k] 30 k w W k] 60 t J e h l f s p y ; g h j j p i a , f f i u r y ; b f h z l e i d f f n t z l k]
e y y t o f h y ; t r j p a [s s e p y j j i j j] n j h t [b r a ; J n e h a ; j h f f g g l h j t p i j , " } p i a
t p i j f f g] g a d g L j j n t z l k] , e j n e h i a t a y p y ; x U K i w f z] t l n d n a j h f f g g l l
b f h j j p f f i s m f w w p 0.3 r j n k d n f h b r g] m y y J 0.125 r j b k l] y h f ! p y] b k d n f h b r g]

myyJ 0.2 rj fhggh] Mf]pFnshiuL fiuriyg] ghjpf]fgghl] ghj]p kwWk]
mi jrRwWp[s;s ghj]pfsYk]edwhf CwWp , enehi ag]guthJ jLf]fnt z Lk]

nkYk] tpij]f] fH';i f ngrpyy!; mknyhyf]tngpad;!; vDk] g["rh z fbfhyyp
ghfPhah bfhz L eltfF Kd; Kf]fak] elt[braj 30 / 60 ehlfspy; ghj]pay;
eidghjd;\ yKk], enehi aedF fl]ghLj]yhk]

Rfhjhukhd tpij]f] fH'Ffis oiunfhlhkh Qhh]pahdk] vdW caph]
bfhyypgh["rh z j]i j ntghk]g[z]zhfFld;nrh]j]p ghj]pF xU fnyh , Ltjhy;neha;
guthJ jLf]fyhk]

ghfPhah thlyneha;

, enehahdJ uhy;! nldpah R[nlhrhyndrpahuk] vdW ghfPhah jhfFjyhy;
c z]hfwJ. , J bjdnpkwF gUt kiHapdngH njhdWk] , J kz]kwWk]tpij\yk]
gut[k]nehahFk] , enehad;mwFwfs;j z bd;fGj]p]g]gFjpay;eh]fhhl]j] g[s]sfshaj]
njhdWp nkYk] f'Gkhf gogghoahf gutf]fwJ. Kjyyp; f'HghFjpay; c s s , iyfs;
bjh'f]ftLk] , iyad; tpskgh] gFj]p RUsj] bjhl'f]p nky; nehff]fg] gutf]fwJ.
f'HghFjpay; c s s , iyfs; k"]s; ewkhfg] gogghoahf nky; gFj]pYs s
, iyfSfFg] gutf]fwJ. neha; KwWp epiyay; brofs; mjpf k"]s; ewj]pYk]
thLjYf]fhd mwFwfs S lDk]fh z ghLk]

jhf]fgghl] j z Lfs py; th!Fyhh] jRf]fs; fUik ewKs s nfhLfis
fh z gpfFk] ghjpf]fgghl] j z LghFj]p ia mGj]pnah myyJ bjspej ehpy; itj]jh
ghh]j]hy;ghy;nghdw jputk]frpa MukghfFk] fH'Fk]mGfptLk]

bkJ mGfy;nehi a]fl]ghLj] ghpe;J iuf]fgghl] nkW]Twp a guhkhgh[K iwfis
, jwFk] gadgLj]yhk] neha; jhf]fhj tpij]f] fH'Ffis eltfFj] njh]bjLf]f
nt z Lk] tUlenjhWk] mnj taypy; , "j]p gaphLt i j j tph]f]f nt z Lk] cUisf]
fH'F kwWk] gpw brhnyndrna FLkgh]j]i jr] nrh]j] gaph]fs; c s s taypy; , "j]p
gaphLt i j j tph]f]f nt z Lk] taypy; neha; bjdgl]tld; neha; c s s tpij]
fH'Ffis mfw]vnt z Lk]kwWk]0.2 rj fhggh]Mf]! pFnshiuL myyJ 3.0 rj fhypak]
FnshiuL kUe;ij vyhghj]pfsYk]edF eida[k]go CwWp nt z Lk] neha;thagghl]
tpij]f]fH'Ffis c lnd taypy; , Ue;J mgh]vghLj]p vhp]j]p tplnt z Lk]

m'ff ntshz;ikaŋy/ tɪj fɪH';i f ngrɔyy !; i y f f d g h h k !; (n g r ɔ y f) v D k]
ghfDhpay;f i u r y y ;e L k] K d ; K f f a k] e l] g d ; 30/ 60/ 90 e h l] f s y ; g h j] p a y ; e i d g g j d ;
\ y K k] , e n e h i a e d F f l] g g L j] y h k] , e n e h i a c z ; l h f F k] g h f D h a k] k z ; z p n y n a
, U f F k] v d g j h y ; e l t f F K d ; N h a x s a h f f j] p d ; \ y k] k z ; i z N l h f F j y ; n e h a p d ;
j h f f j] i j F i w f f V J t h F k]

, i y g g f s p n e h a ;

, e j n e h a h d J g p y n y h ! p f] h \$ d r p b g h v d w g (") h z j] p d ; j h f F j y h y ;
, i y f s y ; \$ ^ i y K j y ; m f h l h g h] t i u b j d g L k] K j y y ; , i y f s y ; e h] n f h h j] j
g [s ; s p f s h f k h W f w J . , j i d r] R w p g G g b [e w t p s k b] f s ; n j h d w p , W j p a y ; , i y f s ;
f h a e ; J t p L k] , e j n e h a h d J k i H j] s p f s ; r p j W t j h y ; g u t f w J . R h a x s p n e u o a h f g
g L k] b r o f s y ; j h f F j y ; m j p f k h f j] b j d g L k]

n e h i a f l] g g L j] 1.0 r j n g h h h l h f y i t m y y J 0.2 r j n k d n f h b r g] k U e ; J
b f h z] b j s p f f n t z] k] , i y f s p d ; m o g g F j p a Y k] g L k h W f t d k h f k U e ; i j b j s p f f
n t z] k]

, i y j] a y ; n e h a ;

, e j n e h a h d J v ! n u h Q p y k] n u h ! ; j h l h v d w g (") h z j] p d ; j h f F j y h y ;
t U f w J . M u k b j] p y ; , i y f s y ; r p t g g [g G g b [t z ; z e h] n f h h j] j g [s ; s p f s h f t U t w J .
g d ; d h] , j i d r] R w p k " r s ; x s p t l] k] n j h d w p , W j p a y ; , i y f s ; f h a e ; J t p L k] n e h a ;
K w p a e p i y a y ; K G , i y f S k] j a p l] J n g h d W n j h w p k s p f F k]

n e h i a f l] g g L j] t p i j n e h j] p k w W k] \ d W K i w , i y t H p C l] k h f
b l g h f h d b r h y ; (0.1 %) k U e ; i j 15 e h l] f s ; , i l b t s p a y ; m s p f f y h k] m y y J k h w W
t H a h f b l g h f h d b r h y ; (0.1 %) g d ; d h] f h h p g z ; r p k] n k d n f h b r g] (0.2 %) k U e ; i j 15
e h l] f s ; , i l b t s p a y ; m s g g J n e h i a r p w e j K i w a y ; f l] g g L j] J t j h f
f z ; l w a g g l] s s J .

E w b G f f s ;

n t h] K o r R g b G (b k n y h a n l h i f d) / g w f F k] E w b G (n u n l h n g h y ! ; r p k p y !) k w W k]
n t h] g G g b [E w b G (g l h o b y d f !) n g h d w i t , ") p i a j] j h f f p n r j h u k] t p i s t p f F k]
K f f p a k h d E w b G f f s h F k] , i t j h f F t j h y ; b r o f s / t s h r] p F d w a k] , i y f s ;

k" }s;ewkile;Jk] Fiwthd bfhj]pffis cila jhft[k]fhz gblK]nt iug]gpl'fpg] ghnrhj]j]hy; nth] KorRfSk] neha; KwWma epiyay; nth] mGfYk] bjdgLk] jhf]f gbl] fH'Ffspd;btsgblw]j]pRf]fspy;gGgb[epwKs;s eh]nfhh]j] gFj]f i s f] fhz yhk] E)wblGf]fspd;jhfFjy,fH'FmGfy;nehia mjpfgblj]pfpwJ.

neha;jhf]f gbl] fH'Ff i sr]RLehpy;(50° bryrpa!) 10 epkl'f s; i t gbljhYk] E)wblGf]fshy;jhf]f gblhj tpij]f fH'Ff i s cgnahf gbljhYk]eLk]Kd]ghj]pfi s 40 eh]f S fF Rha xsaahfFtjhYk] ,ej nehia flLgblj]j yhk] E)wblGf]fspd; v z]z p]f i f mjpKs;s , l'fspy; neha;vjphbl]j d;i k bfhz]l l.l.v! .Mh]k Qpkh ,ufj]i j ga phlyhk] bghnrhdpah fspkplh! nghhhpah vdW E z]q a ph]bfhyypia el t[braa[Kd; , " }p t a y y ; 20 fphk]ghj]p t j k] , L t J k]ghpe;J i u f f g b l f p w J .

g(r)f s;

j z] J i s g b h d ; (n f h d h f / j ! ; g ' p b g u h y / !)

, J , " }p a y ; m j p f k] n r j h u j] i j c z] l h f F k] g (r) p a h F k] g G f] f s ; j z] i l j] J i s j] m j d ; c s n s c s s j p R f] f i s c z] p d w d . , j d h y ; j h f] f g b l] j z] d] , i y f s ; k " } s ; e w k i l e ; J f h a e ; J t p L f p d w d . j z] p y ; f h z g b l K] g G J i s j] X l] i l a k] m j d ; f H p t g] b g h U l] f S k] k " } s ; e w K i l a e y e j e L j] j z] k] , e j g] g (r) j] j h f F j y p d ; j d j] j d ; i k t h a e j m w F w f s h F k] t s h } p a w w m e j g b (r) p 20 k . k ' m s t [s s , w f : i f i a f] b f h z] J . , j d ; , w f] i f f s ; k p f r] p w a f W g b b] g [s , s f S i l a M u " R f y e j k " } s ; e w K i l a i t . e d F t s h e j g G f] f s ; m l h] j] p a w w K o f s ; b f h z] n y r h d g G g b [e p w K i l a d . , e j g b (r) f s p d ; v z] z p] f i f t a y y ; \$ ^ d] K j y] m f] l h g h] t i u m j p f k h f f] f h z g b l K]

, e j g (r) f i s f] f l L g b l j] , \$ ^ i y - M f ! ;] (15 e h l] f s ; , i l b t s p a y) k h j ' f s p y ; g] p a j h f j] j h f] f g b l] j z] f i s f] f t h j] p b r a ; J m f w w a k] f h s h u h d ; l j d y p g j h y ; (m) g] ~ b g d ; l a i k l] (m) ! ; i g n d h n r l] k U e j i j (0.5 k p y] p / y p l] h) e l t [b r a j 45 e h l] f s] K j y] 15 e h l] f s ; , i l b t s p a y] b j s p g b i j j] b j h l ' f n t z L k] .

fH'F brjy;g(r) (m! goyyh Qhhp)

, e j b r j y ; g (r) p a h d J f H ' F f i s t a y p Y k] k w W k] t p i j n r k g b d ; n g h J k] j h f F f p w J . t s h } p a i l e j j h a g b (r) p a h d J t l] t o t k] (V w j] j h H 1 k p . k ' t p l] k] c i l a

gGgb[K j y; rhkby; epwk] bfhz] i t f s h F k] , i t f s; f p H' F f s p y; j p l] n g h d W
 n j h w j k s p f F k] n k Y k] m i t r h i w c w p " j p c l p f h s; f p d w d. f p H' F f s; m j p f k h f
 j h f j f g b l] h y; m i t R U ' j p < u g b j j i j , H e j t p L f p d w d. M j y h y; K i s f F k] j w d;
 g h j p f f g b L f w J. t p i j f] f p H' F f i s e L t j w F K d g k] n r k p g b j w F K d g k] F a p d h y g h ! ;
 (3 k p y j p / y p l] h) k U e j p y; 20 e p k p l ' j f s; e i d j j p g] g a d g L j j t j h y; , e j g (r) p f s p d;
 j h f F j i y f] f l] g b L j j y h k] m j p f k h f j] j h f j f g b l] f p H' F f i s n r k p g b j w F K d g h n t
 m f w j p t p l n t z j k] n e h j j p b r a j t p i j f] f p H' F f s; k u j j p s; (m) v l p k u , i y f s p y;
 (! p i u f j h d h ! ; e f j ! n t h k p f h) (f h a e j J) n r k p j j p i t f j f g h e j i u f j f g b L f w J.

, j u g (r) p f s;

, i y R U l] g j g F j f s; (c / h ! p g ! ; n g h @ y !)

, i t , i y f i s b t l p R U l p f] b f h z j c s n s n a , U e j r h w j i w c w p " R f p d w d.
 t s h j j p a i l e j g (r) p f s; e L j j u c U t k] b f h z j t z j z j j p g] g (r) p f s h F k] m i t f s p d;
 , w f j i f f s; b t s; i s g] g s s p f s; b f z j g G g b] f y e j f W g b] e w K i l a d. g G f j f s; m j p f
 g r j i r e w j j l d; f h z g b L k] , e j g (r) p f i s f] f l] g b L j j , \$ ^ i y - M f ! ; j (15 e h l j f s;
 , i l b t s p a y) k h j ' j f s p y; g j p a j h f j] j h f j f g b l] j z j f i s f] f t h j j p b r a j m f w j p a k]
 f j s h u h d ; j d p y g j h y; (m) g j ~ b g d ; l a i k l] (m) ! ; i g n d h n r l] k U e j i j (0.5 k p y j p / y p l] h)
 e l t [b r a j 45 e h l j f s] K j y j 15 e h l j f s; , i l b t s p a y] b j s g b i j j b j h l ' f n t z j k].

n t h] t z L g b G (n Q h n y h o i u f p a h)

v g b g h G j h t J b k d; i k a h d f p H' F f s / n t h j f s; k w j W k] j z p d; m o g b F j p f i s j] j h f j p
 k " j s; e w k i l a r] b r a f p d w d; n k Y k] j z j f s; t h L f p d w d. , e j g j g (r) p f i s 0.075 r j
 F n s h n u h i g h g h ! ; k U e; i j k z j z p y; e i d j j p f l] g b L j j y h k]

, a w j i f n t s h z j i k

, a w j i f t p t r h a j j p d; n f h l g h L f s; k w j W k] b r a y; K i w f i s g] g p d g w j p , " j p r h F g o
 b r a t j w j f h d t H p K i w f s; j a h h p f j f g b l] s s d. , e j t H p K i w f i s t p t r h a p f s; r u h f
 f i l g b j o j j h y; e t p d t p t r h a j j p y; f p i l f j f T o a m n j m s t [k f R (y) r p y t U l ' j f S f F s;
 f p i l g b j p y y h k y; k z j t s k] m j p f h f F k] k w j W k] R w j W g b j W R (H y; r k e p i y a k]
 g h J f h f j f g b L f w J.

khWk] j j l] k]

rhdwsgg[,aw]i f tH , " } cwjj]ffhf/ gauphdJ Fiwejj 18 khj'f s;
 ,aw]i f tptrha Kiway;guhkhff]gg]bUff nt z Lk] mjhtJ , " }pad; ,uz]htJ
 gapiu ,aw]i f Kiway;cwjj]pahff]ajhf brhyyyhk]jwhghJs; njhl]j]i j flej
 rpy tUl'fshf ,urhad cuk]kw]Wk]g(r)]f]bfhyyp kUe; bj sff]fhky;tptrhak]bra;J
 tejjUejhy; ,ej khWk]fhyj]i j (conversion period) jshj] Koak] ,jw]fhf rhahd
 gjntLf isg]guhkhjj rhdwsgg[eWtdj]j fF rkhhff] nt z Lk] njhl]j]j d; xU
 gFjia ,aw]i f tptrhaj]pwF khwW jilaay;iy vdwYk]Tl njhl]j]j d; vyyh
 gFjpf isa[k] ,aw]i f tptrhaj]pwF khwWtJ kft[k]edW.

, " }ia fygg[gauphf bjd;i d/ ghfF/ kh/ ugg]nghdw njhl]'f spy; rhFgo
 braa[k]hghJ gz]i z f] fHt[f s; kw]Wk] gah]fHt[f is gadgLj]p fk]gh!;]
 cz]hfFtjd; \yk]kW RHw]p braayhk] ,jdhy;kz]tsj]i j edF eiy eWj]j
 ,aYk]

,aw]i f tptrha Kiway;guhkhff]gg]Lk] njhl]j]i jr]Rw]p gah] tpyF gFj
 Vw]Lj]p khRgLtjpyUe;J jth]ff nt z Lk] ,ejg]gah] tpyF gFjpaayUe;J fiilfFk]
 tpi sbghUl]f s; ,aw]i f tptrha Kiway;cwjj]p brajJ myy. rhthd gFjfsy;
 gf]jj] njhl]j]j pyUe;J eh]toahkYk] kUe;J bj sffFk]nghJ fhwy;mojj] tuhkYk]
 ,Uff Kd]pdr]hpf]i f eltofi ffs:nkw]bfhs; nt z Lk] ghj]f s d; , ilbt sapy;
 khwW FHf s; cz]hf]p kz]mhgg[kw]Wk]eh] tojiyf] Fiwff nt z Lk] jhH]thd
 gFjfsy; jz]z'h] nj'fhJ ,Uff MHkhd tofhy; tha,f]hy; mikjj] bfhLff
 nt z Lk]

guhkhgg]braK i w f s;

eypj]d;jd;i k kw]Wk]r'njh# z eiy ia bghUjj eyy kFR[y;juf]Toa kw]Wk]
 g(r)]/ neha,f s;kw]Wk]E]w]Gf]f S fF vjphgg]j]jwd;myyJ jh'f]p tsUk]j]wd;bhz]
 uf'f]i s njh]bjLff nt z Lk]

,jj]ifa ,uf'f s;guhkh]hakhf gah]l] tUk] ,aw]i f Kiway; cwjj]p
 brajjhf ,UggJ edW. gah]fHt[f s; kw]Wk] gz]i z f] fHt[f isg] (gRejhH]
 gah]fHt[f s; Kjypad) gadgLj]p fk]gh!;] kz]G cuk] cz]hfFtjd; \ykhf
 kWRHw]p bra;J/ kz]z d; tsj]i j mj]f s tpy;eiy eWj]j ,aYk] braw]i f Kiway;
 cwjj]p braj ,urhad cu'f s/ g(r)]f] bfhyypf s; kw]Wk] g("]hz f]bfhyypf is
 cgnahf]f]f] TlhJ. bQ fh]lUfF 25 Kjy;30 ld,f s;bjhG cujj]ld/ 4 ld;kz]G

cuk] ,LtnjhL 12-15 ld; gRejhiH epyghghh]i tahf 45 ehlf s; , ilbtspay;
 , lntzlk] , jDld; xU bQ fhIUfF 2 ld; ntggbk[z]zhfF/ 5 ld; kffpa ehfhHt[
 kwWk] gah] nth] Ez]q agh] tsh]r]pa(f]fahd mn!h!; ighyk] kwWk] kzpr]j]i j
 fiuf]fToa ghfPhah nrhghjhy; kz]zpd; tsk] TLtnjhL kfr(Yk] mjpfhgghjhf
 fz]waggh]l-sJ. ngryy!; mknyhyf]tngpad;!; (GRB35) vdw gah] nth]
 Ez]q agh]tsh]r]pa(f]fahdJ , "rpad; tsh]r]pia mjpfhgghnjhL kfr(iyak]
 Tl]tjhffz]waggh]l-sJ. kz]ghnrhj idad; moggh]lay; Rz]zhkb[/nlhyikl]
 uhfgh!; ng]kwWk]kur]hkh]iy kz]zpy; , l]kz]zpwF nj i tahd kzpr]j]J kwWk]
 rhkby; rj]pid <Lbraayhk] rwpjst[nj i tggLk] Ez;q}l; \yf'f s; Fiwthf
 , Ue;J mj dhy; kfr(y; Fiwak] vdwwhy; rhdwpjy; eWtdj]pd; ghpe;J iuggho , iytH
 Cl]khf IISR , "r Ez;q}l]f]fy i tia 5 fuhk]ypl]h] t]jkel t[braj 60 kwWk]90
 ehsp;bj spff]ykh]

capudg]g(r]f]bfhyypf s/ cHtpay;kwWk]gah]Rfhjhuk]nghdw i t f s; , aw]i f
 ntshz]i kay;g(r]p kwWk]neha;eh]thf j]pd; Kffpa jpl] 'fshFk] jz]J i sgghid
 fl]gghLj] / xU'f]p i z ej gah]ghJfhgh[Kiwfshd fthj]J brajy; kwWk]g]pajhf
 jhf]fgh] jz]f i s mfwy mHj]jy; nghdw i t f i s \$^i y-Mf!;] khj 'f s y; (15
 ehlf s; , ilbtspay) braayhk] nkYk] 0.5 rj e'khfhyL myyJ 0.5 rj ntkg[
 vzbz ia brg]kgh]mfhlhgh]khj 'f s y; (21 ehlf s; , ilbtspay) bj spff]ykh]

fH'F mGfy; nehiaf] fl]gghLj] / Mnuhf]fakhd tpij] fH'F f i s
 njhbjLj]y/ kz]i z R(hpa btggh]pd; \yk] \l]k] brajy; capudf] fl]gghl]
 fhu z pfshd oiunfhblh]kh/ gah] nth] Ez]q agh] tsh]r]pa(f]f (m) R(nlhnkhdh!;
 Mfpatw]iw , z f]fkhdbghUl]fshd kffpa kuf]TH] kffpa bjhGcuk]myyJ ntggbk]
 g[z]zhfFbfhz]lgz]kl'f]hf]p kz]zpy; , Ljy/ tpij neh]j]p brajy; nghdw bray;
 Kiwfis eLk] nghJk] kwWk] ruhda , ilbtspay; bra;Jk] kft[k] mtrpak]
 , iyf s y; njhdWk] neha;fid fl]gghLj] / rhdwpjH] eh]thf ghpe;J iuggho xU rj
 ngghh]h fyit ia nj i tgg]l]hy; bj spff] ntzlk] mjhtJ xU tUl]j]pwF xU
 bQ fhIUfF 8 fnyh t i u jhkuk]mDk]f]fghLfwJ. eyy jukhd ntggbk]g[z]zhf]i f
 bghr]rhdah fshkplh! ngghah vdw capud Ez]q agh] bfhyypf s; nrh]j] , l]
 E)w]Gf]f i s f]fl]gghLj] ykh]

rhdwsgh[

rhdwjH] kwWk] bgahly; bray,fi s j d dhl] pahik bfhz] m'f f h f f g b l] eWt d 'f s; bra,fdwd. rWghd;ik kwWk] FWe y t p rha f S f F c j t k] t i f a y; , e j a m u r h 'f k] A P E D A m 'f f h u k] b g w y r h d w s g b [e W t d 'f i s e W t p , a w] i f n t s h z] i k b g h U l] f s p d; c w b j j] p f F r h d w j H] f s; b f h L f f p d w d. r h d w s g b [e W t d 'f s h y; e a k p f f g b l] f z f h z g b h s h f s / g u h k h g b [g j p n t L f s; k w W k] x G 'f h d n e u o f z f h z g b [\ y k] g z] i z a p d; n t i y g b h L f i s f z f h z p f f p d w d h]

rhjhu z K i w k w W k] , a w] i f t p r h a K i w a y; g a h] f i s r h F g o b r a a k] n g h J / r h d w j H] b g W t j w f h f n j h l] j j] p y; e l f F k] v y y h b r a y, f i s a k] g j p t [b r a a n t z L k] x n u K i w a y; c w b j j] p b r a a k] c w b j j] p a h s h f s; k w W k] g j g b L j] p n t h h f S i l a F G t w F F G r h d w s g b [j p l] 'f S k] c s s d.

mWt i l

, "f p a h d J e l t [b r a j 200-240 e h l] f s p y; m W t i l f F j a h u h f w J. f h a, f w f f h f g a d g L j] g b L k] , "f p f F e l t [b r a j 180 e h s, f s p y; n j i t f h f w b m W t i l b r a a g b L f w J. t p i j f f p H 'F f f h f g a d g L j] g L k] , "f p K G t J k] K w y a g d n g m W t i l b r a a g b L f w J. m j h t J , i y f s; k "f s; e w k h f k h w f h a M u k b j j] t l d; e h] g h r d j] i j m W t i l f F x U k h j j] p w F K d n g e p W j] p t p] g h e; J i u f f g b L f w J. k z p t l p m y y J K s, f i t f i s f] b f h z L f p H 'F f s; n r j k i l a h j t h W k z] i z f p s w , "f p n j h z p v L f f g b L f w J. b g h a m s t p y; r h F g o b r a j t a y, f s p y; o u h f] l h] (m) g t h] o y y h] \ y k] m W t i l b r a a g h e; J i u f f g b L f w J. , j j] i f a f p H 'F f s p y; c y h e; j , i y f s / n t h f s; k w W k] x l p a [s s k z] i z g h p j] b j L f f n t z L k] , "f p k z] q f F m o a y; m n j j u j] p l d; , U g b j h y; r p y k h j 'f s; j h k j k h f m W t i l b r a t J x U r p y , l 'f s p y; g p d g w y g b L f w J. , e j p a h t p d; g r] i r , "f p a d; g a d g h L m j p f k h f c s s J. b t S f f g b l] m y y J b t S f f g b l h j c y h] , "f p a h d J m j p f k] V w W k] p b r a a g b L f w J. g j g b L j] Y f F , "f p a d; e h h] j] d; i k / f h u j] d; i k k w W k] v z p z a; m s t [M f a i t m o g b i l f h u z p f s h f c s s d. , e j \ d W K f f p a f h u z p f s p d; m s t [f i s g] b g h W j] p m i t c f e j , W j p g a d g h l] f F n j h t [b r a a g b L f w J.

bt t h t W e i y f s y; m W t i l b r a a g b l] , "f p a d; , W j p g a d g h L

, W j p g a d g h L

**m W t i l e i y f s;
(e l t f F g b d; k h j 'f s y)**

fha,fwəhf kwWk] gjdgǵLjǵjy/ , "ǵp Kwgǵh/ Fshǵhd'ǵs/ CWfha; kwWk] kǵghd'ǵs;	5-6
Rfǵ kwWk] , "ǵp v z ǵ z a/ xyǵnahburǵd/ c yhǵj kwWk]bt S fǵgǵlǵ , "ǵp	7-8

gǵgǵLjǵjy;

, "ǵp gǵgǵLjǵjy; , U eǵi y f sǵy; e i l bgWfǵwJ. mǵht J nky;nǵhy;Ru z ǵjy;
kwWk]bt aǵyǵy; c yhǵjǵjy;(nǵ i t ahd m s t<ugǵjǵjǵ i j b f h z ǵUǵjǵy).

nǵhy]Ru z ǵjy]

, "ǵp i a c yhǵjǵj t jwǵ vsǵjhf mǵd;nky;brǵjǵi y (vgǵblhǵǵ!) eǵfǵf n t z ǵk]
edwǵh Kwǵǵa , "ǵp i a Rǵjǵk]braǵj gǵwǵf fǵH'ǵf f i sǵjǵj zǵz ǵhǵyǵUeǵj b t sǵna vLǵjǵj/
mǵd;nky;nǵh i y fǵ]Thǵi ka h d \ 'ǵfǵy;Frǵǵf i s fǵ]b f h z ǵ m f wǵy n t z ǵk] v z ǵ z aǵr]
Ruǵǵf s;nǵh Yǵfǵo aǵy; , Uǵǵjǵhy; MǵHk h f c hǵǵǵ i jǵjǵj t ǵhǵfǵf n t z ǵk] nǵhy; eǵfǵf ǵa
fǵH'ǵf f i s f G tǵ/ Rǵhǵa x sǵaǵy; xU t h u k] rǵu h f c y hǵjǵj n t z ǵk] , eǵj c y hǵj
 , "ǵp a h d J mǵd; eWk z k]R i t kwWk]f h u jǵj d; i k i a b g h W jǵj k jǵǵǵlǵǵL fǵwJ.

, eǵjǵa h tǵy; c wǵǵjǵjǵ bra aǵǵLk] , "ǵp a h d J \$ i k fǵf h tǵd; , "ǵp a l d; xǵǵǵLk] b g h G J
f u L K u l h f n j h Y hǵfǵfǵǵL fǵwJ. b g h J t h f , "ǵp a h d J j lǵi l a h d g fǵf'ǵf sǵy; k lǵk]
b rǵjǵy; c hǵfǵfǵǵlǵ , L fǵf f sǵy; nǵhy; eǵfǵfǵǵl h k y; c y hǵjǵjǵǵL fǵwJ. , kǵK i w a y;
n f u s h tǵy; b g U kǵǵh d; i k a h d , "ǵp n j h Y hǵfǵfǵǵL fǵwJ.

fha i tǵjǵy;

grǵi r , "ǵp a d;<ugǵjǵk h d J m W t i l b r a a k] n g h J c s s 80-82 r j k]<ugǵjǵk]10
r j jǵjǵwǵf F i w fǵfǵǵlǵ n r kǵfǵfǵǵL rǵwJ. b g h J t h f , "ǵp a h d J Rǵhǵa x sǵaǵy;8-10 e h lǵf s;
t i u c y hǵjǵjǵǵL fǵwJ. Rǵhǵa x sǵaǵy; c y hǵjǵjǵǵlǵ , "ǵp a h d J n k wǵǵǵy; R U fǵf k]
tǵGe j j h f tǵk]x G 'ǵf wǵ t o t jǵjǵI D k] g Gǵǵ[t zǵz jǵjǵy; , U fǵf k] f h y e i y k zǵj y k]
kwWk] , u f 'ǵf i s gǵ]b g h W jǵj g rǵi r , "ǵp a yǵUeǵj 19-25 r j c y hǵ] k f R{y;f i l fǵf k]

b k U T IǵyǵR jǵjǵf h jǵj y;kwWk]k jǵǵǵL j y;

fhaej brjiiy efFtjwFk] kwWk] xG'fwW RUfFk] tGந்த fodkhd
 nkwbugby; , "Jp nja,fFgblfWJ. ifKiwahf nkwbugby; c s s k z] kwWk] J}Rfs:
 Rj]pfhfFgblfWJ. Rj]pfhj] g d dh] ewk] m s t [kwWk] v " Jpa R z] z h k] d ; m s t [
 (b t S f f g b l p U e j h y) b g h W j] , " J p a d ; k j p g b l g b l f W J .

nrkjj y;

c y h e j , " J p i a r h f F g j i g f s p y ; n r k j j h y ; g (r) p (r p f u l] t z]) (n y r p n a h b l h k h
 b r h p f h f h n d) j h f F j i y m j p f g b l j] k] v d n t K w W Y k] f h a e j , " J p i a f h w W
 g [f K o a h j g h y p] d ; i g f s ; m y y J m i j n g h d w n t W b f h s , f y d f s p y ; n r k j j i t f f y h k]
 , u z] t U l ' f S f F n k y h f e z] e h s ; n r k g b J m j d ; e W k z k] R i t k w W k]
 f h u j] d ; i k i a F i w f f W J .

bt S f f g b l] , " J p

g r] i r , " J p i a R z] z h k] [f y i t a p y ; (1 f p n y h R z] z h k] p W F / 120 f p n y h j z] z h)
 t j k] e i d f f n t z] k] g d d h] m i j b t a p y y ; c y h j j n t z] k] , " J p a d ; n k Y s s < u k]
 f h a e j g d d h] k z] k] , " J p i a R z] z h k] [f y i t a p y ; e i d f f n t z] k] , " J p K G t J k]
 b t z] i k e w j] p f F t U k] t i u j p U k] j j p U k] , i j r] b r a a n t z] k] c y h e j
 , " J p i a a k] , k K i w a p y ; b t S f f y h k] R z] z h k] p y ; e i d j j , " J p a h d J g h h g b j w F
 e y y n j h w] j] D k] g (r) p b j h w W j y ; , y y h k y ; n r k j j i t f f t k] b j h i y J u
 n j r ' f S f F b f h z] b r y y t k] g a d g l f W J .